Strengthening DRM capacity under COVID-19 pandemic in cyclone/flood-prone area

Draft Final Report

Strengthening DRM capacity under COVID-19 pandemic in cyclone/flood-prone area
Progress Report

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Table of contents

List of figures

List of tables

List of maps

List of abbreviations

AAY	Antyodaya Anna Yojana
ADKAR	Awareness, Desire, Knowledge, Ability and Reinforcement
APL	Above Poverty Line
ASHA	Accredited Social Health Activist
BDO	Block Development Officer
BPL	Below Poverty Line
BRC	Block Resource Centre
CBDRM	Community Based Disaster Risk Management
CBOs	Community Based Organizations
CHC	Community Health Centre
CRC	Cluster Resource Centre
DDMA	District Disaster Management Authority
DEOC	District Emergency Operation Centre
Dept.	Department
DLNA	Damage, Loss and Need Assessment
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
FGD	Focussed Group Discussion
GP	Gram Panchayat
HH	Household
HRVA	Hazard Risk Vulnerability Analysis
IAG	Inter-Agency Group
IEC	Information, Education and Communication
JICA	Japan International Cooperation Agency
KISS	Kalinga Institute of Social Sciences
MSME	Micro, Small, and Medium Enterprises
MPCS	Multi-Purpose Cyclone Shelter
NATECH	Natural hazards triggering technological disasters
NCRMP	National Cyclone Risk Mitigation Project
NDRF	National Disaster Response Force
NGOs	Non-Governmental Organizations
OBC	Other Backward Classes
ODRAF	Odisha Disaster Rapid Action Force
OSDMA	Odisha State Disaster Management Authority
PHC	Primary Health Centre
PRA	Participatory Rural Appraisal
PRI	Panchayati Raj Institutions
QRE	Quick Risk Estimation
RCC	Reinforced Cement Concrete
RIKA	Resilience Innovation Knowledge Academy
SC	Scheduled Castes
SDG	Sustainable Development Goals
SDMC	School Disaster Management Committee
SDMP	School Disaster Management Plan
SEBC	Socially and Educationally Backward Communities
SEOC	State Emergency Operation Centre
SFDRR	Sendai Framework for Disaster Risk Reduction

SOP	Standard Operating Procedures
SRC	Special Relief Commissioner
ST	Scheduled Tribes
TMC	Temporary Medical Centres
ULB	Urban Local Bodies
UNDRR	United Nations Office for Disaster Risk Reduction
WHO	World Health Organization

A. Introduction

The Indian coastal state of Odisha is highly prone to disasters due to its specific geo-climatic condition that makes the state vulnerable to frequent floods, cyclones, epidemics, drought, and heatwaves (Annexures 1-4). Its location on the east coast of India makes it one of the six most cyclone-prone areas in the world along with being the most vulnerable in terms of cyclone landfall. In the last century, out of 1019 cyclonic disturbances in the Indian subcontinent, 890 were along the eastern coast, and of these, 260 cyclonic disturbances had their landfall along the Odisha coast[1]. The ten major river systems in Odisha including many perennial rivers such as Mahanadi, Baitarani, Birupa, Rushikulya, Budhabalanga, Brahmani, and Subarnarekha, and their tributaries make the region vulnerable to floods. It is the fifth most flood-prone state in the country. Its vulnerability to flash floods, landslides, earthquakes, and tsunami is also high.

The coastal districts of the state including Kendrapara, Jagatsinghpur, Puri, Bhadrak, and Balasore are some of the most vulnerable districts that frequently get affected due to floods and cyclones year after year. Out of the total area of the state, about 21 percent (3.34 million hectares) is considered as a flood-prone area and 75 percent of this spread across the coastal districts of the state[2]. Besides the exposure to various natural, human, and climate-induced hazards, the state, with 50 percent of its population living below the poverty line, is among the poorest and least developed states in India. This level of poverty has further aggravated the population's vulnerability to disasters, in particular for those living in high-risk coastal areas[3].

The state of Odisha is among the pioneer Indian states to have in place a dedicated and robust mechanism for the management of disasters and has won global accolades for its preparedness, response, and management of some of the recent cyclones such as 2013 Cyclone Phailin and 2019 Cyclone Fani. However, the management of Super cyclone Amphan amidst COVID-19 in Odisha has highlighted a critical gap of inadequate considerations and integration of biological hazards in the Disaster Risk Management (DRM) policy, plans, and strategies, especially at the lowest levels of administration. The complex risks posed by Amphan and COVID-19 brought forth new challenges for the provincial and local government and community. Among others, these include:

- Convincing the population-at-risk to move to shelters amidst fears of transmission of COVID-19 infection;
- Ensuring adequate COVID-19 safety measures during mass evacuation and search & rescue operation;
- Optimum use of PPEs by response forces so that COVID-19 protocols are followed without undermining the efficiency and speed of the rescue operations for Amphan;
- Efficient use of shelter space in consideration of norms of physical distancing;

[1] https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_732468.pdf
[2] http://www.isec.ac.in/WP%20453%20%20Niranjan%20Pradhan%20and%20Madheswaran%20-%20final.pdf
[3] https://www.indianredcross.org/publications/odisha-disaster-mitigation-programme-ODMP.pdf

- Prompt identification of new safe buildings to be used as shelters for ensuring physical distancing norms and also because some of the exiting safe shelters being used as Temporary Medical Centres (TMC) for COVID-19;
- Provisioning of special arrangement and segregation of pregnant women, old aged and sick persons who are more susceptible to COVID-19 infection;
- Prompt provisioning of an adequate supply of water and hygiene products in shelters for supporting the frequent hand washing and other required norms for COVID-19 management

All these newly-faced field-level challenges triggered by the complex and dynamic nature of risk have necessitated an improved understanding of risk in all its dimensions (hazards, vulnerability, and exposure) by policymakers, executives, and communities at large. The Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-30 echoes the need for the same, supported by strengthening the existing mechanisms for disaster risk governance at all levels while being mindful of new and emerging risks. In this regard, the role of local government and community is immense not only as first responders but also as well aware, risk-informed, and resilient stakeholders for disaster risk management. One of the guiding principles of the SFDRR lays great emphasis on "empowering local authorities and local communities to reduce disaster risk, including through resources, incentives and decision-making responsibilities, as appropriate". At the national level, the paramount importance of engaging with and enhancing the capacities of local government and local communities is also resonated by the Prime Minister's 10 Point Agenda on Disaster Risk Reduction. It calls for building on local capacities and initiatives for enhancing disaster risk reduction (DRR). It further underscores that such efforts not only lead to risk reduction but also create opportunities for local development and sustainable livelihoods along with duly imbibing the traditional good practices and indigenous knowledge.

B. About the study

The current study aims to evaluate and provide for better integration of aspects of biological hazards into existing planning and decision-making mechanisms for Disaster Risk Management (DRM) at the local level in the state of Odisha. The study envisages supporting such integration with enhanced preparedness and capacity of local government and local communities for playing the critical roles and functions leading to better management of complex risks of natural and biological hazards.

B.1 Objectives of the study

For fulfilling this aim, the study has the following key objectives.

1. **Identification of good practices and lessons learned from the management of Cyclone Amphan under the COVID-19 pandemic**

The management of the complex risk of Cyclone Amphan and COVID-19 in Odisha provides a unique opportunity to the stakeholders of DRM to evaluate the effectiveness and efficiency of the existing institutional and societal mechanism for management of natural and biological

hazard risk. The good practices and lessons learned capturing not only response activities undertaken but also various risk reduction measures undertaken for management of complex risk of cyclone Amphan and COVID-19 are crucial to better informing the key stakeholders of replicable and effective practices and also further updating/strengthening the existing DRR mechanisms and practices. This may support putting in place robust and risk-informed pre-disaster measures which form the foundation of prompt, appropriate, and effective disaster response and recovery.

2. **Enhancing disaster awareness, preparedness, and capacity of local government and local community for better risk management of natural and biological hazards**

Guided by the understanding of the hazard, vulnerability, capacity, and risk profile of study area; the level of risk awareness of key stakeholders including local community; and functioning of disaster risk governance system and critical infrastructures like shelters, health care systems, and schools at the local level, the current study seeks to gauge the prevailing gaps and bottlenecks in the management and integration of biological and natural hazards risks. In addition to this, the study envisages exploring NATECH (Natural hazards triggering technological disasters) risks in the study area and includes key considerations for NATECH management in the local DRM planning. The study further supports bridging and addressing the identified gaps and bottlenecks by equipping the local government and local communities with suitable guidelines and tools along with field-based capacity-building actions such as training, workshops, evacuation drills, and locally contextualized audio-visual and printed IEC tools and awareness material for the key stakeholders.

3. **Knowledge sharing in Odisha and other coastal states including West Bengal and Tamil Nadu**

Imbibing the approach of whole-of-society and whole-of-government, an important aspect of the study is to build knowledge of key stakeholders including government officials at the state, district, and local level; response & rescue forces; diverse sections of local communities; etc. by engaging with them in dialogues and consultation processes for appropriate and effective dissemination of the findings of the study in terms of recommendations, lessons learned and good practices. The study seeks to provide for knowledge sharing both within the state of Odisha and also with other coastal states of West Bengal and Tamil Nadu for promoting the culture of preparedness and resilience through mutual and collaborative learning. Thus, through the fulfilment of its varied objectives, the study can be instrumental in empowering the local government and local communities for effective and sustainable localization of the targets and priorities of action envisioned under the global framework of SFDRR.

B.2 Outcomes of the study

The study envisages fulfilling the following five outcomes:

Table 1: Key outcomes and activities of the study

Outcomes	Activities
Outcome 1: Enhancing local government capacities with upgraded DRR/ DRM plans and SOPs for evacuation, shelter management, and other DRM measures in times of COVID-19 pandemic	1-1. Evaluation of DRR/ DRM plans including SOPs and COVID-19 related public health measures of the State and district governments and capacity of the health care system in the State to identify possible improvements by referring lessons learned with Cyclone Amphan. 1-2. Compile recommendations on how to incorporate risk reduction and management measures for biological hazards, such as COVID-19, into existing DRR/ DRM plans and SOPs for evacuation, shelter management, and other disaster risk management measures by reflecting advice from medical professionals and health communities to ensure feasibility. 1-3. Organize two workshops (approx. 20 participants each) to discuss how to better incorporate biological hazard issues into existing DRR/DRM plans, SOPs for evacuation, shelter management, and other disaster risk management measures with concerned government officials who are responsible for DRR/DRM, emergency response team including the fire department and search and rescue team, and medical/public health department. Challenges in the application of such plans and SOPs in real disaster preparedness and responses need to be identified by referring practices for Cyclone Amphan. 1-4. Prepare guidelines for upgrading DRR/DRM plans and SOPs which cover both biological and natural hazards by reflecting outcomes of 1-2 and 1-3.
Outcome 2: Enhancing communities' preparedness for cascading risks caused by biological and natural hazards	2-1. Identify target communities based on the criteria, which include geographical factors such as vulnerability to natural and biological hazards and type and level of damages caused by Cyclone Amphan, and other economic and social factors. 2-2. Collect lessons learned and good practices from the actual evacuation and risk reduction measures taken for Cyclone Amphan under the COVID-19 pandemic and compile recommendations for improvements. 2-3. Conduct baseline survey on target communities' capacity and resilience and risk assessment for biological hazards including COVID-19 and natural hazards such as cyclone and flooding in the target communities with scientific approach and identify vulnerable areas, infrastructures, and facilities in the target communities. 2-4. Compile recommendations to improve school disaster management plan to cope with pandemic and disaster risk reduction, especially for schools used as shelters in times of disaster. 2-5. Plan and conduct training (approx. 50 participants each for 2 days at each community) and evacuation drills (approx. 50 -100 participants each), based on the improved DRR/DRM plans and SOPs with biological hazard aspects, in the target communities with local and state authorities.

Outcomes	Activities
	Ensure effectiveness and applicability of the training and evacuation drills by reflecting advice from the technical advisor when necessary.
Outcome 3: Supporting preparedness of shelters and health facilities depending on its necessity	3-1. Review preparedness of shelters based on the recommendations compiled in activities 1 and 2. 3-2. Identify necessary stock of critical equipment and goods such as soaps, sanitizers, and PPEs to prepare for future shelter operation under COVID-19 pandemic and compile the list.
Outcome 4: Creating public awareness tools and/or guidelines based on the lessons and good practices acquired by activities 1 and 2 to share knowledge with other communities in the State and other States in the coastal region such as West Bengal and Tamil Nadu	4-1. Identify and develop effective public awareness tools and/or guidelines based on the lessons and good practices acquired by activities 1 and 2 to share knowledge with other communities in the State and other States in the coastal region such as West Bengal and Tamil Nadu. 4-2. Test the effectiveness of the public awareness tools and/or guidelines in a pilot community selected from target communities during monsoon season.
Outcome 5: Promoting MSMEs' (micro small medium enterprises) resilience by identifying business continuity risks under biological and natural hazards and critical needs	5-1. Conduct a quick risk assessment of the impact caused by natural and biological hazards on MSMEs in the target communities and identify critical needs for business continuity and effective public support by local (and State) governments under biological and natural hazards. 5-2. Plan and conduct workshops in each target community to promote critical public support for MSMEs by local (and State) governments. 5-3. Compile good practices about local MSMEs' efforts for their business continuity and communities' livelihood under the COVID-19 pandemic. 5-4. Develop guidelines for MSMEs on business continuity and contribution to local communities and for local government on how to support such efforts based on the findings of the activities 5-2 and 5-3.

C. Technical approach for the study

Disaster risk is context-specific (UNDRR, 2019). While it can be driven by local, national, regional, or global factors, disaster risk demonstrates varied local and specific characteristics that are shaped by local patterns and interplay of exposure, vulnerability, adaptive capacities, and resilience. The non-linear changes in the intensity and frequency pattern of the natural and biological hazards make the risk more dynamic over time and scale. Such changes can be better gauged and perceived at a local level wherein the local government, local communities, and other key stakeholders like Community-Based Organizations (CBOs), Non-Governmental Organizations (NGOs), private sector, etc. are actively engaged and have an instrumental role in the DRR and DRM processes.

Guided by the UNDRR's 'Words into Actions on Local Disaster Risk Reduction and Resilience Strategies', a technical approach (Figure 1) is laid down for the study. The technical approach of local DRR and resilience strategy lays down that the local government should be playing a leading role in developing and implementing the local DRR and resilience strategy with an active engagement of the local community while other stakeholders like government at a higher level, private sector, and academia should be playing a supporting role. The local DRR and resilience strategy should imbibe the whole-of-society, whole-of-government, and all hazards (including their interplay leading to compound and cascading risks) approach while ensuring that it is laid down in a participatory, inclusive, and ownership driven manner. Such a local DRR and resilience strategy should be guided by a shared vision of its stakeholders and be informed by the shared understanding (of local government and local community) of risk and resilience.

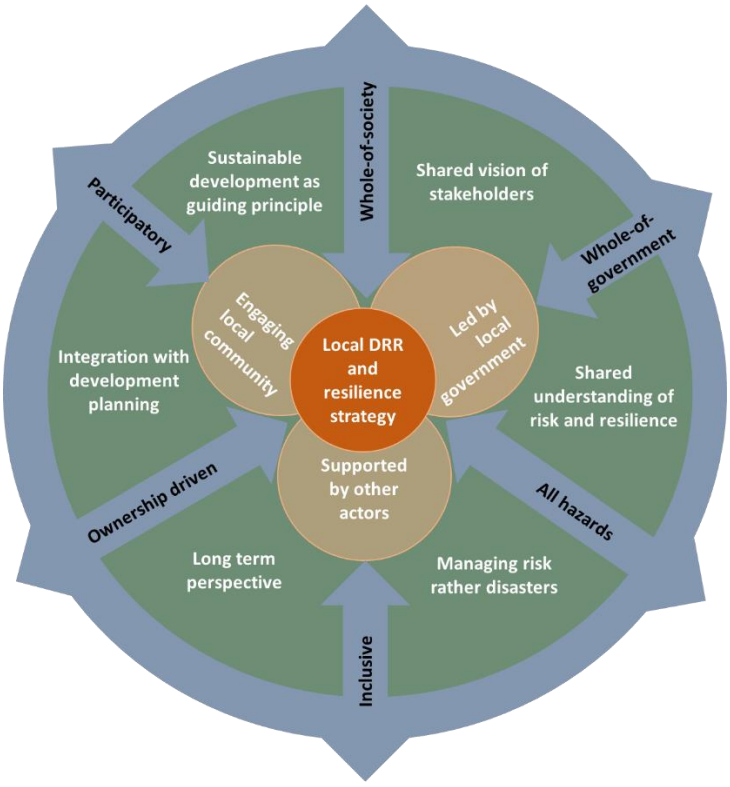


Figure 1: Technical approach of local DRR and resilience strategy for the study

Overall, an effective risk reduction strategy should envisage working towards the management of disaster risks rather than just the management of disasters. It should be laid with a long-term perspective and considerations for existing & emerging and complex risks and not just for the adhoc management of a single disaster event. Further, with sustainable development as one of its key guiding principles, the local DRR and resilience strategy should strive to integrate and make DRR inherent to development planning.

For the current study, the following key characteristics can be considered while identifying the good practices (Figure 2).

Figure 2: Key characteristics of good practices in DRM

D. Selection of study area

The current study requires the identification of six communities for studying the complex risks of cyclones/floods and COVID-19 pandemics. For this purpose, the study considers villages and wards as communities in the rural and urban areas respectively. They are respectively the lowest level of governance and administration in rural and urban areas. They act as a bedrock for Community Based Disaster Risk Management (CBDRM) and decentralization of DRM governance. Besides, the village and ward are also the lowest levels where disaster risk management planning is undertaken in Odisha. The detailed criteria based on which the districts, blocks and villages/wards have been selected are laid down in figure 3. The list of study area was shared with OSDMA during the kick-off meeting of the project and its suggestion were incorporated for finalisation of the same.

D.1 Selection of districts

The selection was based on the criteria of their geographical location (coastal and inland), level of vulnerability to floods and cyclones, good experience of handling past cyclones (evacuation & shelter management), level of damage by cyclone Amphan/past cyclones in the districts and the population density of the districts. The aspect of population density is crucial as the higher the density of population of a district, the more challenging it can be for the management of cyclone and flood shelters especially in the backdrop of the COVID-19 pandemic where

ensuring physical distancing is an important factor for limiting the transmission of the virus. Based on this, 6 districts, namely, Balasore, Bhadrak, Ganjam, Kendrapara, Khordha, and Puri have been selected (Map 1). Based on suggestion of OSDMA, Ganjam has been selected as it is considered as the model district for its management of evacuation and shelter management during past cyclones and its preparedness and management of COVID-19. The selection of districts has been done such that it is representative of a diverse population by including both coastal & inland; the ones with higher & lower population densities; with high, medium & low vulnerability to floods & cyclones. This is envisaged to inform the study of the diverse nature of challenges faced and risk perception of the stakeholders and communities placed in different settings.

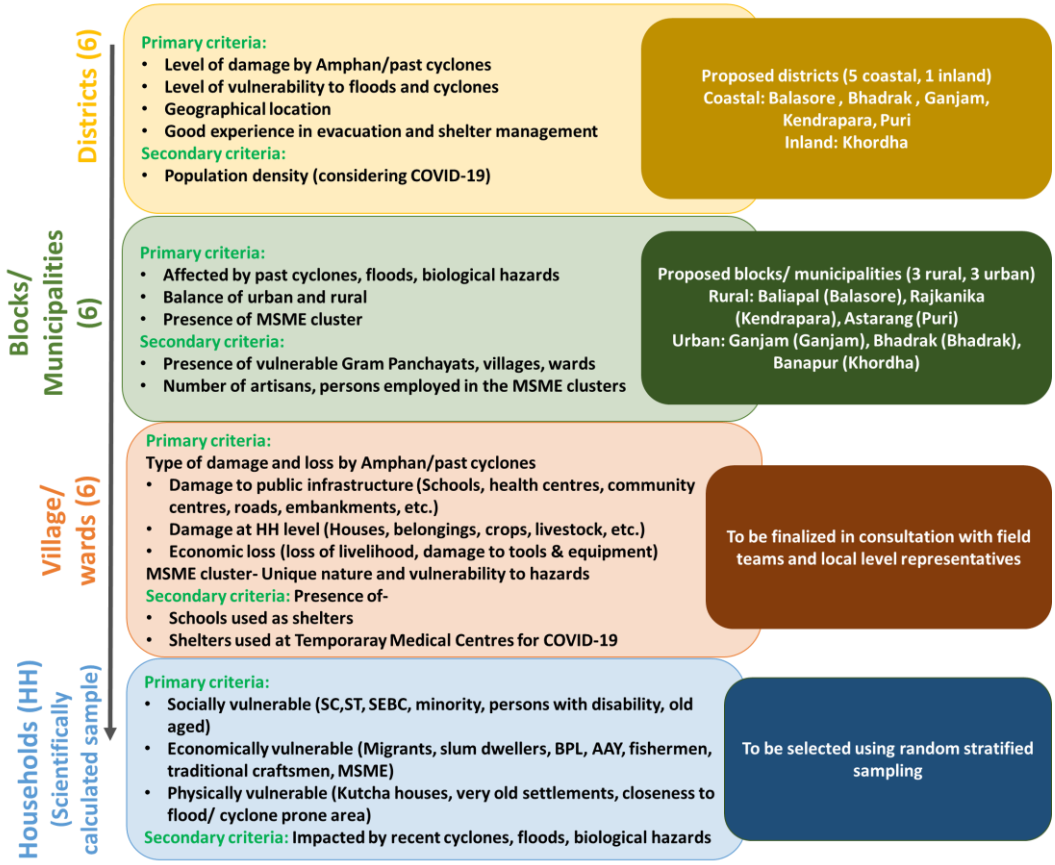
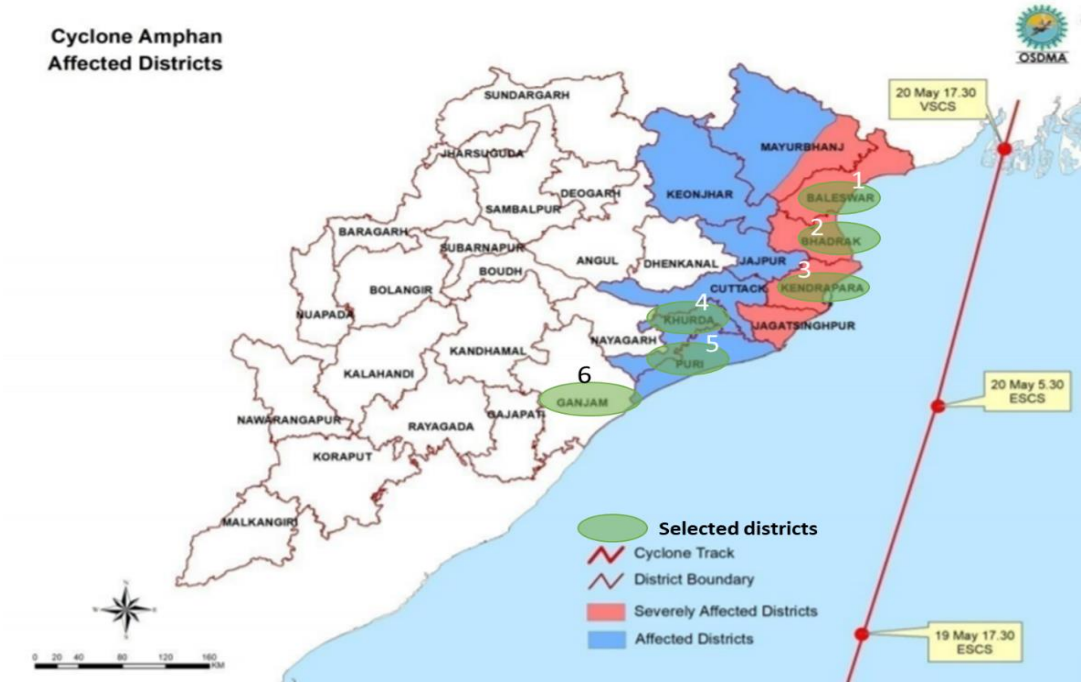


Figure 3: Methodology and selection criteria of the study area

D.2 Selection of blocks and municipalities

For each of the 6 selected districts, one affected (by Amphan, past cyclones, floods, biological hazards) block or municipality has been selected. The selection is guided by the presence of vulnerable Gram Panchayats, villages, and wards in the blocks and municipalities along with the presence of MSME clusters. The study of proposed blocks and municipalities will help in better informing the project team of the diverse nature of challenges faced in urban and rural areas during natural and biological hazards. Thus, a total of 6 blocks/municipalities (3 each) are proposed (Figure 3).



Map 1: Selected districts for the study

Source: Office of Special Relief Commissioner, Govt. of Odisha

Detailed demographic, socio-economic, and other characteristics of the selected districts and blocks/municipalities are discussed below.

1. Balasore

Balasore is one of the coastal districts of the state with high[4] vulnerability to cyclones and floods. As per the Final Memorandum on Super Cyclone Storm Amphan (GoO, 2020), the district was severely affected. During Amphan, around 720 shelters were used in the district to shelter 49,564 evacuated persons. The detailed demographic and socio-economic profile of the district is listed in table 2.

Table 2: Demographic and socio-economic profile of Balasore district

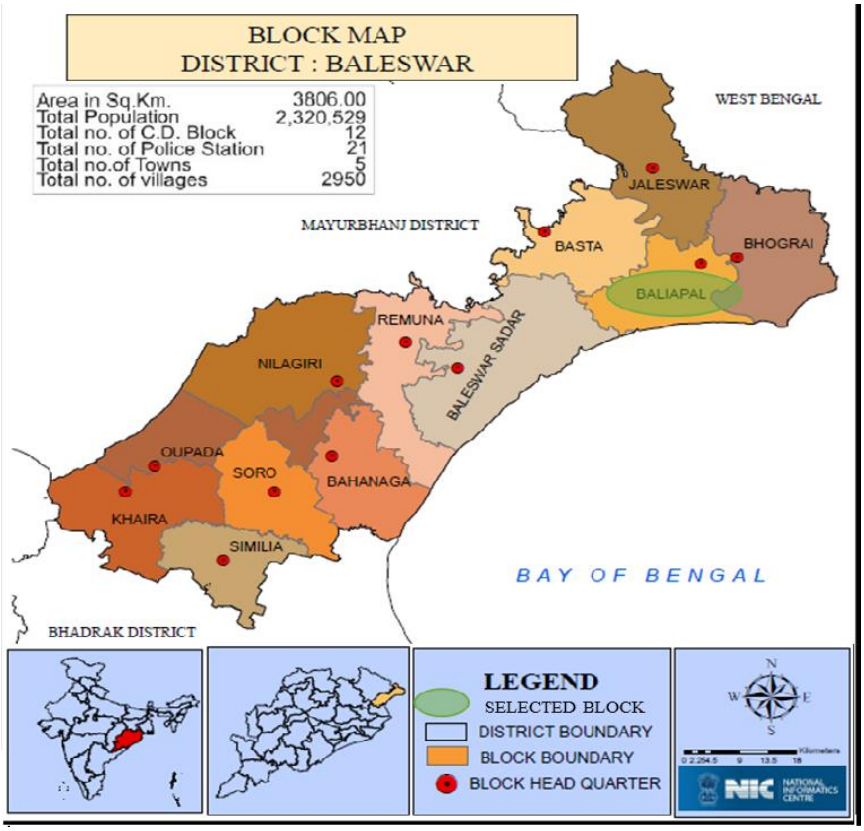
Number of Villages	**Total**	**2,932**	
	Inhabited	2,635	
	Uninhabited	297	
Number of Towns	Statutory	5	
	Census	0	
	Total	5	
Number of Households	Normal	5,32,281	
	Institutional	520	
	Houseless	200	
Population			**Percentage**
Total	Persons	23,20,529	
	Males	11,85,787	
	Females	11,34,742	
Rural	Persons	20,67,236	

[4] https://www.researchgate.net/publication/265459164_Assessment_of_vulnerability_to_cyclones_and_floods_in_Odisha_India_A_District-level_analysis; High: >0.5; medium: 0.4-0.5; low: <0.4

	Males	10,56,466	
	Females	10,10,770	
Urban	Persons	2,53,293	
	Males	1,29,321	
	Females	1,23,972	
Decadal Population Growth	Persons	2,96,021	14.62
	Males	1,49,276	14.4
	Females	1,46,745	14.85
Area (in sq. km.)		3806	
Density of Population (Persons per sq km.)		610	
Sex Ratio	Total	957	
	Rural	957	
	Urban	959	
Literates		16,21,232	80
Scheduled Castes		4,78,586	21
Scheduled Tribes		2,75,678	12
Workers	Total workers	9,32,707	40
	Main Workers	6,18,064	26.63
	Marginal Workers	3,14,643	13.56
Non-Workers		13,87,822	59.81

Source: Census 2011

Using the selection criteria mentioned above, a rural block of Baliapal of Balasore district is proposed for the current study (Map 2).

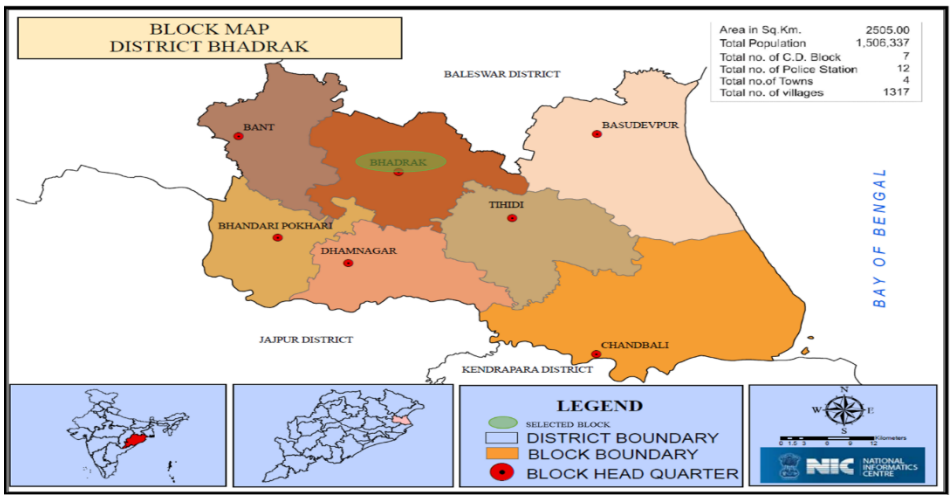


Map 2: Block map, Balasore

Source: NIC

2. Bhadrak

Bhadrak is another coastal district selected for the current study. It was also severely affected during Amphan which led to an evacuation of 31,017 persons in 561 shelters. The district has a high vulnerability to cyclones and floods. The detailed demographic and socio-economic profile of the district is listed in table 3. The selected block is marked in Map 3.



Map 3: Block map, Bhadrak

Source: NIC

Table 3: Demographic and socio-economic profile of Bhadrak district

Number of Villages	Total	1,312	
	Inhabited	1,250	
	Uninhabited	62	
Number of Towns	Statutory	3	
	Census	1	
	Total	4	
Number of Households	Normal	3,05,775	
	Institutional	369	
	Houseless	189	
Population			**Percentage**
Total	Persons	15,06,337	
	Males	7,60,260	
	Females	7,46,077	
Rural	Persons	13,20,499	
	Males	6,65,255	
	Females	6,55,244	
Urban	Persons	1,85,838	
	Males	95,005	
	Females	90,833	
Decadal Population Growth	Persons	1,72,588	12.94
	Males	84,618	12.52
	Females	87,970	13.37
Area (in sq. km.)		2505	
Density of Population (Persons per sq km.)		601	
Sex Ratio	Total	981	
	Rural	985	
	Urban	956	
Literates		10,94,140	82.78

Scheduled Castes		3,34,896	22.23
Scheduled Tribes		30,428	2.02
Workers	Total workers	4,68,599	31.11
	Main Workers	3,28,097	21.78
	Marginal Workers	1,40,502	9.33
Non-Workers		10,37,738	68.89

Source: Census 2011

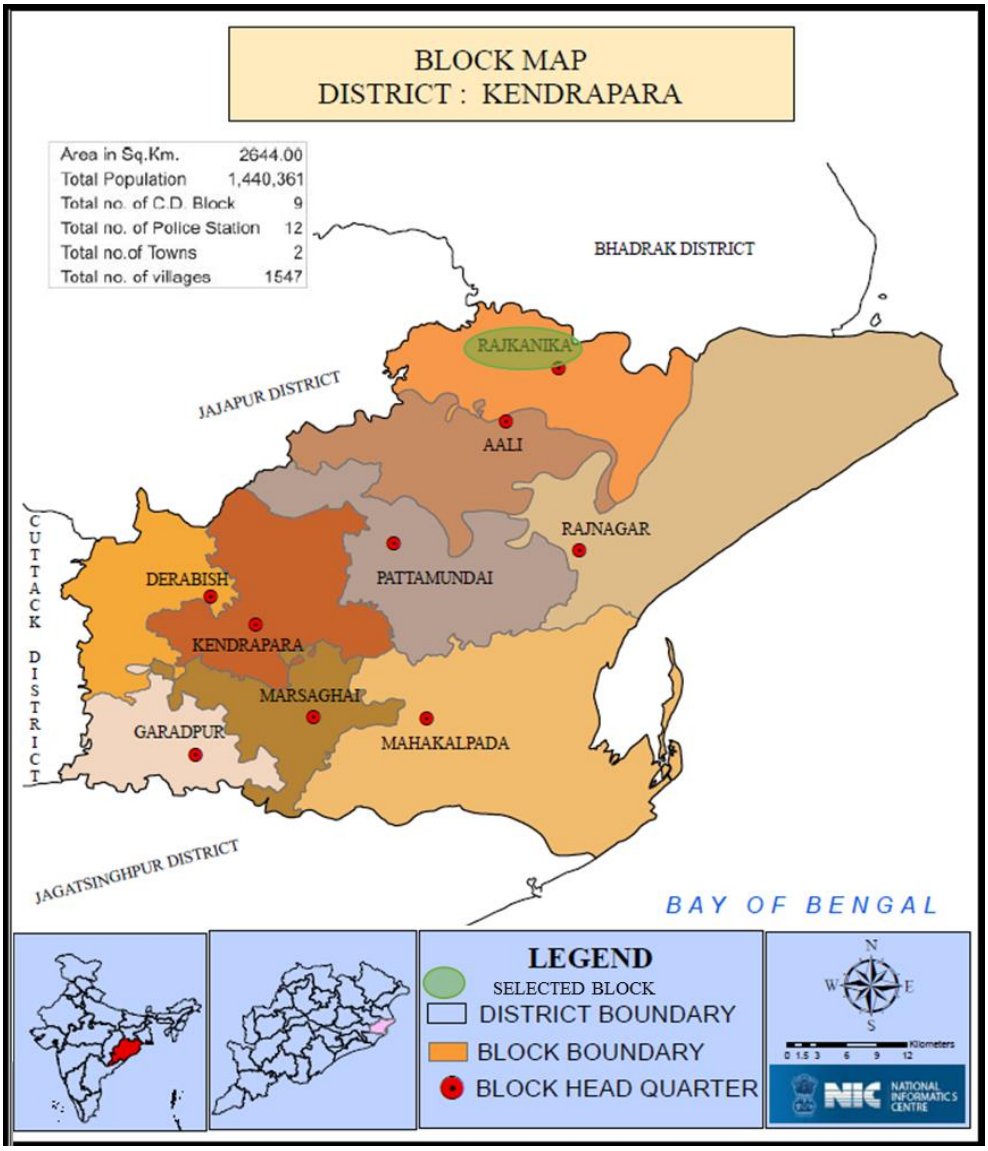
3. Kendrapara

Kendrapara is a coastal district of the state with high vulnerability to cyclones and floods. It was severely affected by Amphan during which 39,864 persons were evacuated to 622 safe shelters. The detailed demographic and socio-economic profile of the district is listed in table 4. The selected block is marked in Map 4.

Table 4: Demographic and socio-economic profile of Kendrapara district

Number of Villages	Total	1,547	
	Inhabited	1,415	
	Uninhabited	132	
Number of Towns	Statutory	2	
	Census	0	
	Total	2	
Number of Households	Normal	3,21,315	
	Institutional	516	
	Houseless	103	
Population			**Percentage**
Total	Persons	14,40,361	
	Males	7,17,814	
	Females	7,22,547	
Rural	Persons	13,56,827	
	Males	6,75,053	
	Females	6,81,774	
Urban	Persons	83,534	
	Males	42,761	
	Females	40,773	
Decadal Population Growth	Persons	1,38,356	10.63
	Males	71,376	11.04
	Females	66,980	10.22
Area (in sq. km.)		2644	
Density of Population (Persons per sq km.)		545	
Sex Ratio	Total	1007	
	Rural	1010	
	Urban	954	
Literates		10,89,265	85.15
Scheduled Castes		3,09,780	21.51
Scheduled Tribes		9,484	0.66
Workers	Total Workers	4,66,890	32.41
	Main Workers	3,22,265	22.37
	Marginal Workers	1,44,625	10.04
Non-Workers		9,73,471	67.59

Source: Census 2011



Map 4: Block map, Kendrapara

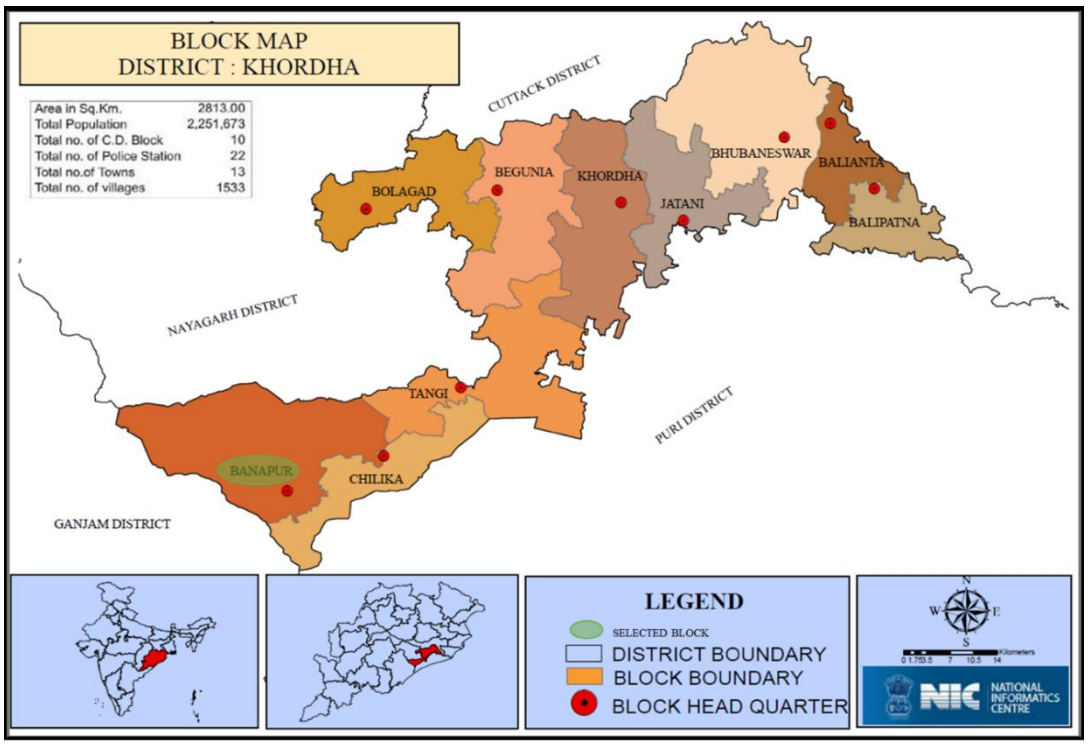
Source: NIC

4. Khordha

Khordha is one of the inland districts of Odisha which has been selected for the current study. It was affected by Amphan. During Amphan, the districts had 103 shelters which provided refuge to 3,172 evacuated persons. Despite its low[5] vulnerability to cyclones and floods, the district is selected due to its high population density of 800 persons/km2 which adds challenges in the management of shelters especially during pandemics like COVID-19. The detailed

[5]https://www.researchgate.net/publication/265459164_Assessment_of_vulnerability_to_cyclones_and_floods_in_Odisha_India_A_District-level_analysis; High: >0.5; medium: 0.4-0.5; low: <0.4

demographic and socio-economic profile of the district is listed in table 5. The selected block is marked in Map 5.



Map 5: Block map, Khordha

Source: NIC

Table 5: Demographic and socio-economic profile of Khordha district

Number of Villages	Total	1,534	
	Inhabited	1,356	
	Uninhabited	178	
Number of Towns	Statutory	5	
	Census	8	
	Total	13	
Number of Households	Normal	4,91,702	
	Institutional	1,950	
	Houseless	560	
Population			**Percentage**
Total	Persons	22,51,673	
	Males	11,67,137	
	Females	10,84,536	
Rural	Persons	11,67,357	
	Males	5,95,809	
	Females	5,71,548	
Urban	Persons	10,84,316	
	Males	5,71,328	
	Females	5,12,988	
Decadal Population Growth	Persons	3,74,278	19.94
	Males	1,80,251	18.26
	Females	1,94,027	21.79
Area (in sq. km.)		2813	
Density of Population (Persons per sq km.)		800	
Sex Ratio	Total	929	

	Rural	959	
	Urban	898	
Literates		17,49,936	86.88
Scheduled Castes		2,97,472	13.21
Scheduled Tribes		1,15,051	5.11
Total Workers (Main and Marginal)		7,92,193	35.18
	Main Workers	6,32,625	28.1
	Marginal Workers	1,59,568	7.09
Non-Workers		14,59,480	64.82

Source: Census 2011

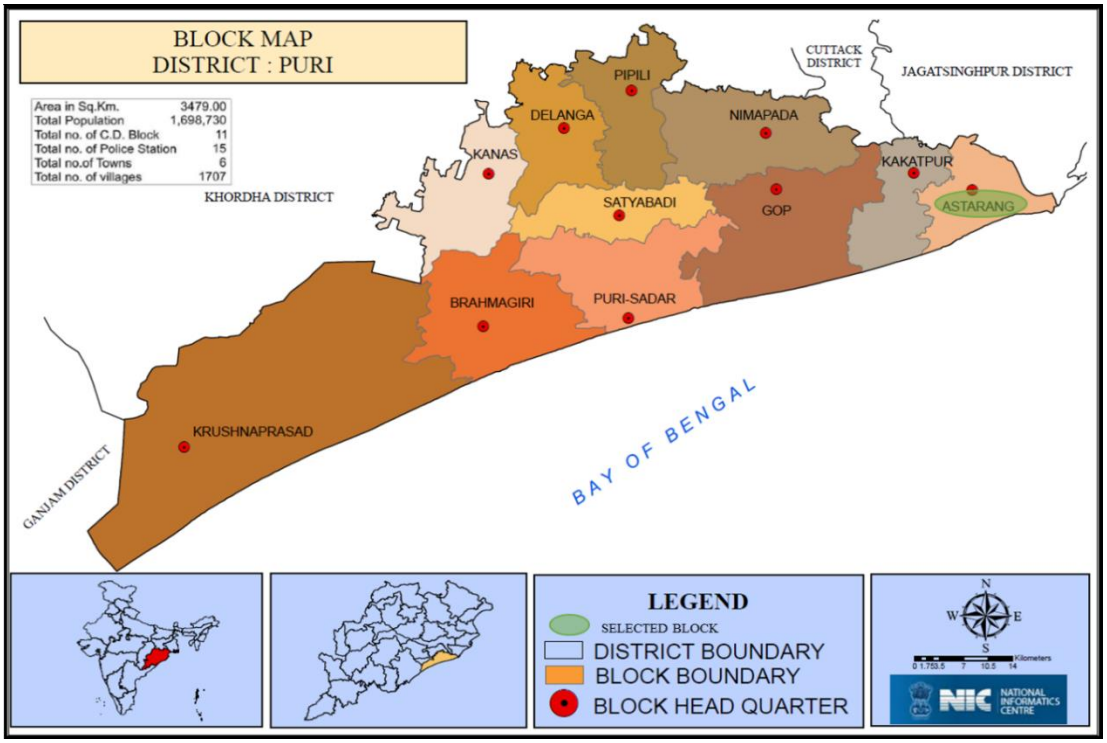
5. Puri

Puri is one of the coastal districts selected for the current study. It has a medium-level vulnerability to cyclones and floods. It was affected by Amphan during which 364 safe shelters provided refuge to 12,712 persons. The detailed demographic and socio-economic profile of the district is listed in table 6. The selected block is marked in Map 6.

Table 6: Demographic and socio-economic profile of Puri district

Number of Villages	Inhabited	1600	
Number of Towns		6	
Population			**Percentage**
Total	Persons	16,98,730	
	Males	8,65,380	
	Females	8,33,350	
Rural	Persons	14,33,800	
	Males	7,28,213	
	Females	7,05,587	
Urban	Persons	2,64,930	
	Males	1,37,167	
	Females	1,27,763	
Decadal Population Growth	Persons	16,98,730	13.05
Area (in sq.km)		3479	
Density of population (Persons per sq.km)		488	
Sex Ratio	Total	963	
	Rural	969	
	Urban	931	
Literates		12,91,939	84.67
Scheduled Castes		3,25,133	19.14
Scheduled Tribes		6129	0.36
Workers	Total workers	6,21,676	36.6
	Main Workers	4,50,536	26.52
	Marginal Workers	1,71,140	10.07
Non-Workers		10,77,054	63.4

Source: Census 2011



Map 6: Block map, Puri

Source: NIC

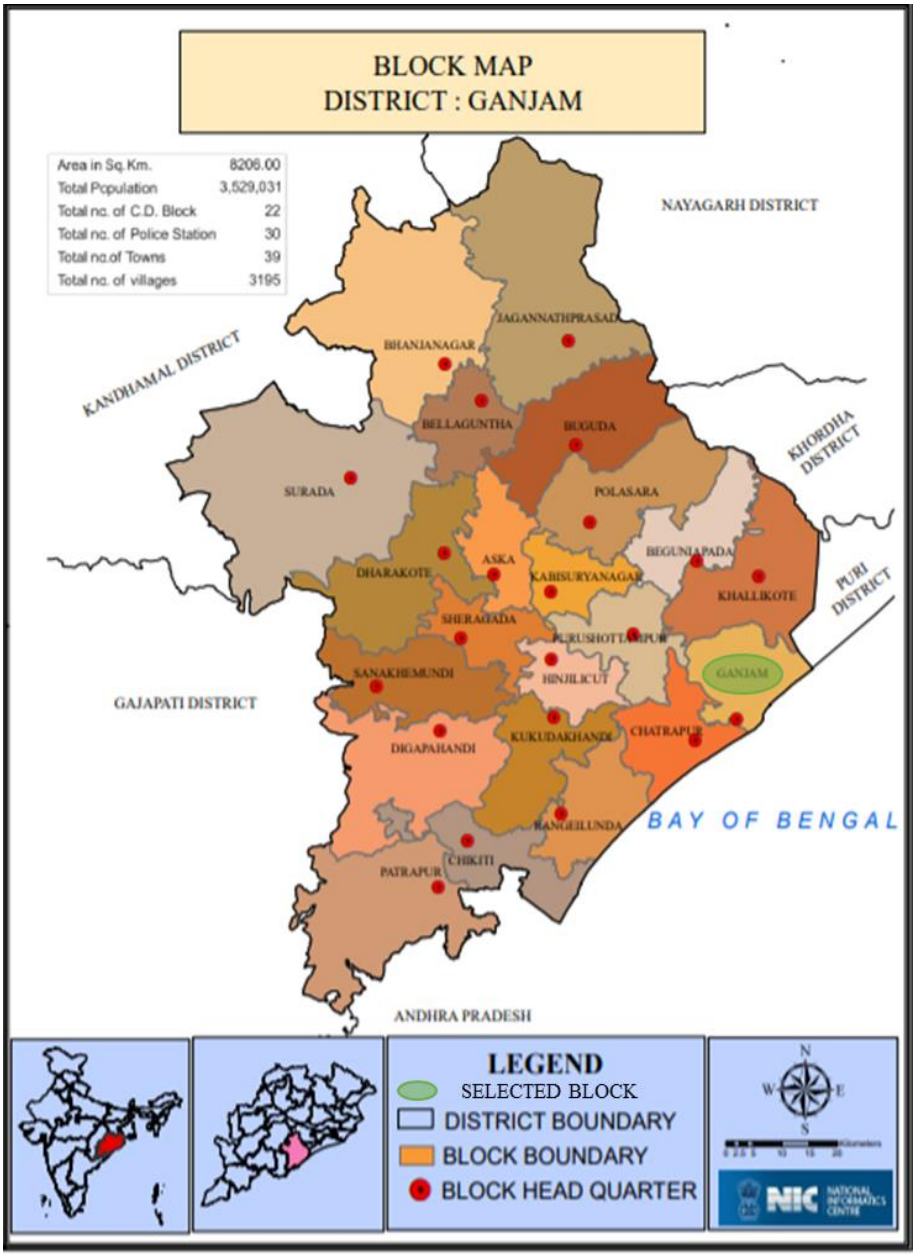
6. Ganjam

Ganjam is one of the coastal districts of the state. Its vulnerability to cyclones and flood is medium. Though the district did not get affected by Amphan, it has, in the past, braved many cyclones including Fani, Titli, Hudhud, Phailin, 1999 super cyclone. During Fani, the district had 1069 shelters for providing refuge to 3,01,460 evacuees. The district has been selected as it is considered as the model district for its management of evacuation and shelter management during past cyclones and its preparedness and management of COVID-19. The detailed demographic and socio-economic profile of the district is listed in table 7. The selected block is marked in Map 7.

Table 7: Demographic and socio-economic profile of Ganjam district

Number of Villages	Total	3,195	
	Inhabited	2,783	
	Uninhabited	412	
Number of Towns	Statutory	18	
	Census	21	
	Total	39	
Number of Households	Normal	7,55,365	
	Institutional	1,146	
	Houseless	1,756	
Population			**Percentage**
Total	Persons	35,29,031	
	Males	17,79,218	
	Females	17,49,813	
Rural	Persons	27,61,030	
	Males	13,83,636	
	Females	13,77,394	

Urban	Persons	7,68,001	
	Males	3,95,582	
	Females	3,72,419	
Decadal Population Growth	Persons	3,68,396	11.66
	Males	1,97,232	12.47
	Females	1,71,164	10.84
Area (in sq. km.)		8206	
Density of Population (Persons per sq km.)		430	
Sex Ratio	Total	983	
	Rural	995	
	Urban	941	
Literates		22,10,050	71.09
Scheduled Castes		6,88,235	19.5
Scheduled Tribes		1,18,928	3.37
Workers	Total Workers	15,01,772	42.55
	Main Workers	9,00,744	25.52
	Marginal Workers	6,01,028	17.03
Non-Workers		20,27,259	57.45



Map 7: Block map, Ganjam

Source: NIC

E. Stakeholder mapping

The current study and its five envisaged outcomes call for engaging with various stakeholders at different levels. Broadly these include government departments and associated agencies at the state, district, and local level; communities and their local representatives; civil society organizations, NGOs, etc. working on different aspects of DRM, public health, and those playing critical roles concerning the five outcomes of the study.

In this regard, various stakeholders have been mapped by the project team through desk-based review of the relevant literature including reports, departmental websites, etc. Figure 4 maps these stakeholders from the state, six districts selected for the study, respective block & community level, and other non-governmental actors including the community itself. These include the State and District Disaster Management Authorities (OSDMA and DDMAs),

Office of State Relief Commissioner (SRC), Health Department, Fire Services, Police Department, Odisha Disaster Rapid Action Force (ODRAF), National Disaster Response Force (NDRF-3rd Battalion), Civil Defence and Home Guards, State Inter-Agency Group (IAG), etc. The mapped stakeholders have roles & responsibilities across different phases of DRM and coordination linkages among them.

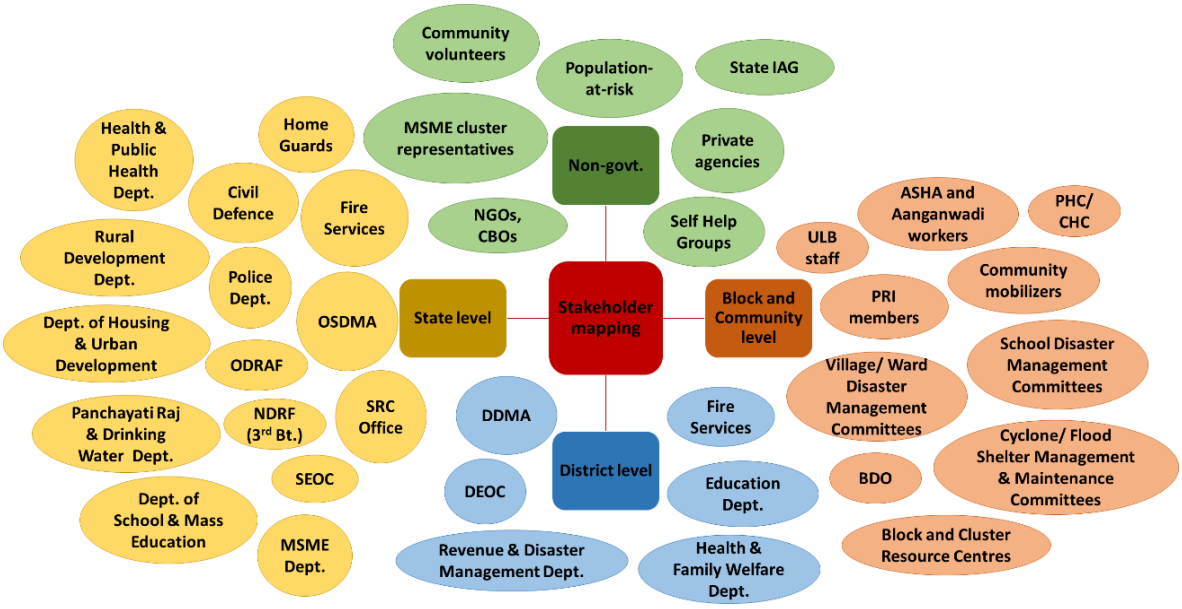


Figure 4: Key stakeholders of the study

Table 9 prioritizes the stakeholders into high, medium, and low priority and lists down engagement with different stakeholders.

Table 9: Engagement with stakeholders

S. No.	Purpose	Stakeholders	When to be contacted	Priority
1.	Overall coordination and support	Odisha State Disaster Management Authority (OSDMA)	At the inception and throughout	High
2.	Support for project activities on the field	District Disaster Management Authority (DDMA)		High
3.	To identify challenges faced and lessons learned during Amphan response amidst COVID-19 and other past disasters	Special Relief Commissioner (SRC)	During stakeholder consultations and workshops planned under Outcome 1	High
4.		National Disaster Response Force (NDRF) 3rd Bt.		High
5.		Odisha Disaster Rapid Action Force (ODRAF)		High
6.		Odisha Fire Services, Home guards and Civil Defence, Govt. of Odisha (State & District)		High
7.		Home Department / Odisha Police (State & District)		Medium

S. No.	Purpose	Stakeholders	When to be contacted	Priority
8.	To study its role in early warning and alerts generation for pandemics; identify gaps & challenges during coordination, evacuation, and response	State Emergency Operation Centre (SEOC) & District Emergency Operation Centre (DEOC)		High
9.	To study the COVID-19 response and health capacities of the state; integration of health aspects in DRR planning	Health & Family Welfare Department, Govt. of Odisha		High
10.	To study vulnerability, risk, and resilience of the selected communities and capacity mapping	Rural Development Department, Govt. of Odisha	During baseline survey and FGDs, interviews, and stakeholders' consultation and assessments planned under Outcome 2 and 4	Medium
11.		Housing & Urban Development Department, Govt. of Odisha		Medium
12.		Panchayati Raj & Drinking Water Department, Govt. of Odisha		Medium
13.		Block Development Officers (BDOs)		High
14.		Urban Local Bodies (ULBs) representatives		High
15.		Panchayati Raj Institutions (PRI) members		High
16.		Village/Ward Disaster Management Committee members		High
17.		Community Mobilizers		High
18.		ASHA/Anganwadi workers		Medium
19.		Primary Health Centre (PHC) / Community Health Centre (CHC) representatives		Medium
20.		Community volunteers		High
21.		Population at risk		High
22.		State Inter Agency Group (IAG)		Medium
23.		CBOs, NGOs, SHGs		Medium
24.		Private agencies		Low
25.	To assess the School Disaster Management Plans and roles the schools play as safe shelters; challenges faced;	Department of School & Mass Education, Govt. of Odisha	FGDs, interviews, and stakeholders' consultation planned under	Medium
26.		District Education Officers, Govt. of Odisha		High

S. No.	Purpose	Stakeholders	When to be contacted	Priority
27.	identification of critical needs	School Disaster Management Committees	Outcome 2 and 3.	High
28.		Cyclone/ Flood Shelter Management and Maintenance Committees		High
29.		Block and Cluster Resource Centres		Low
30.	To assess the risk of MSME clusters to natural and biological hazards; need identification; study of existing and potential govt. support to them	Micro, Small and Medium Enterprises Department, Govt. of Odisha	During consultations and workshops planned under Outcome 5	High
31.		Representatives of MSME clusters at district level		High

F. Outcome wise progress and findings

This section of the report lays down outcome and activity wise methodology adopted by the project team, different tools used for data collection and analysis, and key findings and progress made so far.

F.1. Outcome 1: Enhancing local government capacities with upgraded Disaster Risk Reduction (DRR) / Disaster Risk Management (DRM) plans and Standard Operation Procedures (SOPs) for evacuation, shelter management, and other disaster risk management measures in the times of COVID-19 pandemic

1-1. Evaluation of DRR/ DRM plans including SOPs and COVID-19 related public health measures of the State and district governments and capacity of the health care system in the State to identify possible improvements by referring lessons learned with Cyclone Amphan.

1-2. Compile recommendations on how to incorporate risk reduction and management measures for biological hazards, such as COVID-19, into existing DRR/ DRM plans and SOPs for evacuation, shelter management, and other disaster risk management measures by reflecting advice from medical professionals and health communities to ensure feasibility.

1-3. Organize two workshops (approx. 20 participants each) to discuss how to better incorporate biological hazard issues into existing DRR/DRM plans, SOPs for evacuation, shelter management, and other disaster risk management measures with concerned government officials who are responsible for DRR/DRM, emergency response team including the fire department and search and rescue team, and medical/public health department. Challenges in the application of such plans and SOPs in real disaster preparedness and responses need to be identified by referring practices for Cyclone Amphan.

1-4. Prepare guidelines for upgrading DRR/DRM plans and SOPs which cover both biological and natural hazards by reflecting outcomes of 1-2 and 1-3.

F.1.1. Framework and methodology

The study of existing DRR/DRM plans and SOPs was guided by the i10 framework of DRM planning (Figure 5) which lays down the following ten key parameters and considerations for DRM plans and SOPs:

1. Comprehensiveness of the plans catering to different phases of DRM
2. Existing institutional and financial mechanism to undertake various measures laid down in plans and SOPs
3. Consideration of biological hazards, public health emergencies and in the existing DRR/ DRM plans, SOPs;
4. Consideration of multi-hazards, cascading and complex risks such as NATECH (Natural hazards triggering technological disasters) risk in the plans and SOPs;
5. Provision of crowd management during evacuation and shelter management;
6. Provision of contextualized Incident Response System and Emergency Support Functions;
7. Integration of coherence with DRM policies and global frameworks such as SFDRR;
8. Mechanism for mainstreaming and integrating DRR within and across all sectors;
9. Mechanisms for implementing, testing, and updating the plans and SOPs;
10. Challenges faced while developing, implementing, and updating the plans

Figure 5: Framework for evaluation of DRR/ DRM plans and SOPs

Supporting the above framework with the study of relevant global, national and sub-national frameworks, policy documents, plans, and guidelines on the related aspects, the project team has developed the guide for study of disaster risk management plans and SOPs (Annexure 5) through desk-based study and stakeholders consultations (Annexure 6).

Similarly the review of the SOPs, COVID-19 related public health measures and capacity of health care system was guided by the following framework (figure 6) on the resilience of health and public health systems. The framework is aligned with the UNDRR's Public Health System

Resilience Addendum to Disaster Resilience Scorecard for Cities and the WHO's Health Emergency and Disaster Risk Management Framework. It studies various aspects of DRM and resilience across the six core aspects of the functioning of healthcare and public health systems, namely physical infrastructure, services, human resources, information & knowledge management, governance, and financial mechanism.

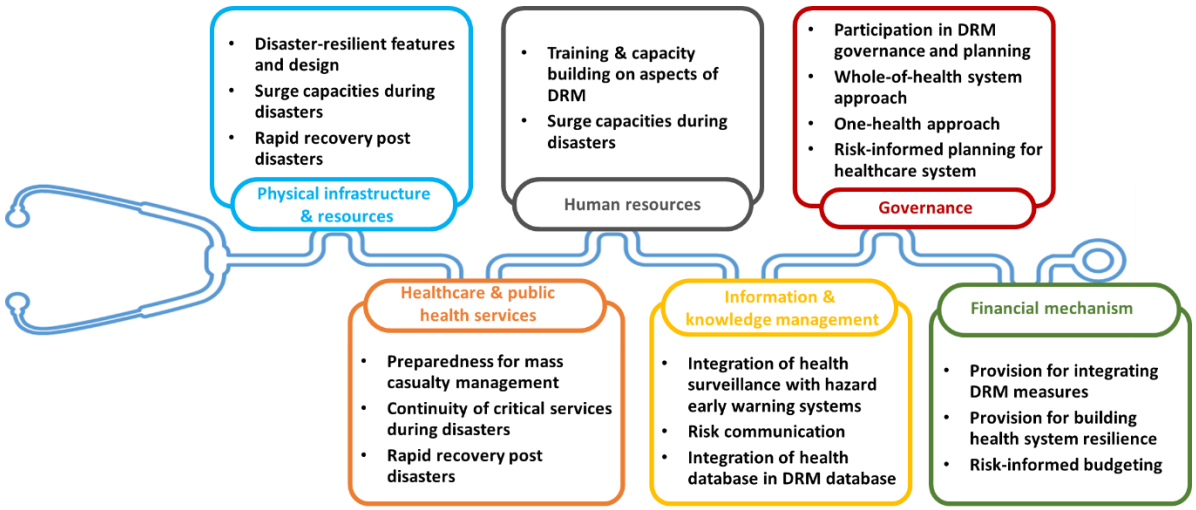


Figure 6: Framework on the resilience of health & public health systems

Informed by the above framework and study of global and national principles, plans, and guidelines on the subject including the National Disaster Management Guidelines on Medical Preparedness and Mass Casualty Management; National Disaster Management Guidelines on Hospital Safety; Bangkok Principles for implementation of health aspects of SFDRR, the project team has developed guide for review of public health/ COVID-19 measures and capacity of the healthcare system in the state (Annexure 7). The guide was used both for reviewing the secondary literature (notifications, guidelines, report) available and undertaking consultations with health officials and related stakeholders.

F.1.2. Key findings

1. Review of State and District Disaster Management Plans and SOPs

The Odisha State Disaster Management Plan (SDMP) along with the District Disaster Management Plans (DDMP) of the 6 selected districts available as of March 2021 were studied using the developed tool for analysis. Key observations based on the desk-based review are discussed below.

i. The SDMP recognizes and discusses various biological hazards the state is prone to. These include epidemics, water and vector-borne communicable diseases, the spread of diseases from endemic to non-endemic areas, malarial drug resistance, enzoonotic diseases in rural and tribal areas, food poisoning due to consumption of inedible roots and tubers in tribal areas, pest attacks, industrial and chemical-related health hazards in industrial belts, emergence of new types of pathogenic agents due to ecological changes, the introduction of new diseases through international travellers and tourists. However, their considerations for mitigation, preparedness, capacity building, response, SOPs and recovery are not adequate.

ii. The SDMP identifies epidemic and other biological hazards in Chapter II: Vulnerability Assessment and Risk Analysis but the same are not elaborated or discussed in detail. The plan enlists the year of occurrence along with damages and losses inflicted by identified hazards. While discussing the vulnerability to different hazards, it seems the content pertains more to the exposure to different hazards, rather than the vulnerability. While different potential biological hazards are listed, the plan does not identify the areas and population exposed to these risks or have been hotspots for such risks in the past.

iii. The plan as part of preventive and mitigation measures talks about surveillance mechanism involving state, district and village level veterinary institutions for early detection of outbreaks. However, similar mechanism for other BPHE is not discussed in the plan.

iv. The SDMP recognizes the past events where the state has braved different hazards occurring simultaneously or repeatedly i.e. the state has prior experiences of cascading and compound aspects of risks. The plan does reflect implicit and explicit considerations of multi-hazard and complex risk. For example, it recognises the risk posed to hazardous industries located in cyclone-prone areas and earthquake-prone areas. It includes hazard-prone maps of the state, however, maps showing multi-hazards risk or composite risk may be added for undertaking effective risk-informed planning. It may also be useful to map the critical infrastructure and key resources on the hazard exposure maps for better understanding the potential cases of cascading and complex risks including that of NATECH (Natural Hazards Triggering Technological Disasters).

v. From the perspective of pandemics and others Biological and Public Health Emergency (BPHE), stakeholders and institutions like Health Ministry, and platforms like Integrated Disease Surveillance Programme (IDSP), etc. have not been listed among the stakeholders playing crucial role in information generation and sharing. In the backdrop of this and considerations of potential cascading and compound risks, it may be advisable to enlist the nodal departments/ agencies for each of the potential hazards on the lines of National Disaster Management Plan 2019. While a reference has been made to surveillance mechanism among the preventive measures for the Animal Husbandry and Veterinary Services, the same has not been included for the Health & Family Welfare Department.

vi. The plan lays down the mechanism for communication of early warnings from the State Emergency Operations Center (SEOC) to respective District Collectors through telephone/ fax/ wireless/ emails. It is then further communicated to gram panchayats and villages through respective Tahsildars and Block Development Officers by means of telephones, civil and police VHF networks and in person. The emergency communication systems are further strengthened for the cyclone and tsunami prone districts by the establishment of Early Warning Dissemination System (EWDS) which supports the last mile dissemination of warnings and alerts to communities at risk. However, no separate or special mechanism is discussed for early detection, surveillance and the management of biological hazards and complex & cascading emergencies involving biological hazards.

vii. The plan enlists awareness creation, conducting sensitization programmes, undertaking IEC campaigns among the non-structural measures to be undertaken by different stakeholder department and agencies. However, these roles and responsibilities do not reflect the considerations for cascading and compound risks involving biological hazards. They mostly include dissemination of department/agency specific schemes/ programmes along with information on related hazards such as heat stroke, chemical & industrial hazards, etc. in silos.

viii. The SDMP briefly talks about the SFDRR Roadmap for the State which is in the process of finalisation. The plan lays down key activities for supporting implementation of the Sendai Framework in Odisha. While these activities include some of the important measures for furthering the four priorities for action laid down under the Sendai Framework, they do not focus and cover the aspects of biological hazards, multi-hazard risk, cascading risks. Further, the plan does not even mention the Bangkok Principles or measures laid down under it for implementation of health aspects of the Sendai Framework.

ix. The SDMP discusses the case of the NATECH event during the 1999 super cyclone, however, the term NATECH has not been used explicitly. It will be helpful to identify such events by the existing nomenclature of NATECH so that such past incidents are not considered as one-off events but are understood holistically. Besides, various existing frameworks, case studies, and policy documents on NATECH risk management availably globally and nationally could then be easily be linked to and can aid the relevant stakeholders in enhancing the local mechanism for management of such risk scenarios. This will also support adequate capacity building of the involved stakeholders on aspects of NATECH risk management.

x. The SDMP informs of the existence of the State, District, and Local Crisis Groups for the management of major chemical accidents and lists their key functions in this regard. It is suggested that the aspects of multi-hazards, cascading and compound risks including the NATECH risk may be reflected in the functioning of the Crisis Groups, Factories and Boilers, and also in the on-site and off-site emergency plans.

xi. The SDMP prescribes for preparing a standard drill for responding to cyclones, floods, tsunami, etc. However, it does not lay down any mechanism for undertaking these drills. The plan also talks about conducting regular drills involving Police, Civil Defence and Fire Services. The plan is silent on if cascading and compound risks are considered during these drills. It is also not clear that which all aspects of the plan are tested through these drills and if the lessons learnt from them are documented and used in improving the plans further.

xii. The biological hazards have not been addressed in detail as a hazard in most of the DDMPs studied. The plans have talked about diseases breakouts in past and have identified the potential roles and responsibilities of health departments in case of such emergencies.

xiii. The DDMPs do not adequately cover pre- and post-disaster measures in case of pandemics or other BPHE. For most of the DDMPs studied, there are no explicit mention on aspects of prevention, mitigation, preparedness & capacity development specific to BPHE. While during response phase, only a brief role of NDRF is mentioned in this regard in some of the plans.

xiv. Some of the DDMPs mention measures like covering drains and maintenance of water pipelines which help in checking diseases caused by contaminated water. They also mention strengthening of infrastructure like arterial roads. Additionally, capacity building measures for public health emergency like safe water and sanitation at block and district level have been mentioned. In most of DDMPs studied, while a brief role of NDRF is mentioned for management of biological hazards, the holistic focus on risk prevention, mitigation and recovery for BPHE is missing. Besides, most of the DDMPs do not lay down relevant legislations for management of BPHE.

xv. Most of DDMPs mention about role of District Disaster Management Authority (DDMA) to set up early warning systems. The information provided by District Emergency Operation Centre (DEOC) is used by different line departments like Chief District Medical Officer (CDMO) to initiate actions. The plans mention the role of CDMO in case of accidents, water disinfection and hygiene. The capacity development activities for heat wave preparedness, mass causality management and public health emergency have been mentioned in the plan. However, there is lack of emphasis on how to manage BPHE and inter departmental coordination for handling them. In most of the DDMPs studied, there is absence specific Emergency Support Function (ESF) focusing on BPHE and management of cascading and compound risks.

xvi. In most of the DDMPs studied, there has been no focus on measures to be taken up at individual/community level for minimizing the impacts of biological hazards.

xvii. The specific mechanism for integrating the risk of biological hazards into DRM planning is mostly missing. For example, in most of the DDMPs studied, there is no consideration of BPHE in aspects of evacuation, shelter management, response and relief management. This is probably because of absence of integration of all-hazard/ multi-hazard approach of risk assessment, planning and management in the districts HRVA and DDMPs.

The desk-based review of plans and SOPs was supported by field-based consultations with relevant stakeholders from key line departments/ agencies at district and block level to understand the gaps and bottlenecks faced and lessons learned by them in implementing the laid down plans on field during disasters in general and COVID-19 and cyclone Amphan, in particular. These primarily included the officials from the District Disaster Management Authority such as Additional District Magistrate (Revenue), District Emergency Officer, and District Project Officer (Disaster Management), Fire Station Officer, Police Officials, etc.

During the stakeholder consultations, it was informed that the disaster management activities in the districts are guided by the DDMPs of the respective district. DDMPs available in the districts are updated on regular basis, however, the updation process was hampered due to the COVID-19 situation last year. The DDMPs covers various aspects of disaster management starting from hazard, vulnerability and capacity analysis of the district, institutional and financial mechanism, preparedness and mitigation measures, response, relief and rehabilitation activities, etc. The District Emergency Operation Centre (DEOC) provides necessary support in the overall implementation, coordination and updation of the plan. Some districts have incorporated a chapter on biological disasters along with the SOPs on COVID-19 duration the current updation process. DEOCs have compiled the guidelines and orders received from various authorities concerning the COVID-19 related public health measures, however the same will be integrated into the DDMPs in the upcoming updates under the chapter biological hazard and related SOPs and sections of the plan. These were under approval during the time of data collection in the study areas.

DDMPs also entail the most vulnerable areas of the districts and the key DRR and capapcity building measures undertaken taken. For example, in the Bhadrak district, the most vulnerable blocks are Chandavali and Basudevpur blocks where a total of 15 Early Warning System Stations have been established. A total 80 cyclone shelters and 24 flood shelters are located in the district, mostly in the coastal areas. For the ongoing COVID-19 pandemic, data is updated on daily basis and shared with higher authorities for the necessary actions. Similarly, there are 140 multi-purpose cyclone shelters in the Balasore district. During cyclone Yass, additional 1200 buildings were added to for ensuring social distancing because of the ongoing COVID-19 pandemic. Around 2.5 lakh people were evacuated from different vulnerable blocks like Bhograi, Remuna, Baliapal, Jaleswar, etc. Disaster management plans and SOPs that are made at the state level are further disseminated to the district, block and village levels. In case of Kendrapara, there are total 117 shelters; 98 shelters of which have been constructed by the OSDMA and 19 by the Red Cross Society. Considering the COVID-19 situation, additional shelters were reserved in the district. Separate shelters were also marked for COVID-19 positive cases. Mike announcements were made in each village for passing on messages and awareness generation. However, these are some of the good practices that have not been included in the DDMP and shelter management SOPs earlier and should be duly reflected in the updated plans and SOPs. In case of Ganjam, there are 72 multipurpose cyclone shelters and 33 multipurpose flood shelters. As the district is highly vulnerable to cyclones / floods, other important infrastructure including schools / colleges, anganwadi centres, etc. are also used as shelters. During the COVID-19 pandemic, additional infrastructure of the district has also been designated as shelters to deal with natural hazards and quarantine centres. There is an existing ODRAF unit in Chatrapur and a new one is coming up in Berhampur. The district of Puri was marooned during the cyclone Fani in 2019. Learning the lessons from the past, the district administration was well prepared for the response during the cyclones Amphan and Yaas. However, the compound disasters of COVID-19 and cyclone Amphan was something new for the district too. This highlights the need for imbibing the all-hazards approach in DRR planning and implementation. Such an approach should also be informed of new and emerging risks.

(a) Consultation with the District Emergency Officer, Balasore

(b) Consultation with the District Project Officer, Disaster Management, Puri

Figure 7: Snapshots from consultations with District Officials

Early warning communication mechanism: Based on the consultations with key stakeholders, the following is learnt regarding the early warning communication mechanism (Figure 8). The information on early warning for cyclones is provided by the Indian Meteorological Department to the Odisha State Disaster Management Authority (OSDMA). OSDMA reports the information to the Revenue and Disaster Management Department which is headed by Special Relief Commissioner. The information is officially passed to the respective District Collectors and response agencies such as ODRAF. The District Collectors pass the information to the emergency section of the district which further disseminate the same to the line departments and response agencies such as medical and public health, police, fire brigade, fisheries, education, agriculture, horticulture, veterinary, irrigation, panchayati raj, etc.

The District Emergency Officer through District Emergency Operation Centre passes the information to the respective Block Development Officers and Tahsildars. Planning for evacuation, shelter, food, medical care, etc. are undertaken at the block level immediately after receiving the early warning from the district in coordination with the block, tahsil and panchayat level line departments including the medical officer of the CHC, block program manager of NHM, police and fire brigade, panchayat executive officer, sarpanch, gram panchayat extension officer, etc. Other response teams like ODRAF and NDRF are mobilized and deployed at the areas to be affected and are micromanaged at the district and block levels.

At the village level, the information is communicated to the community through the sarpanch, gram rakhi, ASHA, Anganwadi worker, SHG groups, shelter committee members, volunteers, etc.

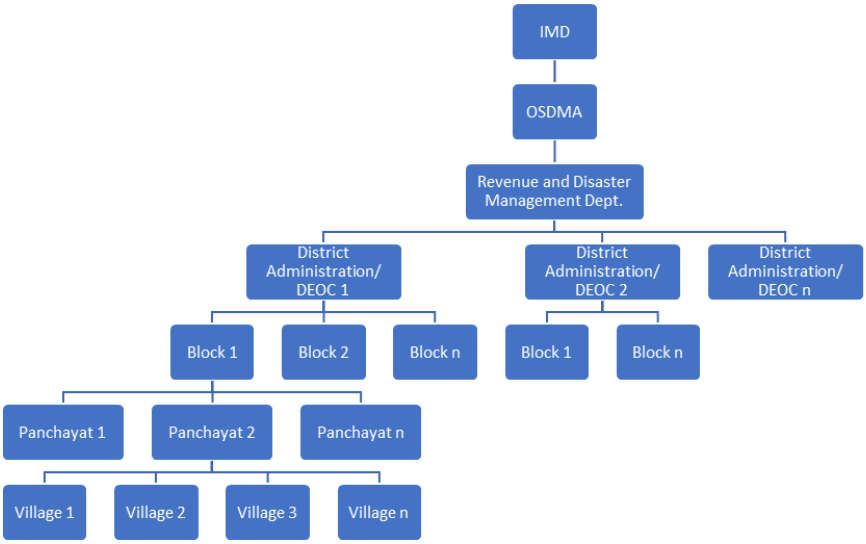


Figure 8: Flowchart depicting early warning communication mechanism for cyclones

It is learnt that District Fire Services have provided active support during the management of cyclones such as Fani, Amphan and Yaas as well as COVID-19 pandemic. Key roles and responsibilities assigned to the Fire Services included clearance of road by cutting fallen trees and electric poles; providing support to shifting critical patients; rescue and relief operation; distribution of dry food items; and sanitisation of shelters, and containment zones, etc.

In terms of district-level capacities, there are 9 fire stations in the Bhadrak district and a total 16 personnel are available in the district headquarter fire station and 116 personals in the district. Fire stations are equipped with key response equipment such as OBM, power saw, escalator, combi tools, etc. During cyclone Amphan, roads were cleared within 2-3 days to ensure continuity of essential medical and other transport facilities. Based on the alerts from IMD and directives from the administration, teams from other districts were also deployed and kept ready for the actions. Two fire service personnel were also stationed at COVID-19 hospital for fire safety during the night. Besides, fire safety and evacuation mock drills were last conducted at the District Headquarter Hospital (DHH), Bhadrak in April and June, 2021. There is no fixed timeline for conducting these drills but are regularly conducted as when hospital administration provides directives.

(a) Consultation with Fire Station Officer, Bhadrak

(b) Fire Station, Bhadrak

(c) Consultation with Odisha Fire Services Officials in Banpur NAC, Khorda

Figure 9: Consultation with Fire Services

In Kendrapara district, there are total 10 fire stations with an average 8 to 10 personnel at each fire station. Additional 10-20 civil defence volunteers are also registered at each station. The Fire Services provide support in road clearance, building collapse, dewatering, and evacuation of trapped persons and animals during the cyclones. During cyclone Amphan, they have rescued 75 people in the night from the flooded delta areas and have supported the sanitisation of the contaminated areas, public and private vehicles. Further, they had provided necessary services and support at shelters. If required, their personnel use the emergency equipment available at shelters.

Ganjam district has 23 fire stations and as per policy of the Govt. of Odisha, each fire station has been developed as a multi-hazard disaster response unit in addition to its core mandate of fire-fighting and rescue operations. This policy decision was taken post the 1999 super-cyclone. This has enabled the Odisha fire personnel to be trained and equipped over a period of time to enhance the capacity of state government and district authorities to play a key role in disaster risk management. The fire stations play a key role in road clearance to enable easy movement of vehicles, assist the District Collectors's office in evacuation and relief and rescue operations. They had played a critical role during Cyclone Titli and Fani that had impacted the district widely. The fire stations are well-equipped to deal with cyclones and floods situations. There is availability of power boats, ASKA lights, lifebuoy, life jacket, power saw, underwater BA set, hydraulic combi-tool (only at Chhatrapur) amongst other necessary equipment. A monthly update on the equipment and their working status is provided by the fire station to the Fire Officer, Berhampur. Mock-drills are conducted intermittently but, mostly to deal with a Tsunami situation. There is no particular time-line/frequency of the training /drill but, it mostly depends on the direction from authorities. Earlier the trainings were also organized in schools/colleges and selected industries, but the frequency has reduced now. Apart from the trainings at the district level, some trainings are also organized in Bhubaneswar on DRM.

To deal with the COVID-19 pandemic, there is no specific SoP that has been issued but whenever required, there are orders issued by the District Collector's office. The protocols mostly includes usage of masks, sanitizers, maintaining social distance at the shelters as well as during the transportation of people during evacuation. Apart from this, the District

Administration based on the need and requirements of the situation issues directives to deal with the situation including distribution of masks, PPE kits, sanitisation equipment in the shelters, hospitals and other places of importance. The Fire Services have also been playing a key role in sanitizing buildings and other places of importance including shelters.

Another important line department consulted is the Police Department. It plays a very critical role in ensuring law and order during disasters. During the cyclone Amphan and COVID-19 pandemic, the Police Department played a crucial role in supporting the implementation of the laid down guidelines and safety protocols. Separate squads were formed during the cyclone Amphan to ensure physical distancing and wearing of masks. The police forces assisted Block Development Officers (BDOs) and Tehsildars during floods and cyclones in evacuating people from low lying areas and shifting them to the safe shelters and ensuring proper crowd management. They also assisted in road clearance, sanitisation, free and fair distribution of relief materials, dry and cooked food. VHF and Walkie-Talkie sets of the Police Department help in ensuring continuous communication among the forces deployed on field and the control rooms and EOCs. Generator sets were also made provided at police stations to charge VHF sets for ensuring uninterrupted channels of communication during disasters.

At DHH Kendrapara, three police personals remain on duty to manage the crowd, help patients and provide security to the doctors. During cyclone Amphan and Yaas, the police helped ODRAF and NDRF in road clearance and transporting old age persons and pregnant women to shelters and hospitals. They also supported the process of post-mortem and handing over the dead bodies to respective families.

Additional manpower from home guards was used for various key functions such as patrolling, traffic management and monitoring the movement of the people at the cyclone shelters. Local volunteers and Gaon Kalyan Samiti (GKS) provided support in the field level activities such as distributing COVID-19 kits, sanitisation, vaccination, post-cyclone food distribution, and transportation of Alternate Vaccine Delivery, etc. Diesel generator sets were made available at each of the Community Health Centres (CHCs) and to support the cold chain.

In Ganjam, the office of Home Guards plays an important role in assisting the District Administration during any disaster situation. Though ODRFAF has a major role to play in any disaster situations, the Police Department contributes largely towards managing law and order situation. In situations of disaster and especially during the COVID-19 pandemic, a number of law and order situation arose where the District Administration took the assistance of the Police/Home Guards/Civil Defence in managing the situation.

During the 1st wave of the COVID-19 pandemic, the Police and Home Guards were actively involved in assisting the District Administration with the incoming migrant population. They were involved with assisting the Health Department officials in screening personnel, arranging transport services to shift the migrant population at quarantine centres, managing the law and order situations at the quarantine centres as few of the returnees did not want to stay at the quarantine centres and also managing any untoward incidents at the community levels. Due to the restrictions imposed to curb the pandemic, there was a lot of resistance initially from the

communities leading to law and order situation. Thus, in such a scenario, the Police/Home Guards were actively supported the District Administration and other line departments to manage the situation on a 24*7 basis.

During cyclone Yass, Police and Home Guards were actively involved in assisting the District Administration for managing the impending situation. The key challenge faced by them in management of cyclone and pandemic together was maintaining physical distancing. As there is already resistance from people to move to cyclone shelters and other safe places, convincing them to maintain physical distance, wear masks and sanitize was an added responsibility and also led to law & order situation in some places. The key roles that Police and Home Guards have played during cyclone Yass and COVID-19 is supporting the District Administration and key line departments during announcement of the impending disaster, assisting in evacuation of people and livestock while maintaining the COVID-19 protocols and also ensuring the same in shelters, places of relief distribution, etc.

A very small training component on Disaster Management is included during the training for police personnel and home guards and orders/directives issued from District Collector's office or any other line department during the time of disaster guide their work. During the pandemic situation, managing people to follow the protocols has been the main task of this unit. To enable the same, regular co-ordination meetings take place under the DM/ADM where responsibilities are distributed and regular updates are taken and solutions sought for any particular concerns. This calls for inclusion of new roles (such as sanitisation, and other pandemic-related roles) which the Police, Home Guards and Civil Defence in the disaster risk management plans along with appropriate capacity building considering similar future scenarios.

Consultations with stakeholders highlighted the need for investment in disaster resilient infrastructure which will help in avoiding the cost of rebuilding in disaster prone areas. They have suggested creation of coastal belts and tree covers like mangrove plantations near the coastline for reducing the potential impact of high-velocity winds and flooding in coastal settlements. Similarly, underground power cabling is one of the solutions to reduce the damage to electrical lines and poles during disasters. The stakeholders further underscored that DRR may be adopted by the corporates as part of their corporate social responsibility. The disaster risk management plans can identify some key DRR measures which can then be taken up/supported by the corporates, so that the resources available with the private sector are best utilised as per the local needs and contexts. Besides, the plans can include insurance mechanism and existing policies/ schemes in the existing financial mechanism for disaster risk management and disaster recovery.

Some of the key challenges in the application of such plans and SOPs in real disaster preparedness and responses by referring practices for Cyclone Amphan are listed below:

- The process of updation and approval of DDMPs got affected and delayed
- Although schools were being used as evacuation shelters in addition to flood and cyclone shelters, the COVID-19 protocol for physical distancing was not maintained owing to the large number of people evacuated and the space available.

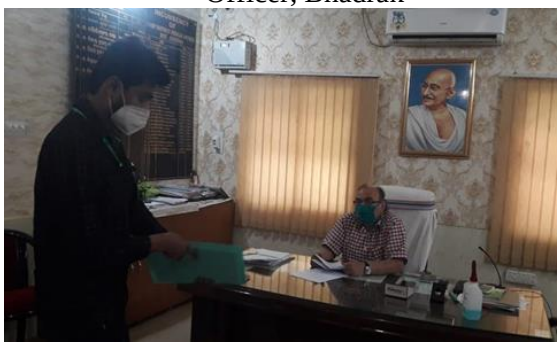
- Many schools failed to provide proper shelter owing to their limited or lack of proper basic facilities. There was a lack of WASH facilities, especially the lack of toilet facilities, which also lead to a lack of cleanliness.
- The difficulty in using safety gears while disaster rescue and response activities and fear of getting contaminated was a challenging issues to address
- Convincing people to move to shelters is an arduous task as they do not want to leave their belongings and livestock behind. In reference to COVID-19, people did not want to move to quarantine centres that had led to law & order situation in a number of cases.
- The frontline workers who were in charge of looking after COVID centres and quarantine centres have faced the wrath of people / villagers for fulfilling their duties. Proper IEC / communication measures ought to be in place to make people aware about evacuation / quarantine and have adequate safety measures for frontline workers.
- In some instances the frontline workers including Anganwadi / ASHA workers / care takers of shelters informed that regular supply of PPE kits, sanitizers, masks and gloves weren't provided. In such instances, some of the workers were exposed to hazardous situations. Thus, regular supply of preventive equipment should be provided to frontline workers and others involved in relief and rehabilitation measures at regular intervals.
- Lack of inter-departmental coordination, lack of experienced field level manpower, lack of training and capacity building programmes on effective disaster preparedness and recovery.
- Stakeholders have highlighted that local dialect plays a crucial role in disseminating the critical information related to health emergencies and natural hazards to the community. But most of the time, information, communication and education materials are prepared in dominant Odia language. There is a need to use local dialect and visual mode of communication and outreach programmes (pictorials and audio-video) for effectively and meaningfully sensitising the rural and tribal communities on the impending disaster and health emergencies.

2. Study of SOPs and COVID-19 related public health measures undertaken and the capacity of the health care system

Various officials at district and sub-district levels were consulted to understand the key COVID-19 related public health measures and overall health care system with the help of the developed tools for data collection and analysis. The key officials consulted include officials such as Chief District Medical and Public Health Officer (CDM&PHO), Assistant Public Health Officer, Hospital Manager, District Headquarter Hospital (DHH), District Project Manager, National Health Mission, In-Charge, CHCs and PHCs and other medical staff.

(a) Consultation with District Public Health Officer, Bhadrak

(b) Consultation with District Project Manager, National Health Mission, Puri



(c) Consultation with the Chief District Medical Officer, Banpur NAC, Khordha

(d) Consultation with Additional Public Health Officer, Balasore

Figure 10: Snapshots of consultations with the Health Officials

Micro disaster management planning

Public health and medical preparedness for disaster response; and micro-level disaster management planning at the CHC level in the flood/cyclone-prone areas have been developed as per the State's directives. These plans incorporate details of the vulnerable locations in the areas. Instructions are also given to the CHC/PHC to constitute a Rapid Response Team (RRT). The team usually consist of one doctor, one pharmacist, one ASHA, two ANM and two health workers.

During cyclone Amphan and Yaas, patients were transported to the health facilities without much difficulty. Pregnant women were already shifted to DHH before three days of predicted cyclone landfall. Waterlogging and cut-off of some areas were usually observed in both the cyclones. The areas were regularly supervised by the health staff. Regular surveillance was being done through IDSP and the central control room for COVID-19.

After the cyclone has crossed an area, assessment is carried out to find out the key impacts; mainly on affected facilities/utilities, and the affected population. Disinfection drives are carried out in the all affected areas, where majorly wells are disinfected to prevent/control potential water-borne diseases. Local administration assists in the evacuation of the people to safe areas. Panchayat assists in providing food. The Engineering Wing of the Health Department assists in the construction of health posts in vulnerable areas, as required.

Health facilities and public health measures in Balasore

There is one District Headquarter Hospital (DHH), 9 Community Health Centres (CHC) and 32 Primary Health Centres (PHC) in Balasore district. Micro disaster management plans are prepared at the CHC level, especially in the flood/cyclone-prone areas to respond to the disaster. These plans incorporate details of the vulnerable locations in the area. Instructions are also given to the CHC/PHC to constitute a rapid response team (RRT). A team usually consist of one AYUSH doctor, one pharmacist, one ANM, two ASHAs, one FHW and one male worker. They also take measures to prevent and proper precautions for any potential the outbreak of diseases/epidemics in the aftermath of cyclones and floods. Regular medical camps are conducted, as per need. It was learnt that works are being delegated after receiving the guidelines from the centre and state.

During cyclones amidst COVID-19, the ASHAs were instructed by the Health Department to lookout for people who need medical aid in the cyclone shelters and also check people for routine diseases such as fever or diarrhoea, etc. They distributed ORS, paracetamol, cetirizine and other basic medicines in the shelters. They were given orders to ask the people individually if they needed any medical support. It was informed that practice of physical distancing was compromised in some of the cyclone shelters as they accommodated greater number of people than their capacities. Masks and soaps were distributed in the shelters. People were strictly instructed to wear masks and follow hand washing regularly.

It is also learnt that because of the pandemic, routine activities like Village Health and Nutrition Day were alternatively conducted by paying home visits. Each mother was visited in their respective houses. Home-based neonatal care was also delivered at the doorstep. As Anganwadi centres were closed, the beneficiaries were given a dry ration at their doorstep.

Health facilities and public health measures in Bhadrak

In terms of public health-related capacities, there are one District Headquarter Hospital (DHH), 7 Community Health Centres (CHC) and 52 Primary Health Centres (PHC) in Bhadrak District. The DHH provides a wide range of public health facilities, both general and specialised. OPD, IPD, COVID-19 care, trauma, MCH, SNCU, paediatric, chemotherapy, etc. A total of 50 doctors, 55 nurses, 15 pharmacists, 15 lab technicians, 5 radiographers, 1 hospital manager, 1 senior clerk, 1 junior clerk, and 1 accountant are available in the DHH. IDSP unit undertakes surveillance activities. Mostly, the logistics and supply chain remains smooth in the hospital. It was informed that there is a need of more pharmacists in the district. Further, disaster management training is required for all staff in the hospital.

The current hospital started way back in 1947 as a sub-district hospital and was later converted into DHH in 1993. New buildings were also added to the existing ones. Realising the infrastructural deficit, a new hospital compound is coming up. The existing hospital compound has direct road connectivity. There are total nine buildings in the hospital; the tallest one has five floors. Lifts are available in two buildings. Civil engineers of the department look after the safety aspects of the buildings. Renovation activities were carried out when required. 24 hours water supply is ensured in the hospital. Three staff regularly monitor and repair the systems in

case of damage or disruption. A total of 637 oxygen cylinders is available in the hospital. In normal circumstances, 10 to 15 cylinders are used and that regularly gets filled. A full air conditioning system is only available in the neo-natal care unit. Total 36 security personals are available in the hospital who look after parking, patient lines monitor entry-exit, and perform ward duties.

The hospital manager looks after disaster management related activities. The hospital is located on a higher ground. However, it has faced flooding during the 1999 Super Cyclone. Fire is another potential hazard in the hospital. The hospital has only a single entry and exit point. Firefighting equipment are available in the buildings at various locations. There is no space for parking neither for safe assembly area within the hospital compound. Staff from the Fire Services remain available to look after the fire safety system. However, the emergency exits are not marked. Periodic meetings and fire mock drills are also conducted.

Health facilities and public health measures in Ganjam district

Ganjam district has 1 medical college, 1 DHH, 2 SDH, 30 CHC, 89 PHC AND 1 Zonal disp. The total no of sub-centres is 460. Micro disaster management plans are prepared at the CHC level for areas prone to different natural hazards. Along with developing a hazard/vulnerability plan, a team is also constituted that is deployed during emergencies. In case of any natural hazard event or in the case of the present COVID-19 pandemic; the guidelines issued by the Health Department, GoO or directives/orders issued by the District Collector's office, CDMO play a critical role in deciding the next steps of action.

Though the basic facilities like fire safety equipment, emergency routes, etc. are made available in the health centres, it is learnt that there is a need to regularly review them for their effective usage. The same also needs to be reviewed in shelters and other safe places of safety where the people are shifted to during emergencies. Availability of first-aid boxes, wheelchair, stretchers, etc. needs to be reviewed frequently in shelters so as to enable its effective usage during emergencies.

During cyclones amidst COVID-19, the district followed various guidelines, directives, SOPs issued by the Health Department, OSDMA and other respective line departments. During the ongoing pandemic, the District Administration has started tele-medicine facilities to enable people to utilize the health facilities effectively. A WhatsApp group of local traders was formed who were in charge of online delivery or supply of essential items during lockdown and shutdown.

Health facilities and public health measures in Kendrapara

The District Headquarter Hospital in Kedrapara has a total of 30 doctors, 35 staff nurses, 10 attendants, 45 housekeeping staff, 10 pharmacists, 10 lab staff, 17 security staff and 5 x-ray staff. The DHH operates a 24*7 call centre during the cyclone period. All pregnant women in the areas likely to be affected are shifted to DHH in advance. Extra manpower was hired during the COVID-19 in terms of doctors, staff nurses, security and patient care attendants. Fire safety equipment are installed in the hospital and are regularly checked by in-house electricians. They

are also trained in operating fire extinguishers. The fire alarm is not available in the hospital. Emergency exits are available in the hospital; however, they are not marked. The internal committee meets once in two months and as when required during cyclones and floods. Fire safety mock drills are conducted annually during the refiling of the fire extinguishers.

Figure 11: District Headquarter Hospital, Kendrapara and Fire Safety Measures in the Hospital

Health facilities and public health measures in Khordha

In rural areas, many people still struggled to name a correct symptom of COVID-19, one third did not know any high-risk groups. Health knowledge about COVID-19 was notably lower among caregivers for sick or elderly household members. ASHA workers, Anganwadi workers, and auxiliary nurse midwifes (ANMs) typically serve as information providers on health matters. In routine, they are periodically trained in-person as per the demand of situations, however, the same was not possible during the pandemic period. This may have possibly contributed to less reliance on these traditional change agents as many people reported that they primarily received key information on the coronavirus from the television and news compared to the Anganwadi or ASHA workers. Additionally, the common message delivery mechanism of person-to-person communication was less feasible as people were more isolated during the pandemic, which may have resulted in a change in information channel to other sources for COVID-19 knowledge.

There was also a gap in messaging content, which suggests that messaging needs to be designed keeping in perspective the broader aspects of health impacts such as physical health, mental health, and nutrition needs. Furthermore, message delivery channels need to be made accessible to all, including women with limited access to the external world. As such, new delivery channels need to be explored for creating awareness other than the village meetings or in-person consultation and digital literacy may be helpful in this context. It is learnt that there is a need for enhanced government response to reinforce livelihood and mental, social, and nutritional health during and post pandemic.

It was informed that there needs to be more functional autonomy and clear cut devolution of responsibilities on the institutions of local self-governments to address the specific health needs in each locality. The COVID-19 pandemic has heightened the need to strengthen PHCs at village level by provisioning of acceptable level of health care personnel, more number of beds,

diagnostic facilities, intensive care units and improving the quality of supply chain management in providing essential health service delivery to rural areas. The network of laboratories and contact tracing teams at block, district, state and national levels needs to be strengthened. This will increase the pace of identification, diagnosis, contact tracing and isolation of infected people. It was discussed that raising awareness through a massive public outreach campaign needs to be promoted as the first step to fight against future pandemic in the rural areas. During the consultations, it was highlighted that the outreach programme should be based on rural/tribal lifestyles, have rural characters, and be presented in vernacular languages. There should be special guidelines for the more vulnerable groups such as pregnant women; given the shortage of medical facilities in rural areas.

Health facilities and public health measures in Puri

Public health and medical preparedness for disaster response in Puri were primarily informed by state's guidelines and orders. The micro-level disaster management planning is done at CHC and PHC levels in cyclone and flood-prone areas, especially during the COVID-19 pandemic to contain the infection and respond to the cyclone simultaneously.

The micro-level disaster management plan is also available at the CHC in Astaranga block of district, which guides the overall disaster response at the CHC level. It was learnt that CHCs generally lack adequate safety measures such fire extinguishers and training to use them in case of fire. Besides the buildings are often have old structures leading to seepage of water. The stakeholders informed that the dual disaster scenario of cyclone and pandemic brought additional challenges to respond but appropriate measures were taken to address them. Rapid response teams performed their duties such as maintenance of routine and essential services.

Reflections from the consultations indicate that for hazards like cyclones and floods, which require evacuation of at-risk communities to safe emergency shelters, community healthcare workers like ASHAs and Anganwadi workers play a major role. During cyclones and floods amidst COVID-19, community healthcare workers like ASHAs and Anganwadi workers played crucial role of inspecting the evacuating person for symptoms. They administered essential drugs like antipyretics, anti-diarrheal, anti-allergic, etc. to the person, as and when required. Vulnerable groups such as pregnant women who have their estimated date of delivery within the next 10-15 days are transferred to the nearest health facilities where they can deliver safely. There was provision for safe drinking water. Besides, chlorine tablets are also used for disinfection of existing water sources. The Health Department is always ready for any kind of post-disaster epidemic situation. They organize medical camps in different villages, as per need.

In case of COVID-19, before evacuating the people, the shelters were properly sanitized. The same process was re-done after the people left to their respective homes. To maintain the COVID-19 protocols, sanitisers and masks were distributed. As there was a challenge to maintain physical distancing among the people, 50% capacity of the shelters were being filled. Alternate safe shelters such as nearby schools, panchayat offices situated at a higher level were identified and used for doing so. In many areas, doctors were sent to examine people at the shelters and to undertake required testing.

F.1.3. Key recommendations

The key gaps in plans and SOPs pertain to lack/absence of adequate integration of BPHE in risk assessment, planning and management. Some of the key approaches and aspects for enhancing the integration of biological hazards into DRM planning are discussed below.

A useful approach for ensuring the **all-hazards approach**. Such an approach will not only help in laying down risk-informed planning but will also provide the opportunity to the key stakeholders and policy makers to capture the potential interactions of different hazards leading to scenarios of cascading and compound risk as witnessed in the case of simultaneous occurrence of cyclone Amphan and COVID-19 pandemic.

Such an integration is also underscored in the global frameworks such as the Sendai Framework and the Bangkok Principles. The review and stakeholders consultations highlight the need for aligning the existing plans and SOPs with current global policies and frameworks which are duly endorsed by India. The SDMP, DDMPs and related SOPs can provide a useful tool in ensuring localisation and effective implementation of these policies and framework. Similarly, the **one health approach** endorsed by the WHO needs to be duly integrated with DRR planning at all levels. The one health approach envisages to design and implement programmes, policies, legislation and research in which multiple sectors communicate and work together to achieve better public health outcomes. Control of zoonoses (diseases that can spread between animals and humans), food safety, etc. are among the key areas of concern where one health approach can provide effective prevention or mitigation and management measures.

The key focus of plans and SOPs often seem to be inclined towards hazards. However, the disaster risk management plans should be able to enhance the understanding of **all dimensions of risk** (hazards, exposure, vulnerability). In line with the paradigm shift brought forth by the Sendai Framework, the focus of the plans and SOPs should on disaster risk management rather than only disaster management. For this, the plan development process should be well-informed of updated datasets on all dimensions of risk. This requires close coordination among various line departments with whom different datasets and information concerning physical, geological, geographical, social, health, cultural, financial, legal, political drivers of risk are available. Identifying a nodal officer for disaster risk management in each of the key line departments (such an officer should be identified designation wise and not name wise to avoid issues of potential vacancy due to transfers and retirement) can help establish robust inter-department coordination and collaboration; imbibing an **all-of government approach**.

As experienced in the cases of various past disasters and BPHEs, depending on the inherent nature of diseases, different age group, existing comorbidities, underlying socio-economic vulnerabilities, different vulnerable groups are affected differentially. Thus, there is a need for including **vulnerability-disaggregated baseline databases** of the population in the disaster management plans. This will help the decision makers in devising targeted and effective measures for capacity building, ensuring social protection, prompt response and relief planning and inclusive and holistic recovery. This should be supported by mechanism for regular

updation of these databases. Efforts should also be made to digitise such baselines so that they quickly accessible by decision makers during disasters.

With the emerging risk landscape where various new and emerging risks are increasing interacting with the existing ones, there is a need to have in place **robust risk assessment, and disease surveillance mechanism**. It is crucial that the existing plans and SOPs are regularly updated and are necessarily informed by these new risk-patterns. For ensuring that the plans are well integrated with biological hazards, there is a need for **stronger collaboration** among the disaster risk management professional/decision makers and health and public health professionals/ decision makers. This possibly calls for closer coordination among the SEOC, DEOC and control rooms of Health and Public Health Departments and agencies. The role of academic and research institutions and private sector is also crucial in this regard. Existing technologies along with the new and emerging ones should be duly leveraged for early/timely capturing of disaster risks, public health risks and their potential interactions.

Inclusion and active engagement of all sections of society should be encouraged. The plans and SOPs should explicitly underscore **inclusive and whole-of-society approach**, with special focus on all vulnerable groups in all phases of DRM. Over the years, c**ommunity based disaster risk management** has contributed significantly in reducing the number of deaths in Odisha. The consultations suggest the need to institutionalise this approach into the plans and SOPs which can support better understanding of envisaged roles, responsibilities and better coordination among the government departments, agencies, grassroot institutions and communities.

Some of the key points of considerations while updating the disaster management plans and SOPs with focus of integrating biological hazards and their risk management are:

- Updation and approval of the SDMP and DDMPs incorporating separate chapter on biological hazards and the risk management including all the safety, precautions and SOPs related to COVID-19 from the competent authorities for its immediate implementation.
- Inclusion of appropriate measures to guide and motivate population at-risk for evacuation to shelters while following pandemic appropriate behaviour
- Establishing a robust communication mechanism within the department at different levels and with all line departments targeting a “zero casualty” approach
- Incorporation of a medical professional in the rescue and response teams of the line departments other than public health
- Along with earmarking the schools as cyclone and flood shelters, ensure that schools are in good conditions, have proper safety equipment, and other basic facilities such as WASH (Water, Sanitation and Hygiene). Apart from that, as the schools have also served as isolation, quarantine and TMCs during the COVID-9 pandemic, fix responsibility in the state and district plans for development and updation School Disaster Management Plans (SDMPs). Include measures in the plans for strengthening

the capacity of schools and its stakeholders in effectively implementing the laid down SDMPs and SOPs.

- Include in the plans key measures along with fixing of responsibility for conducting structural and non-structural safety audits of the health facilities and implementing the mitigation measures recommended in the audit.
- Detail out the plan for procuring additional manpower and critical resources in time of crisis.
- Establish a proper mechanism in the plan for maintenance of the cyclone and flood shelters, usually those not being used regularly for other purposes such as schools.
- Detail out the monitoring and reporting mechanism at the shelter points for the entry and exit of people to facilitate better planning and coordination for the administration as people often go back to their homes without reporting.
- Develop a training calendar for various stakeholders on different aspects of disaster risk management including coordination mechanism.
- The plan should recommend appropriate training and capacity building measures for key stakeholders. For example, in CHC/ PHC, training should be organized on DRM for doctors, health workers (both male and females). The training should include patient treatment in emergencies, mass casualty management, preventive measures, transportation, reporting, monitoring and evaluation, inspection, etc. Similarly, there is a need for strengthening the fleet of Rashtriya Bal Swasthya Karyakram vehicles that are being used for transportation at CHCs.
- Establish a mechanism for proper arrangement of basic facilities such as food and accommodation of the response teams.
- As the pandemic has affected small businesses, MSME units, agriculture and allied activities, measures to maintain the economic and social fabric of the communities may also be considered as part of the relief and rehabilitation operations in the plan
- A number of schemes of the Govt. especially those dealing with livelihood/employment generation/health, etc. may be integrated into the existing DRM/DRR plans along with integrating measures to handle biological hazards
- Utilizing the services of youth groups, village committees, SHG group members and other voluntary groups should be explored in disseminating information.
- The table-top exercises and mock drills that are mandated to be organized at the district level should also include a section on COVID-19 management in the midst of other natural hazards. Plan should lay down measures to build capacity and train the disaster management volunteer force being created on management of COVID-19 and other BPHE amidst natural hazards.
- Measures to be adopted to ensure regular supply of masks, sanitizers and other items to frontline workers and others in the field to manage the COVID-19 pandemic should be included in the plans and SOPs.
- Telemedicine as an option to cater to the needs of health facilities of communities when access to health institutions become difficult should be included in the ESF on Management of Health and Public Health. Plan should also lay down measures for

strengthening such tele-facilities in respective jurisdictions along with appropriate capacity building of the staff.

- Network of local traders/suppliers to be formed in association with the District Administration that can supply essential items when accessibility becomes difficult during natural/biological hazards. Databases of such association, mutual aid groups, etc. should be reflected in plans and resource inventories of the state and districts.

F.1.4. Draft guidelines for upgrading DRR/DRM plans and SOPs

Introduction: Emergencies and disasters often result in significant impacts on people's health, including the loss of many lives. Every new threat reveals the challenges for managing health risks and effects of emergencies and disasters. All communities are at risk of emergencies and disasters including those associated with infectious disease outbreaks, natural, technological, conflicts and other hazards. The health, economic, political and societal consequences of these events can be devastating. More than 1200 outbreaks in 168 countries including those due to new or re-emerging infectious diseases have been recorded by WHO from 2012-2017. Prevailing COVID-19 pandemic has put huge burden on health and development across the world. As on 23 November 2021, globally there have been 257,469,528 confirmed cases of COVID-19 including 5,158,211 deaths (WHO).

Following aspects may be included/supplemented in the state and district disaster risk management plans and SOPs for addressing both biological and natural hazards. These aspects have been broadly categorised under different chapters of the disaster risk management plans (as mentioned beblow).

1. Under hazard, vulnerability and risk assessment

Public health risk assessment: Public health risk assessment is the process of estimating the nature and probability of adverse health effects in humans who may be exposed to different hazards, including biological hazards, now or in the future. Public health risk assessments are carried out across the different stages of disaster risk management of prevention, preparedness, response and recovery. In other words, this assessment aims to find out the potential public health impact i.e. what is the risk related to exposure to a particular hazard in a particular location, or to a particular population at a particular time in terms of health consequences of mortality, morbidity and disability and also refers to the health measures required to minimize this impact. Regardless of different needs during the preparedness and response phases of disaster risk management, all forms of risk assessment should use health information to determine actions to reduce the public health risk of and potential for an ongoing event. Upon confirmation that a reported event is real and may have immediate public health risk, its public health importance needs to be determined. Depending on the information available to assess the risk, a multi-disciplinary risk assessment team (consisting of health, DRM, environmental health, health communication professionals etc.) may be put together. Deciding the disciplines that should make up the risk assessment team is crucial. Additional expertise (e.g. animal health, food safety or radiation protection etc.) can be brought in at any time but may be needed at the beginning of the risk assessment if: the hazard is unknown; the event is unlikely to be caused by an infectious agent; an event is associated with disease or deaths in animals, and/or is otherwise identified as a suspected zoonosis; the event is related to a food or product; known chemical accident, or radio nuclear incident with or without reports of human disease.

Based on the characteristics of the event, the risk assessment team should decide how frequently the risk assessment should be updated. A public health risk assessment includes four basic steps leading to risk characterization:

i. Identifying the characteristics of a hazard and its associated health consequences

Public health hazards can include biological, chemical, physical, radio nuclear hazards. Public health hazards may also be triggered by natural or human-induced hazards. As the initial step, hazard assessment should done. Hazard assessment is the identification of a hazard (or number of potential hazards) causing the event and of the associated adverse health effects. While identification of public health hazard(s), focus should not only be given, to single hazard event but also multiple (cascading and compound) hazard events, if any. This includes identifying the hazard(s) that could be causing the event; reviewing key information about the potential hazard(s) (i.e. characterizing the hazard); and ranking potential hazards when more than one is considered a possible cause of the event. The relative likelihood of a hazard can be determined by:

- clinical features and natural history of the disease in humans or animals
- timing of the event and the speed with which the event evolves
- geographical area and settings affected
- persons and populations affected

ii. Evaluating the exposure of individuals and populations to likely hazards

Exposure assessment is the evaluation of the exposure of individuals and populations to likely hazards. This gives information on the number of people exposed to the hazard and the number of exposed people or groups who are likely to be susceptible (i.e. capable of getting a disease because they not immune). The information required to evaluate exposure includes mode of transmission; information related to the vector and/or animal hosts; incubation period (known or suspected); estimation of the potential for transmission, immune status of the exposed population; and dose and duration of exposure.

iii. Analysing the context, vulnerabilities and capacities associated with the hazard

The context and/or vulnerability analysis takes into account the evaluation of the environment in which the event is taking place, the underlying health characteristics of the exposed populations and the capacity of a health system to respond to a given event and also to multiple (cascading or compound) hazard events occurring sequentially or simultaneously. This may include the physical environment, the health of the population (e.g. nutrition, disease burden and previous outbreaks), infrastructure (e.g. transport links, health care and public health infrastructure), cultural practices and beliefs. Capacity analysis reflects the capacity of the system to manage the health risks, by reducing hazards or vulnerability, or responding to, and recovering from a disaster. Capacity analysis should also be undertaken considering a worst-case scenario involving occurrence of multiple hazard events. This can facilitate in assessing the actual gap in resources and guides for capacity building and/or mapping the nearby and alternate resources too for prompt scaling up to manage multiple hazard events.

iv. Characterizing the public health impact

Public health impact is the estimation of the overall extent of the direct or indirect consequences of hazards on the health of a population. It relies on the understanding of all components of the risk – hazard, exposure and the context, capacities and vulnerabilities.

Risk characterization: Once the risk assessment is carried out the hazard, exposure and context assessments, a level of risk should be assigned. This process is called risk characterization. The characterization of the overall level of risk is based on estimates of the likelihood, in combination an estimate of the public health impact/consequence. A useful tool to assist in this characterization is a risk matrix, where estimates of the likelihood are combined with the estimates of the consequences.

2. Under preventive and mitigation measures

The key prevention and mitigations measures are listed below along with suggestive indication of the responsible departments and agencies.

Structural measures:

i. Multi-hazard resilient health-care facilities should be constructed abiding building codes. Vulnerability assessment of existing health care-facilities need to be conducted and retrofitting should be done wherever necessary (Lead agency-Dept. of Health& Family Welfare; Support agency-NHM Unit).

ii. Triage area for infectious disease and isolation facilities with necessary amenities should be integral part of the any new hospital design and construction (Lead agency-Dept. of Health& Family Welfare; Support agency-NHM Unit).

iii. Installing High Efficiency Particulate Air (HEPA) filters in the ventilation systems to prevent infectious microbes from entering the circulating air inside critical buildings of the health facilities (Lead agency-Dept. of Health& Family Welfare; Support agency-NHM Unit).

iv. Fire safety and electricity safety of the health facilities should be done on a regular interval (Public Works Department).

v. Safety measures for water and medical gas system of the health care facilities should be ensured (Lead agencies - Public Works Department and Dept. of Health& Family Welfare; Support agency-NHM Unit).

Non-structural measures:

i. Environmental management: Disease outbreaks are mostly due to waterborne, airborne, vector-borne and zoonotic diseases. Regular environmental monitoring can help substantially in preventing these outbreaks.

- **Water supply:** A regular survey of drinking water systems, needs to be carried out by periodic and repeated bacteriological culture. Proper and timely maintenance of water supply and sewage pipeline needs to be done for prevention of waterborne disease having epidemic potential (Public Health Engineering Department)

- **Personal hygiene:** Community level awareness about the importance of personal hygiene including hand washing and health education need to be conducted. Measures should be undertaken for provisioning of washing, cleaning and bathing facilities and developing solid waste collection and disposal facilities (Public Health Engineering Department).

- **Vector control measures:** Integrated vector management programme covering following components should be undertaken (Directorate of Public Health through National Vector Control Programme).
    a. Elimination of breeding places
    b. Biological vector control measures such as Gambusia fish
    c. Outdoor fogging and control of vectors by regular spraying of insecticides.
    d. Protection against rodents by improving environmental sanitation. Killing of rodents associated with diseases such as plague and leptospirosis would require the use of rodenticides like zinc phosphides, digging and filling up of burrows, etc.

- **Disposal of the dead bodies:** Dead bodies resulting from biological and public health emergencies increase risk of infection if not disposed of properly. With due consideration to the social, ethnic and religious issues involved, utmost care should be exercised in the dignified disposal of dead bodies. The Ministry of Health & Family Welfare (MoHFW), Government of India has issued 'COVID-19 guidelines on Dead Body Management' detailing the procedure and precautions to be taken at different levels for management of dead body of the suspect or confirmed cases of COVID-l9. As per the said guidelines, the body is to be placed in a leak-proof plastic bag, exterior of the body bag decontaminated with 1% hypochlorite, wrapped with a mortuary sheet or the sheet provided by the family members and handed over to the relative of the deceased for cremation/ burial. The family member(s) of the patient are allowed to view the body at the time of removal from the isolation room or area with the application of standard precautions. Religious rituals, such as reading from religious scripts, sprinkling of holy water and any other last rites that does not require touching of the body can be allowed. The ash also can be collected to perform the last rites. All these are to be performed including transportation of the body following due precautions and hygienic procedures laid down in the said guidelines.

  However, the Govt. of Odisha has taken the full responsibility of disposal of the dead body of the COVID-19 suspect/ confirmed cases. Respecting the religious sentiments and beliefs of the people of different sects, the Government has allowed the followings:

    a. If family member(s) of the patient wish(es) to view the body at the time of removal from the isolation room or area, they may be allowed to do so with the application of standard precautions
    b. The dead body shall be handled and transported in a decent manner
    c. While disposing the dead body at the crematorium/ burial ground, the family members may be allowed to perform the last rites according to their religion/ faith without touching the body, maintaining minimum safe distance from the body and following standard hygienic precautions, such as hand hygiene, use of mask & gloves, no spitting in public place
    d. Bathing, kissing, hugging, etc. of the body are strictly prohibited

e. The family members may be allowed to collect the ash after cremation for performance of last rites
f. If the family members do not wish to take part in cremation/ burial of the dead body of the COVID-19 suspect/ confirmed case, the dead body may be disposed of in their absence following the method of disposal, such as cremation or burial, as per custom of the religion/sect to which the person belonged to. If the religion/sect of the person is not known, either of the procedure may be followed for disposal of the dead body (Directorate of Public Health through National Vector Control Programme)

- **Strengthening the disease surveillance system:** An effective disease surveillance system is essential to detecting disease outbreaks quickly before they spread, cost lives and become difficult to control. Effective surveillance can improve disease outbreak detection in emergency settings. Existing Integrated Disease surveillance Programme (IDSP) needs to be further strengthened. Personnel of State and District IDSP units should be trained for collection and analysis disease specific data to detect early warning signs and take actions to mitigate any outbreak. Active, passive and sentinel surveillance should be done as per the public health requirement. Surveillance at airports, ports and interstate border crossings needs to be strengthened with appropriate controls. (IDSP)

- **Vaccination**: In disaster setting, mass vaccination campaigns and prophylaxis programmes could be useful when indicated in diseases like tetanus, measles, typhoid, cholera, viral hepatitis, etc. Appropriate influenza vaccination, depending on the causative strain, may be considered when the situation demands it. In pandemic situation implementation of mass vaccination campaign should be considered. In the prevailing COVID-19 pandemic vaccination with COVID-19 vaccine is proven to be effective in reducing the probability of contracting COVID-19. The vaccination priority to the target group should be based on the national guideline.

- **Physical distancing measures:** In many conditions the spread of communicable/infectious diseases can be controlled or prevented by reducing direct contact with patients. Physical distancing measures such as functioning at reduced capacities of schools, universities, offices and market place, cinemas are recommended to prevent the gathering of large numbers of people at one place. There should be ban on cultural events. Restriction of entry to railway stations and airports. If applied properly physical distancing can delay the onset of epidemic, compress the epidemic curve and spread it over a longer time, thus reducing the overall health impact. Physical distancing measures are being implemented as one of the important preventive strategies during prevailing COVID-19 pandemic.

- **Use of mask:** Promotion of use of appropriate mask as part of the prevention and control measures that can limit the spread of certain respiratory viral diseases, including

COVID-19 needs to be done at communities, during home care, and in health care settings. COVID-19 spreads mainly from person to person through respiratory droplets. Masks are simple barriers in preventing one's respiratory droplets from reaching others. Studies show that masks reduce the spray of droplets when worn over the nose and mouth. One should wear a mask, even if he/she does not feel sick. This is because several studies have found that people with COVID-19 who never develop symptoms (asymptomatic) and those who are not yet showing symptoms (pre-symptomatic) can still spread the virus to other people. Hence it is important to wear mask. Correct use of mask is very important. A mask is only effective if it is worn correctly. The guideline for correct use of mask must be followed. It is also important to dispose the used masks properly to avoid the spread of infections. Otherwise, the virus could survive on the mask for a long time and can pose a potential health hazard to people who either touch it or come in contact with it. The disposed masks could be a potential source for spread of the deadly contagious virus. The mask should be disposed as per the prescribed guidelines. However, the use of a mask alone is insufficient to provide an adequate level of protection, and other measures should also be adopted.

- **Disease containment by isolation and quarantine:** The spread of communicable diseases in many conditions can be prevented by isolation and quarantine, thereby reducing direct contact with patients. Isolation separates sick people with a contagious disease from people who are not sick. Isolation is normally done at health facility level or at home level based on the health condition of the sick people with a contagious disease. Quarantine separates and restricts the movement of people who were exposed to a contagious disease to see if they become sick. For example, in case of in the context of the COVID-19 pandemic, there are two scenarios in which quarantine may be implemented: (1) the restriction of movement of travellers upon arrival from areas with community transmission and (2) for contacts of individuals with confirmed or probable SARS-CoV-2 infection. Isolation and quarantine policy for prevention of spread of communicable/infectious disease should be based on the national guideline and advisory as well as local context and needs.

- **Contact tracing:** Contact tracing is the process of identifying, assessing, and managing people who have been exposed to a disease to prevent onward transmission. When systematically applied, contact tracing will break the chains of transmission of an infectious disease and is thus an essential public health tool for controlling infectious disease outbreaks. The decision to test some of the contacts and to quarantine others is based on risk assessment process considering factors like –proximity, duration, nature of exposure as well as other factors. In case of infectious disease outbreak, epidemic and pandemic situation contact tracing should be done as per the national/state health sector guideline. Close and consistent engagement with communities is critical for successful contact tracing. This should include sensitisation and community involvement in planning, selection of contact tracers, contact tracing methodologies and channels of communication. Existing community-based mechanisms such as

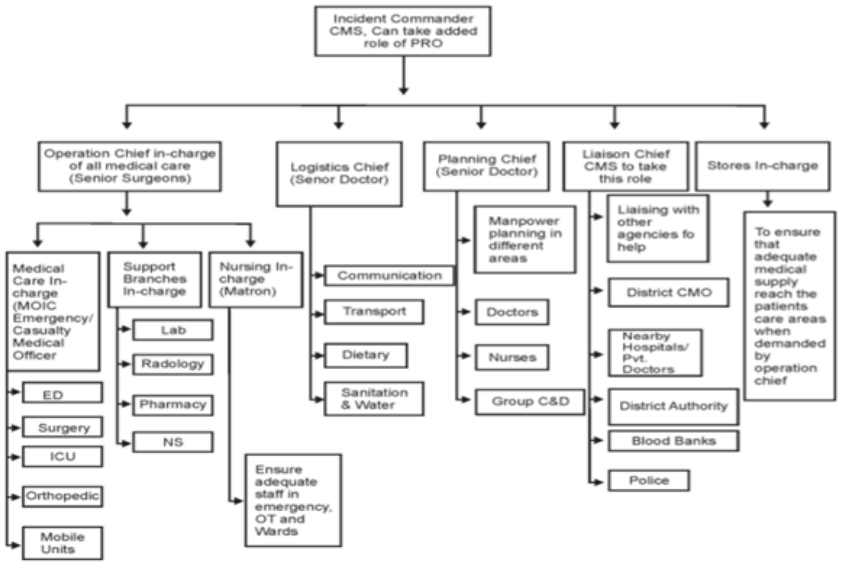
Ward/Village Disaster Management Committees and Teams may be leveraged for the same after laying down proper SOP for them.

3. Under preparedness measures

Facility level Preparedness measures

i. Coordination and Management for disaster preparedness and response readiness:

To facilitate effective preparedness and response during disasters, an efficiently functioning Hospital Incident Response System (HIRS) should be established in each hospital (figure). The overall objective of the HIRS structure is to enable the development of strategies, management of resources, planning and implementation of operations in emergency situations.



ii. Development/updating the Hospital Disaster Management Plan

Each health facility needs to develop its disaster management plan describing comprehensive and actionable plan for disaster preparedness, response and recovery corresponding to the pre-disaster phase, disaster phase, and post disaster phase respectively. All staff of the health facilities should be properly oriented on disaster management plan of the health facility and sensitized about their role and responsibilities. These plans should clearly delineate the SOPs on how to increase the surge capacity (treatment and surgical) of the health facility for mass casualty management during emergencies. There should be an alignment between the disaster management plans of the health facilities at different levels.

iii. Medical relief team and mobile medical team

As per the capacity and capability, the hospitals should plan for provisioning of medical relief in case of major eventualities in the locality. Hospitals should also prepare its mobile medical team to provide healthcare services during emergencies.

iv. Organizing periodic drills at health facilities to test response capabilities

Every health facility should conduct periodic drill and rehearsals to test the response capabilities to emergencies in real time which will serve as opportunities for practical learning

for the hospital staff. Mock drills should be conducted not only choosing the single hazard scenario but also for multi-hazard scenario. There are several types of hospital drills which include computer simulations, tabletop exercises and operationalized drills involving specific emergency scenarios. In addition to the drills organized at health facilities, the human resources of each of these facilities should also participate in the other drills and simulation exercise by different departments and stakeholders in their jurisdiction/zone of influence to get acquainted with operations and management at the site of disaster and/or temporary field-based health facilities established during emergencies. This will also provide opportunity for closely coordinating and working with other emergency line departments and agencies similar to a real disaster situation.

v. Logistics, supply and financial management

To ensure efficient logistics, supply and financial management during emergencies, each hospital/healthcare facility should:

- Develop and maintain an updated inventory of all equipment, supplies and pharmaceuticals and establishment of a shortage-alert mechanism
- Estimate consumption of essential supplies and pharmaceuticals using most likely disaster scenarios
- Consult with relevant authorities to ensure the continuous provision of essential medicines and supplies
- Assess the quality of the contingency items prior to purchase
- Establish contingency agreements with vendors to ensure the procurement & prompt delivery of equipment and supplies in a disaster situation
- Develop mechanisms for storage and stockpiling of additional supplies including pharmaceuticals and ensure an uninterrupted cold chain
- Establish mechanisms for quick assessment of the functional status of different equipment and prompt maintenance and repair of those equipment required for essential services.

In addition to this, a centralised databased should be maintained at district/block level on facilities available in each health units such as beds, specialised wards (ICU, for children, etc.), treatment capacity, oxygen supplies, etc. which will facilitate prompt decision making for patient referral and resource management during disaster situations.

vi. Enhancing the surge capacity of the healthcare facilities

Every hospital should calculate their surge capacity early in the planning process such that the disaster response structure can be established, expanded, and contracted depending on the type and size of the incident. To ensure that the estimated surge capacity is applicable in real-time situations, every hospital should:

- Estimate the expected increase in demand for hospital services and calculate the maximum capacity required for the same
- Identify methods of expanding hospital inpatient/outpatient capacity

- Outsource care or shift non-critical patients to appropriate alternative sites to increase the hospital's capacity
- Designate care areas for patient overflow
- Verify availability of vehicles and resources for patient transportation
- Establish mechanisms for inter-facility patient transfer
- Identify potential gaps in the provision of critical medical care and address the same while coordinating with neighbouring and network hospitals
- Identify sites that may be converted into additional patient care units
- Prioritize/cancel non-essential services when necessary
- Adapt hospital admission and discharge criteria and prioritization of clinical interventions according to the available treatment capacity and demand
- Designate a specific area that may be used as a temporary morgue and formulate a contingency plan for ensuring required post mortem procedures
- Establish protocols for maintenance of a special disaster store/stock pile
- Designate an official for information and communication with attending family members.

vii. Continuity of essential services

Each hospital should ensure the continuity of essential services in all the circumstances by ensuring adequate resources and hospital supplies, developing and ensuring back up arrangement of utility services, having a deployable evacuation plan, coordinating and networking with neighbouring hospitals/health care institutions that can facilitate in continuing the essential services of the hospitals during the emergencies. Every hospital should also have a continuity plan that can be activated in emergencies to facilitate in continuing essential/critical services of the hospital.

viii. Laboratory strengthening

Strengthening of the laboratory at district and state level should be done to manage large scale testing in case of public health emergences including epidemic and pandemic situation. As per the need, laboratory capacity to manage large scale testing for example, in case of COVID-19, can be augmented through public, private and academic laboratories. If this is not possible, testing should be organized through arrangement with reference laboratories. In the event of the large scale public health emergencies or pandemic, setting up of new laboratories at district level may be considered to addressing the pressing need for large scale testing. As in case of COVID-19 pandemic, setting up of RTPCR COVID-19 testing laboratories have been done in 16 District Headquarter Hospitals of the state. Laboratory testing is one of the cornerstones of the management of the COVID-19 pandemic. Testing is critical to detect cases and investigate clusters of cases so that public health actions can rapidly be taken to isolate those infected, quarantine contacts and break chains of transmission.

ix. Preparation for human resources management during emergencies

Every hospital should develop and implement a human resource management policy for the hospital for disaster situations to ensure adequate staff capacity and the continuity of operations

during emergencies that increases the demand for human resources. To effectively manage human resources every hospital/healthcare facility should:

- Establish and implement a human resource management policy for disaster situations
- Identify minimum needs in terms of health-care workers and other hospital staff to ensure the operational sufficiency of the hospital/department in emergencies
- Establish a contingency plan for provision of food, water and living space for hospital personnel during disasters
- Prioritize staffing requirements and resultant deployment
- Recruit and train additional staff according to the anticipated need
- Ensure adequate staff capacity and competency in providing high demand clinical response services during emergencies by providing training and exercises
- Ensure adequate shifts and rotation of the staff
- Ensure adequate measures to deal with psychosocial and mental health issues of hospital staff and their families
- Establish an administrative mechanism for issuing authorization and rapid induction to medical personnel who are not on the regular rolls to work in the hospital for enabling capacity surges
- Ensure that the personnel dealing with contagious diseases are provided with appropriate Personal Protective Equipment (PPE) and interventions (e.g. vaccination) in accordance with the policy and guidelines of the national health authority.

x. Infection Prevention and Control (IPC) measures

Healthcare Associated Infections (HAI) are the most common adverse events in healthcare delivery and a major public health problem with an impact on morbidity, mortality and quality of life. Large percentage of HAI are preventable through effective IPC measures. These measures are essential for the well-being and safety of patients, their families, health workers and the community. IPC measures are among the most effective tools available to contain the spread of COVID-19 both in health facilities and in the community. Each hospital should implement robust IPC measures for prevention of HAI. The success of many IPC measures in health facilities and communities, is dependent on sustained IPC programmes, IPC guidelines, IPC training for health workers, implementation of IPC measures, monitoring and providing feedback on IPC measures, adequate patient to health worker ratio, access to IPC supplies and personal protective equipment (PPE), and access to safely water, sanitation, and hygiene (WASH).

xi. Area level networking of hospitals

To respond to a scenario where the hospital's surge capacity can be exceeded by the number of patients requiring medical attention, every hospital should establish network with other hospitals in the area so that patients may be transferred to the nearest equipped hospital for treatment without any delay. Hospitals shall define the arrangements/memorandum of understandings between them and the networked hospitals during the pre-disaster phase itself, for such eventualities. A list of all networked hospitals (along with their capacity, speciality) shall be maintained and updated regularly by the appropriate authority in the hospital.

xii. Volunteer involvement

Local volunteers in proximity to hospitals/health care facilities can be involved by the hospital authorities for hospital disaster preparedness and response. Volunteers should be identified in the pre-disaster phase and the volunteer roster with key information (like contact details, address, etc.) should be maintained by the appropriate authority in the hospital. Different training such as basic emergency preparedness and response, search and rescue, first aid, crowd management, management of relatives of patients, record keeping, etc. should be imparted to the volunteers.

However, it may be noted that during an emergency volunteers may work long hours under stressful conditions. Many of them may themselves become the victims of a disaster, facing the death of family members or the loss of property; others may be emotionally affected by what they see, making them vulnerable to depression or exhaustion. Hence safety aspects of the volunteers need to be ensured. Some of the measures to protect the volunteers include: providing insurance for volunteers; registering volunteers; training volunteers to do the job; provisioning of personal protective equipment (PPE); and provision of psychosocial support etc.

Community level preparedness

i. **District Health Plan:** District health preparedness and response plan needs to be prepared and updated regularly to address the health risk, vulnerabilities and health needs of the people during different phases of the disaster. The plan should be aligned and coherent to the District Disaster Management Plan and SOPs.

ii. **Community based health preparedness plan:** Actionable and easy to use village level health preparedness and response plan need to be prepared to address the public health risk reduction concern of the local community. These should be prepared through an active engagement of the local community for ensuring wider ownership and acceptance.

iii. **Risk communication:** During public health emergencies, people need to know what health risks they face, and what actions they can take to protect their health and lives. Accurate information provided early, often, and in languages and channels that people understand, trust and use, enables individuals to make choices and take actions to protect themselves, their families and communities from threatening health hazards. Risk communication is the real-time exchange of information, advice and opinions between experts, community leaders, or officials and the people who are at risk. During epidemics and pandemics, and humanitarian crises and natural hazards induced disasters, effective risk communication allows people at-risk to understand and adopt protective behaviours. It allows authorities and experts to listen to and address people's concerns and needs so that the advice they provide is relevant, trusted and acceptable.

iv. **Community engagement:** Community engagement should be done in providing support to public health services**,** preventive measures such as chlorination of water for

controlling the possibility of epidemics, sanitation of the area, disposal of the dead, and simple non-pharmacological interventions will be mediated through various resident welfare associations, ASHA/ANM, village sanitation committees, and PRIs. Community level social workers can help in rebuilding efforts, create counselling groups, and also act as informers to local medical authorities during a biological disaster.

v. **Raising awareness among community:** Sharing information, imparting education and risk communication for households and communities at risk to promote healthy behaviours to reduce risks and prepare for disasters should be done through the media and community-based emergency and disaster risk management programme.

4. Under capacity building measures

Education, training and technical guidance should be imparted to the professional of health and other sectors to enhance their knowledge, skill and attitude towards managing the health risk of the disasters.

i. Training of health care workers on:

- Pandemic preparedness and response
- Preparation of the disaster management plan for the hospital
- Mass-casualty management
- Management of cases of resulting from an epidemic/pandemic
- Disease surveillance
- Health data handing and interpretation
- Strengthening the convergence between health sector preparedness and response activities with DRM activities
- Fire safety in the health facilities

ii. Training of community on:

- How to prepare village health plan
- Community level preparedness for pandemic with reference to Covid-19
- Covid appropriate behaviour
- Infection Prevention and Control
- Coping with pandemic

5. Under response measures

i. Setting up of dedicated health facilities to treat the infectious disease having epidemic and pandemic potential

In case of pandemic scenarios setting up dedicated health facilities for care and treatment of cases may be considered so that existing health facilities will continue providing with regular healthcare services. In the prevailing COVID-19 pandemic, dedicated COVID hospitals, COVID care centres have been established to provide care and treatment to COVID-19 positive cases.

ii. Screening of people during evacuation to safe shelters

When community is exposed to multiple hazards at the same time, extra precaution needs to be taken to reduce their vulnerability to be affected by both the hazards. During the prevailing COVID-19 pandemic, community were also affected with natural hazards - cyclonic storm. In such scenarios, at the time of evacuation of the people from their place to shelters, thermal screening, or if feasible rapid COVID-19 antigen test should be performed to quickly identify symptomatic or suspected COVID-19 cases. For suspected cases, separate travel arrangement should be made to reduce the chance of spreading the infection to the other people. In preparing for evacuation in the context of the pandemic, public health guidelines regarding consistent mask wearing, physical distancing, and sanitizing procedures to prevent the spread of the virus, including through asymptomatic transmission, need to be incorporated into existing transportation plans. Service providers may need to increase the number of vehicles or trips or the amount of time specified in evacuation plans to allow for physical distancing. Pandemic safety protocols guidance for each transportation mode need to be clearly displayed, reiterated, and consistently followed.

Drivers need access to personal protective equipment (PPE), as well as training to ensure that they use the PPE properly and are confident in practices other protective measures that have been implemented, such as proper ventilation of the vehicles. In addition, evacuees can be protected by restricting seat occupancy to alternate rows, ensuring mask use and providing access to hand sanitizer at vehicle doors for use at entry and exit. In case, evacuees reach the nearby shelter themselves they should be screened at the shelters. Measures should be taken to ensure the safety aspects of the volunteers involved in evacuation, search and rescue. Efforts should be made to involve vaccinated personnel in response and relief measures.

iii. Shelter management

When community is exposed to multiple hazards (biological and natural hazards) at the same time, extra measures should be taken while shelter management. In circumstances requiring evacuation, COVID-19 health measures should be implemented in shelters, including provisions for handwashing, maintaining physical distance, waste disposal and other water, sanitation and hygiene (WASH) measures. Following key public health principles need to considered while establishing/managing a shelter.

- **Special care for vulnerable groups**

Separate shelter arrangement should be done for vulnerable population - elderly, children, pregnant women, people with co-morbid conditions to reduce their chances of getting infected with COVID-19.

- **Facilitate physical distancing**

Shelters should have processes in place to support physical distancing. Strategies should be implemented to ensure individual/ household groups to maintain at least 1 metre of physical distance from others and prevent commingling. Strategies to promote physical distancing among individuals may include placing clear markings on the ground to demarcate areas; putting up physical barriers (such as plastic partitions) if feasible to separate household groups.

One-way movement of persons within the shelter should be encouraged. Whenever possible, families should be placed together within the shelter, especially those with small children. As physical distancing requirements may affect the number of people that can be accommodated in existing shelters, additional and alternative locations need to be identified and prepared as shelters. The DDMP should provide list of safe shelters and alternative safe buildings which may be repurposed as shelters/quarantine/isolation centres during multiple hazard events.

- **Identify and isolate individuals with suspected, probable or confirmed COVID-19**

Regular monitoring of should be done of the COVID-19 symptoms among the people shelter inhabitants. Shelters should have processes in place for the earliest separation of the suspected, probable or confirmed COVID-19 cases. Information on symptoms of COVID-19 and what to do within the shelter if a shelter inhabitant or staff member becomes unwell at any time should be shared with all inhabitants and staff. Individuals who become unwell should be immediately isolated and make their symptoms known to the staff member of the shelter. Individuals who are suspected, probable or confirmed to have COVID-19 should remain separated until: they depart the shelter (e.g. return home or are moved to a healthcare facility); or they are deemed to be no longer infectious as per national or state guidance.

- **Facilitate contact tracing**

Strategies to facilitate contact tracing should be implemented. Contact tracing includes keeping a record of the inhabitants' names, contact details, arrival times, departure times and location within the shelter where they were accommodated. The confidentiality of personal details needs to be maintained.

- **Practise proper hand hygiene and handwashing**

Accessible and functioning hand hygiene stations (either for handwashing with soap and water or for hand rubbing with an alcohol-based hand rub) should be available throughout the shelter, focusing on areas of high traffic. This is particularly important within operational areas, such as entry and exit points, catering and food service areas, toilets, showers, and waste management areas. Posters promoting correct methods of hand hygiene should be displayed at each hand hygiene station. Care should be taken to ensure information is provided in languages used by shelter inhabitants and for those with hearing or sight impairment and to make the context easy for young children to understand and follow.

- **Use personal protective equipment (PPE)**

Adequate PPE should be available and accessible for inhabitants with suspected or confirmed COVID-19 and shelter staff providing assistance or services to these individuals.

- **Perform environmental cleaning**

Environmental cleaning within the shelter should be followed consistently and correctly. Alongside regular environmental cleaning, frequently touched surfaces (such as handrails, doorknobs and handles, tables, and chairs) should be identified, then regularly cleaned and disinfected to reduce the risk of transmission. Special care should be taken regarding frequently

touched surfaces in operational areas used for food preparation, sleeping, toilets and showers. Additional areas may include administrative or registration areas, as well as entry and exit areas.

- **Control temperature and ventilation**

Temperature control at shelter, wherever possible, is important for sanitation and the health of the shelter inhabitants. Provisioning of fans and other ventilating appliances should be used to promote ventilation, where practical. Alternatively, opening doors and windows will promote the natural flow of air throughout the shelter.

- **Setting up isolation facilities near the shelter house**

Isolation facilities need to be established near the shelters to accommodate suspected or probable COVID-19 cases as well as confirmed cases. If someone in the shelter displays signs or symptoms of COVID-19, he or she should immediately be moved to an isolation facility near the shelter. The suspected cases should be tested for COVID-19. He/she should remain isolated until the result of the test is known. If tested positive, he/she must be sent to the isolation facilities meant for the COVID-19 cases and with medication. The inhabitants who were contacted with the confirmed cases, must also be tested for COVID-19. Dedicated isolation facilities may be established for isolation of the inhabitants who are confirmed to have COVID-19. Ideally, they should be isolated individually in separate rooms or areas. Cases who become unwell and serious need to be referred to appropriate health-care facility or COVID hospital for further treatment.

- **Precautions in food preparation and service areas**

Food preparation and service areas involve people working in proximity. Appropriate strategies should be implemented in food service areas to reduce the risk of COVID-19 transmission. Strategies may include raising awareness of COVID-19 symptoms, frequent handwashing, using disposable gloves, physical distancing and using PPE when physical distancing is not possible in food preparation areas. Organizing food handling staff into working groups or teams to reduce interaction between evacuee groups, maintaining physical distancing and using contactless strategies when serving food to evacuees. Strategies should be in place to minimize the number of shelter inhabitants in food service areas. In addition to all measures to avoid COVID-19 transmission, the safer food practices need to be in place to avoid foodborne issues among shelter inhabitants.

- **Sleeping areas**

In sleeping areas, physical distancing of at least 1 metre should be maintained among inhabitants. Strategies to facilitate a reduction in commingling in sleeping areas include appropriate positioning of bedding. Markings on the ground or physical barriers can assist in demarcating areas.

- **Toilet areas**

Shelters should have adequate toilets. Toilet areas should be sanitized more frequently. Dedicated toilets should be allocated for persons with suspected, probable or confirmed COVID-19 at isolation centres. When this is not possible, toilets should be cleaned and disinfected after use by the persons with suspected, probable or confirmed COVID-19.

- **Waste management**

The provision of safe waste management in shelters is essential in reducing transmission of COVID-19. Waste produced by persons with COVID-19 is considered infectious. Such waste should be managed separately from the general waste, by placing it in appropriate bags and closing them completely before disposal. People handing waste should wear appropriate PPE and perform hand hygiene frequently.

- **Posters and notices**

Posters and notices in appropriate formats and languages should be prominently displayed throughout the shelters (especially in handwashing facilities, entrance or exit points and common areas) to increase awareness of COVID-19 and the protective measures individuals should take.

iv. Promotion of telemedicine during pandemic and other disasters

The prevailing COVID-19 pandemic has highlighted the importance and usefulness of telemedicine, to provide a way to put patients and health professionals in contact when a consultation in person is not possible. Telemedicine also enables many of the key clinical services to continue to operate regularly and without interruption in the course of a public health emergency. Teleconsultations are a safe and effective way to guide the patient's diagnosis and treatment, minimizing the risk of disease transmission in case of emergencies. Provisioning of telemedicine consultations in shelters should be considered wherever feasible.

v. Active surveillance of the disease causing epidemic or pandemic and screening co-morbidity conditions

In case of epidemic or pandemic situation, active surveillance at household should be done to identify new cases, follow up with existing cases, promotion of positive health behaviour, etc. At the same time, identification and management of existing patients with co-morbid conditions, screening of household members for non-communicable diseases and refer the persons with risk factors for further screening at sub centre if required should be done. In the prevailing COVID-19 pandemic, state wide house to house survey by ASHAs and AWWs for monitoring of COVID-19 symptoms and co-morbidity conditions has been conducted.

vi. Intersectoral coordination

Response to a biological disaster requires coordination between a number of departments, namely animal health sector, human health, home, defence, intelligence, civil aviation, tourism, shipping, and transport. MoH&FW coordinates between all these departments for appropriate actions that need to be taken by the concerned departments. This has been very much evident in the prevailing COVID-19 pandemic. Interdepartmental and intersectoral coordination need

to be strengthened at local level (district and below district level) for effective response to biological disaster and health issues arising subsequent to disasters.

Intersectoral initiatives may generate benefits that extend well beyond health. Public health professionals should consider how best to present the case for intersectoral action, remembering that collaboration with other sectors and ministries may be easier to achieve when initiatives are framed in terms of language, concepts, goals and values that are familiar or appropriate to that sector. The political commitment of government to intersectoral action on health may be strengthened by formalizing the partnership in a declaration, memorandum of understanding or other framework document. Civil society organizations, professional associations, academia and the private sector are important partners for achieving shared health goals. Health ministry and departments should be the instrumental in undertaking intersectoral initiatives for health, with practical responsibility for moving them forward. The World Health Organization (WHO) has identified a number of practical steps that may assist health ministry towards intersectoral approach. Health ministries should:

- Build understanding among health sector personnel of the need for an intersectoral approach to implement health priorities or to advance shared societal goals;
- Strengthen the capacity of health sector personnel to interact with and develop alliances with other ministries;
- Use health impact assessment as a tool to identify how health department priorities will have an impact on the goals and interests of other ministries and their constituencies;
- Identify areas where interests are aligned, but be aware of areas where disagreements and rivalries could also arise. Create alliances where possible without undermining health goals;
- Identify existing structures and processes for cross-ministerial, intersectoral action and cooperation. Review existing laws and mandates for intersectoral action. Identify new potential mechanisms for intersectoral cooperation. Seek high-level political support for these to be formalized and used;
- Be responsive to initiatives led by other sectors that provide opportunities for improving health and achieving health goals;
- Explain the health impact of policies administered by other ministries, and the health benefits of a collaborative approach to policy development. Share relevant health data with other ministries;
- Choose the best method of collaboration for implementing each initiative, remembering that the most appropriate implementation strategies may vary according to the priority in question;
- Develop a strategy for engaging other sectors and ministries, and a common framework that assists all sectors and partners to understand the issues and the required actions;
- Support community participation in the development and implementation of health initiatives through public consultation, preparation of discussion papers, web-based tools and mass media;
- Look for ways to ensure political accountability through reporting requirements and access to information. Reporting mechanisms mandated by international agreements

provide opportunities for reporting on government commitments and progress made in intersectoral activities;

- Monitor and evaluate the progress of intersectoral efforts to advance priority health goals, and identify and promote good practices.

Close cooperation between the human and animal health and environment sectors is necessary for the effective prevention and control of emerging and re-emerging infectious diseases, in order to move towards optimal health outcomes for both humans and animals. The One Health approach, based on the premise that the health of humans, animals and ecosystems are interconnected, involves applying a coordinated, collaborative, multidisciplinary and cross-sectoral approach to address potential or existing risks that originate at the human–animal–ecosystem interface. State and district authorities need to establish state and district level mechanisms for cross-sectoral coordination, integrated preparedness and response, surveillance and event information sharing, joint risk assessment, risk communication and risk reduction strategies, and workforce development in the human and animal health sectors. Strengthening convergence between health sector preparedness and response activities with DRM activities at district and below district levels should be undertaken.

6. Under recovery measures

The pandemic has become much more than a public health crisis and has caused severe socioeconomic consequences. In the immediate term, global economic activity has stalled, and has led to the greatest global economic downturn in a century. In the longer-term, the pandemic's socioeconomic consequences are likely to outlast the pandemic, particularly for the most vulnerable, disadvantaged groups that have suffered disproportionately from the impacts of the pandemic (UNCTAD, 2020). Although response to the COVID-19 crisis remains active and dynamic, now is the time to initiate recovery. There is a diverse range of recovery needs that extend far beyond that of human health. While maintaining a steady state of transmission control and the capacity to sustain intermittent spikes in case numbers are both foundational to long-term COVID-19 recovery, the wider recovery effort will require multisectoral participation to address a range of issues (e.g. infrastructure, education, governance, commerce) that are typical of different types of disasters.

The following key principles and action points for recovery from COVID-19 laid down by the International Recovery Platform (IRP) may be referred while updating the recovery planning and mechanism in the state and district disaster risk management plans.

i. Principle 1: Recovery must begin during the ongoing response
ii. Principle 2: Inclusive, people-centered recovery to leave no one behind
iii. Principle 3: Transparent evidence-based decision-making
iv. Principle 4: Build back better (BBB) and greener
v. Principle 5: Preserve development gains
vi. Principle 6: Greater regional and global solidarity
vii. Principle 7: Institutionalize effective coping mechanisms
viii. Principle 8: Effective risk communication

Action 1: Establish pandemic recovery coordination and implementation arrangements

- Assess and amend statutory institutions and mechanisms to enhance effective coordination
- Provide leadership and coordination to multisectoral resources to mitigate societal and economic impacts
- Amend existing laws, or provide supplemental funding through legislative action, to support implementation of recovery plans and strategies.

Action 2: Assess the wider socioeconomic impacts of the crisis and the capabilities to manage needs

In public health emergencies, the focus of response is on public health implications and needs. Recovery, however, requires a more comprehensive and holistic investigation of the socioeconomic impacts of the greater crisis, especially in places where multiple waves of resurgence have occurred, and the local to national capabilities to address societal needs.

- Establish open data reporting protocols
- Leverage citizen science, big data, and other emerging technologies to expand and improve assessment efforts
- Recommend or provide a standard assessment protocol, such as the PDNA
- Link assessment methodologies to action plans for multi-hazard disaster risk reduction, sustainable development, and climate change

Action 3: Ensure safe and healthy workplaces

- Develop policy guidance for phased and safe return to work, including guidelines for risk assessment and prevention measures
- Review and change labour laws to address employee safety
- Assess long-term PPE requirements by sector, including medical workers, essential workers, those working in high-contact professions, and high-risk populations
- Support local PPE production capacity, including repurposing of private industrial facilities, and identify and promote alternative PPE options (e.g., community production of re-useable cloth masks and hand rub, 3-D printing)
- Educate the public on the proper use of PPE; ensure public officials promote positive messages about PPE use and model behaviour
- Establish funding to support PPE use among small and medium-sized businesses and the poor

Action 4: Institute or provide guidance on societal recovery

- Establish framework of incremental reopening, detailing intervals from strict societal restrictions to transmission steady-state, and inclusive of triggers for movement between intervals

- Convene sector-specific working groups to identify and implement safe workplace and facility standards
- Establish framework monitoring and enforcement mechanisms
- Establish and support communication channels to broadcast daily framework status

Action 5: Plan for a comprehensive economic recovery

- Establish active fiscal and monetary policies to stimulate the economy and employment that counter declines in demand
- Provide immediate financial support for MSMEs, including: grants, loans, tax relief; payroll protection loans and reimbursements; extensions on debt, rent, and utilities payments; and support to reconvert production towards immediate needs
- Support, consolidate, and repair supply chains

Action 6: Promote livelihoods recovery and expansion

- Provide cash and in-kind transfers to informal workers and self-employed
- Provide information services to support jobs creation and employment
- Ensure access to affordable health services given loss of employment-based coverage
- Support the safe opening and operation of childcare centers
- Expand or adapt disaster financing provisions to address livelihoods-related social protection requirements

Action 7: Rehabilitate and strengthen the medical and public health sectors

- Promote rehabilitation and rest of medical staff, restock medical supplies and resources, revise plans as needed, and rebuild essential services
- Expand financial and human resources support for preventable and chronic disease management efforts that have been adversely impacted by the pandemic

Action 8: Support psychosocial recovery

- Apply a whole-of-society approach to promote, protect, and care for mental health
- Ensure widespread long-term availability of mental health and psychosocial support resources
- Invest in efforts and programs that institutionalize mental health services and capacity, and promote sector reform
- Expand access to alternate mental health service options, including telemedicine

Action 9: Expand utilization of e-governance and emerging technologies in recovery

- Establish multi-stakeholder partnerships to address financial and human resource needs
- Accelerate the e-government and innovative technologies implementation

F.2. Outcome 2: Enhancing communities' preparedness for cascading risks caused be biological and natural hazards

2-1. Identify target communities, as mentioned in A. Target Site, based on the criteria, which include geographical factors such as vulnerability to natural and biological hazards and type and level of damages caused by Cyclone Amphan and other economic and social factors.

2-2. Collect lessons learned and good practices from the actual evacuation and risk reduction measures taken for Cyclone Amphan under COVID-19 pandemic and compile recommendations for improvements.

2-3. Conduct baseline survey on target communities' capacity and resilience and risk assessment for biological hazards including COVID-19 and for natural hazards such as cyclone and flooding in the target communities with scientific approach and identify vulnerable areas, infrastructures, and facilities in the target communities.

2-4. Compile recommendations to improve school disaster management plan to cope with pandemic and disaster risk reduction, especially for schools used as shelters in the times of disaster.

2-5. Plan and conduct trainings (approx. 50 participants each for 2 days at each community) and evacuation drills (approx. 50 -100 participants each), based on the improved DRR/DRM plans and SOPs with biological hazard aspects, in the target communities with local and state authorities. Ensure effectiveness and applicability of the trainings and evacuation drills by reflecting advice from technical advisor when necessary

F.2.1. Selection of target communities

As mentioned earlier in section C of the report, for the purpose of the current study, villages and wards have been considered as communities in rural and urban areas respectively. The detailed methodology and criterion for selection of districts and respective block/municipality have been discussed earlier in figure 3. For each of the selected blocks and municipalities, the vulnerable affected village/ward has been selected based on varied types of damage and loss incurred by cyclone Amphan/past cyclones and the unique nature & vulnerability of MSME clusters to hazards. These communities have been finalized in consultation with the concerned field teams, local level representatives and stakeholders. The selection of villages and wards has also been undertaken keeping the following factors into consideration, wherever possible.

- Presence of school which is used as a shelter during cyclones/floods
- Presence of dedicated cyclone/ flood shelter (multi-purpose or otherwise)
- Presence of dedicated cyclone/ flood shelter which was used as Temporary Medical Centre (TMC) during COVID-19

Table 8 lists down details of selected communities along with their demographic profile.

Table 8: Demographic details of the selected communities

District/block	Wards/village	HH details	Population details
Balasore/ Baliapal Block (Rural)	Village- Bolang Ward No. 5 Gram Panchayat- Bolang	**Total HH – 125** OBC HH - 80 General HH - 45 Women-headed HH – 10	**Total population- 650** OBC – 395 General – 255
Bhadrak/ Bhadrak Municipality (Urban)	Bhadrak Municipality Ward No. 8	**Total HH – 580** SC HH- 80 ST HH- 160 OBC HH- 230 General HH – 110 Women-headed HH- 120	**Total Population – 3000** SC- 500 ST- 800 OBC – 1100 General- 600
Ganjam/ Rambha NAC (Urban)	Rambha NAC Ward No.10	**Total HH – 135** SC HH- 1 OBC HH-134	**Total Population- 695** SC – 8 OBC – 687
Kendrapada/ Rajkanika Block (Rural)	Village: Akhulipada Gram Panchayat- Akhulipada	**Total HH – 56** SC HH – 2 OBC HH – 3 General HH – 48 Minority HH - 3 Women-headed HH-12	**Total Population- 400** SC – 10 OBC – 39 General – 342 Minority – 9
Khordha/ Banpur (Urban)	Banpur NAC Ward No. 9	**Total HH – 147** SC HH-11 OBC HH-56 General HH-20 Minority HH- 60 Women-headed HH-87	**Total Population- 893** SC – 67 OBC – 310 General – 140 Minority – 376
Puri/ Astarang Block (Rural)	Village: Sahana Gram Panchayat- Churiana	**Total HH – 315** SC HH- 180 OBC HH-135	**Total population- 1575** SC – 900 OBC – 675

Brief profile of the selected communities are discussed below.

1. **Ward No. 5, Bolang village, Balasore**

Ward No. 5 of Bolang Village is located in the Baliapal block of the Balasore district. With total 125 households the ward has a total population of 650. It is located around 45 km East of the district headquarter Balasore. Bolang village is prone to floods and cyclones. A canal also runs through the village making it further prone to floods. Being located near the coast, salinity intrusion is another major problem in the village. There is issue of seepage of saline water into the agricultural lands, rendering them infertile.

2. **Ward No. 8, Bhadrak Municipality**

Ward No. 8 is located in the west direction of the Bhadrak Municipal Area on the bank of the Salandi river. Having Hadagarh dam upstream, the river flows throughout the year. It has total 580 households. According to the Ward Councillor, approximately 70% of the households are below the poverty line. More than 20% of the houses are kutcha houses. This proportion was above 60% before the implementation of the Pradhan Mantri Aavas Yojana. Residents of the ward are involved in service, cultivation, and work as labours. They are often involved as "bakhra" – take land on lease for cultivation. Many households and especially women are also involved in handicraft activities. Major handicraft activities in the area are applique, betel-nut-craft, terracotta and pottery, woollen carpet weaving and soft toys. People follow the Hindu religion and have rice and wheat as a staple diet.

The ward often face issues of waterlogging. Especially, the Adivasi colony located in the ward No. 8 is highly vulnerable. The colony comes under the administration of Bhadrak Municipal Corporation. The population of the colony is approximately 1000. Severe flooding was experienced during the 1999 Super Cyclone.

3. **Ward No. 10, Rambha NAC, Ganjam**

Rambha is a Notified Area Committee in district of Ganjam, Orissa and it is divided into 13 wards. Rambha NAC has a population of approximately 11,700 while Ward No. 10 has a population of 695 (135 households). Being close to the sea, it is vulnerable to sea surge, floods, cyclones and tsunami. Under Ganjam block, Ganjam and Rambha NAC has 14 susceptible GPs, 10 susceptible wards and 106 villages with a vulnerable population of 43,515 and 10,740 milch and draught animals along with around 20,274 vulnerable houses. The zone is characterized by a number of deltas mainly formed by river Rushikulya and the Chilika lake. The community is mostly dependent on fishing, agriculture and daily wage work.

4. **Akulipada village, Kendrapara**

Akulipada is a village in the Rajkanika block of Kendrapara. With 56 households, the village has a total population of 400. The village is located in a low-lying area making it more prone to floods. Floods regularly submerge the agricultural fields and are a big challenge for the villagers. It takes more than 15 days for the rainwater to recede. The kutcha houses largely get affected by the floods and cyclones.

5. **Sahana village, Puri**

Sahana is a village in Astaranga block in Puri district with total 315 households and 1575 population. The village shares its boundary with the Bay of Bengal on one side and River Kadua, an estuary of Devi River on another side. Being, located on the coast, the village is

prone to both cyclones and floods. The approach road to the village is very narrow and is usually gets submerged during cyclones and floods, making it a very difficult place to reach. As the village is located in a very low-lying area, heavy rains often submerge the roads and the agriculture fields. Most people in the village are engaged in fisheries and agriculture. Adequate medical facilities are not available in the village and people usually travel at least 15 km to get medical help.

F.2.2. Methodology

The key methodology used to undertake activities planned under Outcome 2 include field-based consultations, Focused Group Discussions (FGDs), In-depth Interviews (IDI) with diverse stakeholders such as government officials, local representatives of the community, frontline worker groups, community itself. These were supported by development of various guide for FGDs, IDIs, and guide for Participatory Rural Appraisal (PRA). These are respectively placed at Annexure 8 and 9. FGDs, IDIs and consultations are helpful for identifying the key gaps and bottlenecks faced by the local government, field teams and community workers during evacuation, shelter management and overall management of COVID-19 and cyclone Amphan. Through the field-based consultations, good practices, innovative interventions and lessons learned are also being identified.

In addition, household level baseline survey was undertaken. For each of the six selected communities, the project team studied the demographic details such as total population of the community, number of households, average household size, population and number of households under different social categories such as SC, ST, OBC, minorities, women-headed households, etc. Using these demographic information of the communities, an online sample calculator was used at confidence level of 95% and 5% margin of errors to scientifically calculate the sample size for each of the communities (table 9). The households were then selected through stratified random sampling using the following sample size.

Table 9: Sample size for selection of households

District/block	Sample size of households
Balasore	48
Bhadrak	68
Ganjam	50
Kendrapada	29
Khordha	45
Puri	62

A structured questionnaire for baseline survey at the household level among the targeted communities was developed covering aspects such as demographic factors, physical factors (housing structure, location, population density, etc.); social factors (social networks, cohesion, access to resources of the community, etc.); economic factors (income, savings, assets, employment, occupational diversity, access to loans/ credit, etc.); institutional/ human factors (access to emergency services, medical care, education, training, etc.); environmental factors (hazard profile, exposure to potential hazards, climate-induced local risks, etc.), awareness level about hazards/risks, coping/adaptive capacities, preparedness, etc. The baseline survey for the community is targeting the selected households in each of the selected communities for studying the capacity, resilience and risk of the community to natural and biological hazards.

This is important as the local community are the first responders, have a better knowledge of local needs, vulnerabilities, and coping capacities of their communities. This will help in assessing communities' vulnerability, capacity, and resilience to future risks and disaster events. The template for the same is placed in Annexure 10.

F.2.3. Reflections from the actual evacuation and risk reduction measures taken for Cyclone Amphan under COVID-19 pandemic

1. Reflections from Ward No. 5, Bolang Village, Balasore

A multi-purpose cyclone shelter is located in the Bolang village. The shelter was established in the year 2016. The shelter management committee meets three times a year or as and when needed. The capacity of the cyclone shelter is approximately 250 people, however, more than 500 are generally accommodated during cyclones. Other facilities like schools are also used for shelters. There are separate rooms for men and women. Separate WASH facilities are also available in the shelter.

Cooperation from all the ward members was experienced during the cyclone Amphan and COVID-19 pandemic. People with disabilities were given special care and attention during evacuation. Provisions were made to provide dry ration to the people evacuated. The number of people evacuated was much higher than the actual capacity of the shelter, hence making it crowded and difficult to maintain physical distancing.

2. Reflections from Ward No. 8, Bhadrak Municipality

During the cyclone Amphan, an early warning was given to the community well before the landfall by the Municipality through mike announcements. Active cooperation of the people was experienced in the ward in the evacuation. Similarly, awareness generation activities for COVID-19 pandemic were also conducted in the ward through mike announcements. Necessary measures were communicated verbally to community leaders and spread across the community.

Around 250 people living in low lying flood prone areas and *kutcha* houses, especially from the Adivasi colony were evacuated for three days to the B.M. High School which is located in the ward. Dry and cooked food was arranged for the evacuated people. A generator set was arranged to provide the electricity. Urban Primary Health Centre (UPHC) Bagurai located in the ward has provided the necessary medical support.

The main concern people had during the evacuation is that they have to leave their animals before they go to the shelters. They were very worried about them even when they were in the shelter. Sometimes, they used to come out to look for them, even after knowing the risk outside. Another challenge they faced during the evacuation was about the facilities available at the shelter. There was a lack of WASH facilities, especially the lack of toilet facilities, which also led to a lack of cleanliness on the premise. Physical distancing was not well maintained as well as masks or sanitisers were also not used judiciously.

3. Reflections from Ward No. 10, Rambha NAC, Ganjam

The NAC and Ward No. 10 specifically are prone to frequent cyclones and floods. It also comes under the tsunami prone area. As the area is disaster prone, all efforts are made by the district

administration to ensure that the warning, evacuation and other relief and rehabilitation measures are intact. For warning during natural hazards and during the present pandemic situation, a number of steps have been undertaken. The most common method used to inform the communities about any impending hazard is way of announcement through mikes using local language. Apart from that, ASHA and Anganwadi workers, SHG group members, ward members, teachers and other voluntary/youth groups are used to make people aware about the impending disaster and convince people along with the local representatives to move to safer spaces.

To coordinate the work of evacuation, a nodal officer amongst the community is appointed (ex. PO/teacher/ward representatives) who is helped by others in facilitating the evacuation work along with relevant authorities. Apart from this, while preparing the evacuation plan, an inventory of vehicles in the village (2,3 and 4-wheelers) is prepared with details of owners. This assists them in arranging for vehicles during the evacuation process when there is inadequate availability of transport services.

Regular coordination meetings are arranged with various stakeholders including PRI representatives, SHG members, block level machinery and line departments (including agriculture, horticulture, irrigation, RTO, fishery, health, banking/financial institutions, drainage and waste management, etc.) and updates are sought from them regarding their preparedness. Around 100 people get involved in the evacuation process.

Dealing with natural hazard during the pandemic situation has been a challenging task. Maintaining physical distance and convincing people to wear masks and sanitize regularly has been difficult. To maintain social distancing, more schools and other places were identified where people could be shifted during the cyclone. The identification of schools/other spaces was undertaken well in advance with the criteria of ensuring that water and sanitation facilities, etc. are adequately available. As some of the basic infrastructure was missing from schools, etc. it posed as a hindrance to shift people. The School Management Committee members are made in charge of managing the people occupying the shelters, etc. Along with them, other frontline workers including the ASHA/Anganwadi workers were also involved in reaching out to people in shelters/quarantine centres to check regarding their needs and concerns. Pregnant and lactating mothers who were shifted to health care institutions are also reached out to.

As the community is disaster prone, regular mock drills take place with participation from various stakeholders. Mock drills for Tsunami takes place twice a year with the ODRAF team. Most of the equipment required for the drill are placed with ODRAF and some of it is available at the block level. In the drills to manage a flood / cyclone situation, some of the main points of consideration include – what all should encompass in an emergency kit that the family/individual should carry during evacuation (ex. land documents, medical prescriptions, educational certificates, IDs and other necessary documents), torch, medicines, etc. It also evaluates the various equipment available present in all places of shelter (including 2 ASKA lights, chain saw, DG set, life jacket, nylon rope, siren, wheelchair, solar lantern, utensils, water filter, stretcher, wheelchair, first-aid box, equipment for cutting trees, etc.) It also includes identification of spaces/places for storage of dry ration.

4. Reflections from Ward No. 9, Banpur NAC, Khordha

The strategy for the COVID-19 response was mostly based on the five thematic areas, early preparation and stringent control measures, effective governance and evidence based decision making, enhanced surveillance, testing and treatment measures, supporting and encouraging healthcare and frontline workers involved in COVID-19 response and effective roll out of vaccination.

- **Leveraging its disaster management expertise:** The long experience of dealing with natural hazards in terms of preparedness, standard operating procedures, organising relief operations, augmenting critical manpower, linking with key local bodies (panchayats) and ensuring community level support in quick time have come very handy in dealing with COVID-19 in Khordha district. The district administration decentralised the efforts by involving block level workers, CBOs, SHGs and grassroot workers to undertake relief operations and help in sustaining multiple efforts particularly the running of quarantine centres and shelters for migrant workers. Most importantly, physical infrastructure notably, shelters were swiftly turned into quarantine centres or places to temporarily host returnee migrants.
- **Panchayats at the forefront of pandemic management**: In Khordha district, each GP was sanctioned Rs. 5,00,000 to set-up and manage quarantine centres with governmental bodies overseeing their operations. The migrants were provided an incentive of Rs. 2000 to complete the 14-day quarantine. Sarpanches were asked to take an oath to protect migrant labourers on their return, thus evidencing the decentralising intent of the state government.
- **Mobilisation of women's group:** The District Administration has engaged the services of millions of women workers and volunteers in different capacities to respond to the COVID-19 pandemic. Tens of hundreds of Accredited Social Health Activists (ASHA) are working relentlessly in rural areas to spread awareness about the virus and have emerged as critical links for the government agencies. Anganwadi workers have been actively engaged to handle multiple tasks from community level surveillance, assisting district and block administration in contact tracing to the running of quarantine centres in GPs.

In Khorda district, the district administration in collaboration with the OSDMA has promoted community-level warning, built multi-purpose cyclone shelters under National Cyclone Risk Mitigation Project and built an Early Warning Dissemination System with last-mile connectivity. The OSDMA along with the district administration and other government and non-government agencies organised mock cyclone, tsunami and flood drills to create awareness among the people. These efforts have increased preparedness, evaluated response capabilities and improved coordination among all government and non-government agencies and departments. The capacity to deal with natural hazards has increased tremendously at the community level. Timely evacuation due to an early warning system has helped to ensure less or zero casualties. In April 2018, Odisha become the first Indian state to have an early warning system in place for natural hazards such as cyclones and tsunami for people living along its 480 km-long coast. The state government in June 2021, adopted a resolution to train every student, panchayati raj institution, government employee, elected representative, vana surakshya samiti and community-based organisation in disaster and pandemic management. The beginning would be made through incorporation of the subject in school and college

curricula. The government plans to create a huge knowledge infrastructure; a task force will be formulated to take forward the mission. It seeks to make disaster and pandemic management a compulsory part of the government recruitment process. The goal is to train everyone, right from the ward member on the ground till the higher authorities at the top.

5. Reflections from Akhulipada village, Kendrapara

In Akhulipada, the Gram Panchayat Samiti had taken care of the evacuation process. Residents were made aware of the upcoming cyclone and flood situation through mike announcements. It was experienced that due to the threat of pandemic, people were hesitant to take shelter in schools and cyclone shelters. People also refused to evacuate their homes leaving their livestock behind. They sought shelter in the nearby school rather than going to the pre-identified safe shelter. The school has all facilities like beds, food, etc. The school were also used as a COVID care centre for the migrants. Separate WASH facilities for men and women are also available in the school. Considering the pandemic situation, ASHAs and AWW provided door-to-door service during the cyclone Amphan. This included the provision of dry ration, village health and nutrition day, immunization, etc. They accompanied pregnant women to the hospitals.

6. Reflections from Sahana Village, Puri

At the receipt of cyclone early warning, priority was given to the people who were living in low lying areas and *kutcha* houses for the evacuation. They were taken to the primary school of the village, which was used as a shelter point. The school has got all the basic facilities and equipment. The ASHAs were instructed by the Health Department to lookout for people who needed medical aid in the cyclone shelters. They were also instructed to assist people with COVID testing if they experienced symptoms. Home-based neonatal care were delivered. Pregnant women were taken to the hospital in advance when a cyclone warning has been issued. Because of the pandemic, the Anganwadi centres were closed and hence, the beneficiaries were given a dry ration at their doorstep. Road connectivity was hampered due to the cyclone and the resulting flooding which caused delay in medical response in some cases.

F.2.4. Understanding target communities' risk, capacity and resilience to biological natural hazards

To understand the hazard, vulnerability, capacity and risk profile of the target communities, the project team directly engaged with the target communities, local representatives and community workers through FGDs, PRA exercise and baseline survey using the tools developed for data collection and analysis. The key findings are discussed below.

During the PRA exercise, hazard, vulnerability and capacity mapping were conducted with the help of the community members. The community shared their wide range of experiences about their encounters with the cyclones and floods in the area. In case of **Ward No. 8, Bhadrak Municipality,** the low-lying areas around the roadsides and the agricultural fields experiences frequent flooding were identified and marked on the map. Through the exercise, the most vulnerable area of the ward, namely, Adivasi colony where most houses are kutcha was identified. These are made up of grass and mud which are highly prone to adverse impacts of cyclones. In terms of capacities, three schools, an Urban Primary Health Centre (UPHC), three

government offices, electricity grid, pump house, park, community library, parichay gruh, and jan sabaha kendra were identified and marked in the map.

In **Ward No. 5, Bolang village of Balasore**, the mapping exercise help identify that the community is largely surrounded by low-lying agricultural fields, which usually gets submerged in every cyclone and flood situation. *Kutcha* houses in the village are identified as structures highly prone to cyclones. The multi-purpose cyclone shelter located in the village is marked during the mapping exercise. The shelter is equipped with basic facilities required for functioning of temporary shelter such as electricity connection, cooking utensils, ropes, ladders, ASKA light, torches, first aid kits, stretcher, etc. The Ishwar Chrandra Government High School, Bolang has also been identified as cyclone and flood shelter during the mapping exercise. The multi-purpose cyclone shelter located in the Bolang village was used during both Amphan and Yaas cyclones.

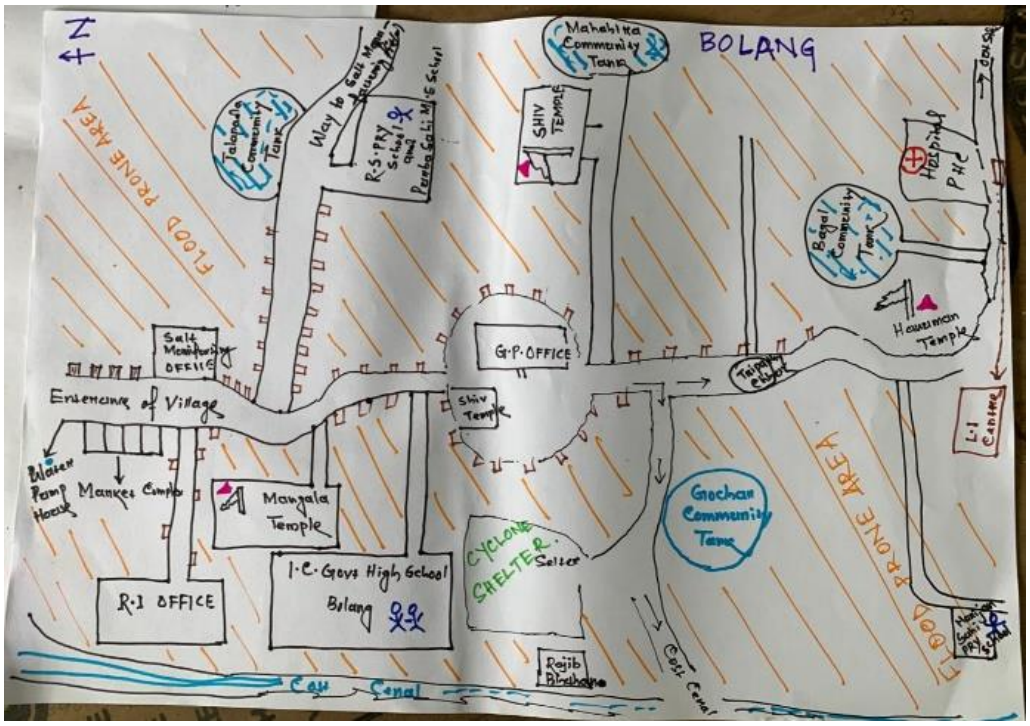


Figure 12: Hazard, vulnerability and capacity map of Bolang village, Balasore

The selected community of Ward No. 10 in Rambha NAC, Ganjam is highly prone to cyclone and floods. Heavy rainfall in the area also poses danger to the community. It destroys the agricultural fields and largely impacts the kutcha houses close to the water bodies. The community hall, anaganwadi centre, schools, etc. that are used as shelters are marked prominently in the map.

Figure 13: Hazard, vulnerability and capacity map of ward No. 10, Rambha NAC, Ganjam

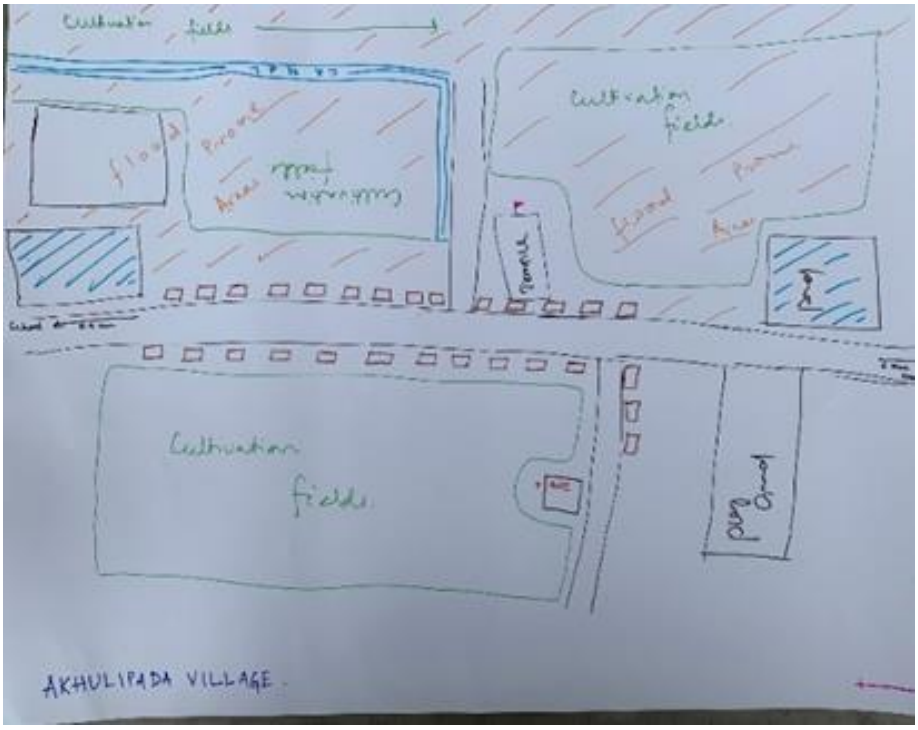


Figure 14: Hazard, vulnerability and capacity map of Akhulipada village, Kendrapara

The PRA exercise in the **Akulipada village, Kendrapara** helped identify and mark the agricultural fields around the village which are located in a low-lying area and are prone to floods. They usually remain submerged for up to 15 days which ultimately destroys crops. The *kutcha* houses in the village are prone to cyclones as well as floods. There is only one Anganwadi centre located in the village. Primary Health Centre is located 6 km away and a school located 0.5 km away from the village.

The mapping exercise in the **Sahana village, Puri** helped identify its physical exposure to cyclones and floods due to its coastal location with the Bay of Bengal on one side and River Kadua, an estuary of Devi River on another side. The key vulnerable structures include cultivation fields which get submerged during cyclones and floods and the *kutcha* houses which usually face the brunt of the cyclones and heavy rainfalls. The key capacities and crticial infrastructures identified include a school and an Anganwadi centre located in the village. An emergency siren, primarily developed for the tsunami early warning is also positioned near the school which has its necessary equipment for operationalisation in the school itself. The village also got mangrove forests along the coast which also acts as a natural barrier in case of cyclones and tsunami.

Figure 15: Hazard, vulnerability and capacity map of Sahana village, Puri

Further, the effects of traditional belief also emerged during FGDs where a tribal group in Bhadrak do not believe in taking any COVID-19 pandemic precautions such as wearing a mask or vaccinating themselves. They are also refraining from institutional deliveries. It was shared that people who reside in *kutcha* houses are among the most vulnerable community and hence are evacuated first. But of those people, people with livestock hesitate to leave their livestock behind while evacuating to shelters. In many communities, public announcements are not accessible because of a lack of human resources, poor road connectivity or roads inundated due to floods.

Resilience in the communities has been developed by community mobilization and involvement of community healthcare workers. It was observed that, in some districts, youth from communities have been trained about the rescue techniques. They have been very instrumental in making the community aware and evacuating them. Similarly, as the community healthcare workers are the most accessible to the people, they rely on them very much and hence seek their advice at the time of their need.

(a) FGD with the group of women in Adivasi Colony of Ward No. 8, Bhadrak

(b) FGD with Anganwadi workers, ASHA, community, and shelter management committee members, Bolang, Balasore

Figure 16: Snapshots from FGDs with different community groups

Key findings and reflections from the baseline survey from three of the districts are as below.

1. **Balasore**

Quick summary

The Rupsa Village (Ward No. 5) of Bolang Panchayat is located in the Sadar area of Balasore district. The community has a total population of 650 persons and comprises of 125 households. Broadly, community members belong to OBC (80 households with 395 persons) and general category (45 households with 255 persons). The average size of a household in the community is 5 persons. The community includes 10 women-headed households. The baseline survey covers 48 households including some of the women headed households.

Connectivity: Community is well connected to main road and railway through all-weather roads.

Locational disadvantages: Proximity to water bodies- 1 km from the river and 5km from the sea. Severe impacts to the settlement during flooding and cyclones.

Prevalent housing type: Kaccha

Average household income: Rs 6125 per month

Predominant source of livelihood: Daily wage jobs

Services predominantly present: Electricity and water connections; individual toilets

Services predominantly absent/inadequate: At source disaggregation and door-to-door solid waste collection and disposal; safe shelters in close proximity, and alternative sources of income.

a. **Physical location and connectivity**

The community is well connected with arterial roads, paved roads and railways. It is located at a distance of 500-1000 meters from the river bank and does not have high ground or shelters within a kilometre which enhances the risk of community during pluvial flooding. The community is around 4-5 kilometres away from the sea coast. There is lack of sea walls to protect the agricultural fields from seawater. The community members have highlighted the

issue salination of agricultural fields in the aftermath of cyclones and floods. The key water sources get contaminated during cyclones and floods. During floods and cyclones, residents of the community protect their valuable assets and luggage by moving them to safer and higher spaces in the house.

Map 8: Bolang

- One of the key capacities of the community is its connectivity to main road and railways through all-weather roads.
- The community is prone to pluvial and coastal floods during monsoon and cyclonic seasons. In the backdrop of the exposure of the community to floods and cyclones, the large majority of *kuccha* houses in the community are more prone to damages and loss of assets.
- The nearest safe shelter/ higher ground is atleast a kilometer away. In the backdrop of presence of vulnerable groups such as infants, children, differently-abled, pregnant woman, old-aged persons in the community, a robust mechanism needs to be placed for ensuring safe and timely evacuation and transportation of the community, especially vulnerable groups to-and-fro the nearest safe shelter during floods and cyclones.

b. Demographic profile of the households surveyed

The 48 number of households surveyed comprise a total of 218 persons. The total number of females and males in the surveyed households are 117 and 101 respectively. Size of the households surveyed ranged from 1 to 9 and the average household size is 5. The majority (close to 64%) of the residents from the household surveyed belonged to the age group 18-60. While around 17% of residents are from 5-18 years age-group, around 19% are those below 5 years and above 60 years (figure 17).

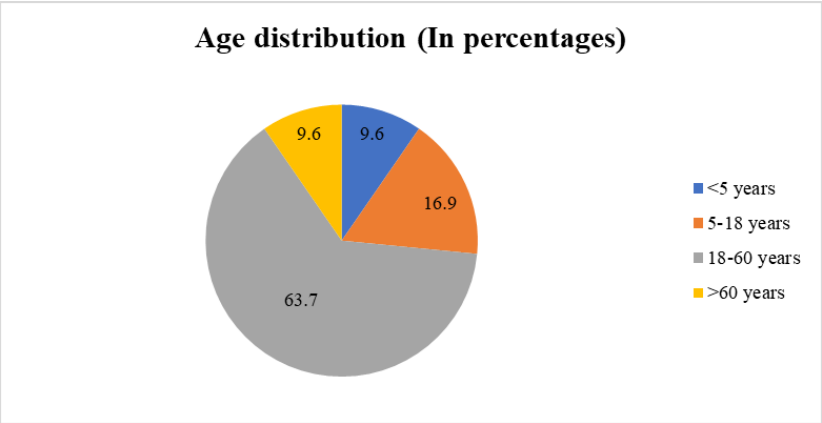


Figure 17: Age distribution (in %) of the households surveyed

Around 46% of households have a higher number of female members than male members, while some households are also women-headed households. Six households surveyed have only female members. Out of these 4 households have only one female member each who are above 60 years of age. While the other 2 households have females belonging to 18-60 years and over 60 years respectively. All the 48 households surveyed follow Hinduism. 20 of these household belonged to OBC while 28 belonged to the General Category.

The majority (around 55%) of the resident from surveyed households are illiterate or have received only primary school education (till grade 7). Among the surveyed households, close to 69% of households have one or more illiterate members. Around 23% of the residents are educated till higher secondary level (till 12 grade). There is only one resident who is educated till university or higher level. It may also be noted that the 5 out of 7 females from female-only households are illiterate which further exacerbates their vulnerability and may be make it difficult for them to effectively comprehend early warning messages, public awareness material on DRR or other government schemes and programmes.

6 households have differently-abled members. Two of households are female-only households with one female belong to the age group of 18-60 years while other being a senior citizen. One of the households has one pregnant/ lactating woman.

The household income in the community ranges from Rs.500-40000 per month. The majority of the residents who are employed are daily wagers. Close to 6% of the residents are self-employed. There is no salaried person in the community. Almost half of the residents are unemployed and around a quarter are students. Almost each household has one or more unemployed members. Around 15 households have no employed members. These include 5 out 6 of female-only households while the 6th female-only household has a daily wager female. There are almost 40% of households that receive assistance through government schemes for health and social protection such as Biju Krushak Kalyan Yojana and Rashtriya Swasthya Bima Yojana. 4 out of the 6 female-only households are not covered any such health or social protection scheme. Almost 63% of households have taken loans in the past and majority of them have taken loans from banks, indicating the access to financial institutions. Out of the 30 households who have taken loans, only 19 households were able to repay in time.

- The surveyed households have **21 infants** (below 5 years of age) and **21 senior citizens** (above 60 years of age). 6 households have **differently-abled persons** while 1 household

has recorded a **pregnant/lactating woman**. These are among the vulnerable groups requiring special assistance during evacuation, response and relief.

- Besides, the identified households with **single senior citizen female members** (some of whom are also differently-abled) are among the most vulnerable households with overlapping drivers of vulnerability (age, disability, gender). Most of these women are also illiterate and unemployed.
- Their special needs and concerns are to be considered and included while planning and executing various DRM activities, particularly during early warning, evacuation, shelter management, response and relief.
- The most common means of living in community is daily wage jobs. There is absence of salaried jobs among the household surveyed. The common features of daily wage jobs include uncertainty and irregularity in income. Often these features become more unpredictable during disasters making the community more **economically vulnerable** to the adverse impacts of a disaster.
- Majority of the households are availing services such as loans from financial institutions.

c. Housing, facilities and assets

All the households surveyed reside in their own houses except for only one household who reside in a rented accommodation. Majority (around 79%) of the houses are *kuccha* houses and only 21% of the houses are *pucca* houses (figure 18). All the houses are being used only for residential purposes. Almost all the houses are single-storeyed with no access to the terrace.

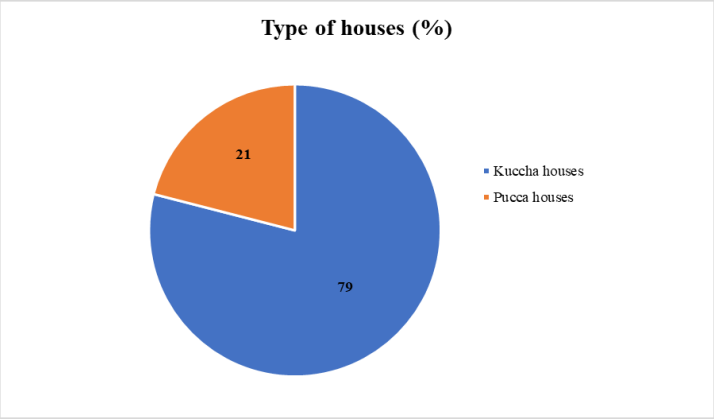


Figure 18: Type of houses (%)

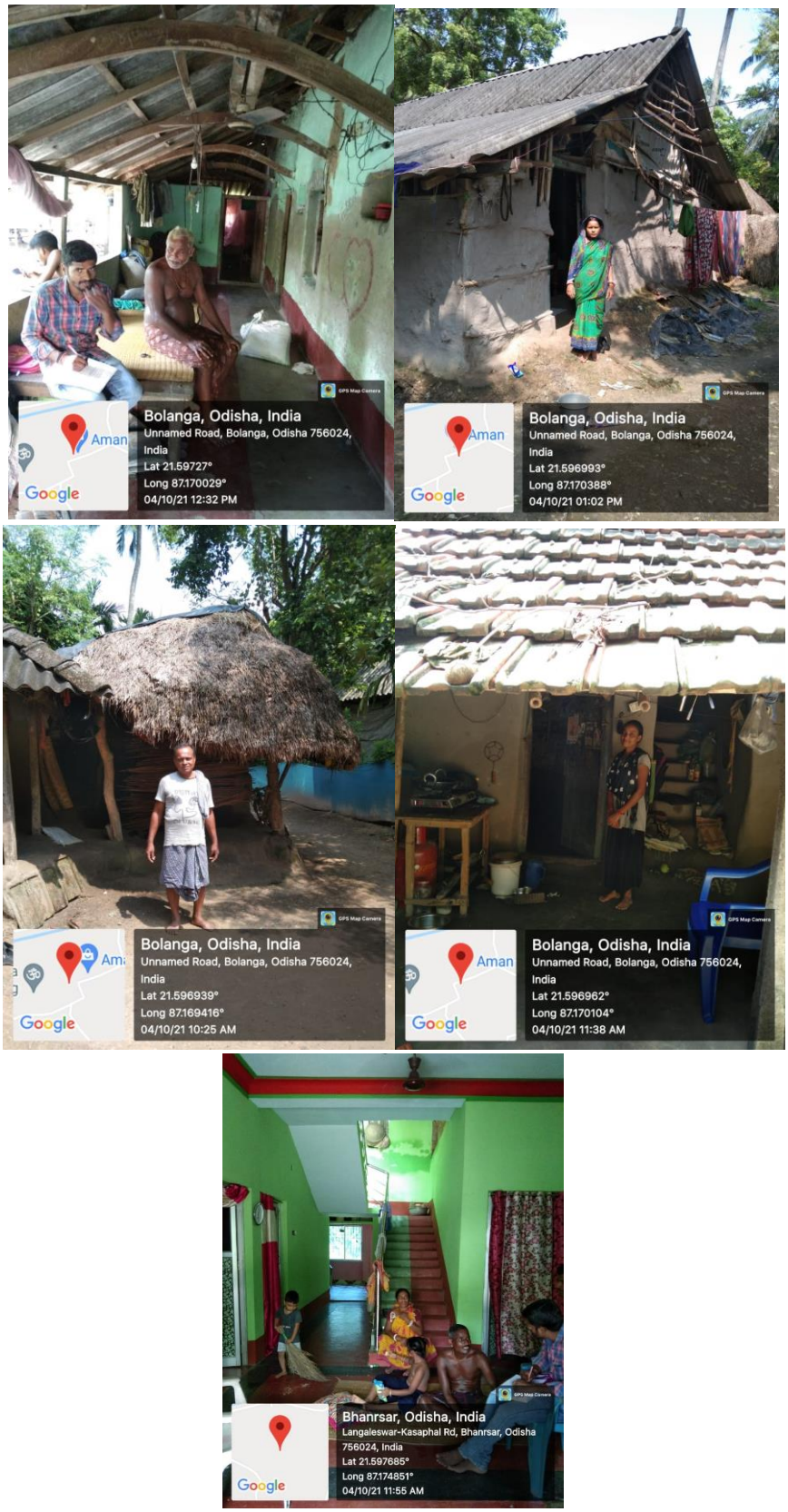


Figure 19: Types of houses in the community and their condition

There is electricity connection in 79% of the houses while 85% of the households have water connection in their houses. The houses with water connection receive water twice a day. While the ones without a water connection (close to 14.5%) collect water from the government taps in the community. Except for one house, toilets are present in all the 47 houses. However, there

is no bathing facility within houses and general practice in the community is visit a nearby pond and river for bathing purposes. There is no service for proper door-to-door waste collection and disposal in the community. The residents usually burn their solid waste. All the households in the community own parcels of agricultural land, livestock, and pets.

- Majority of the dwelling being *kuccha* in nature are not strong enough to withstand strong cyclonic winds and associated heavy rains; making the residents and their assets more exposed and vulnerable to adverse impacts during disasters.
- Absence of an accessible terrace in most of the houses limits the option of **vertical evacuation** for the community during floods and water stagnation at ground level.
- Absence of 24*7 access to water in the houses can act as impediment for ensuring COVID-19 appropriate behaviour of regular and proper hand washing. From a public health perspective, this may limit availability and easy access to adequate water required for safe and hygienic practices.
- Lack of adequate service and mechanism for solid waste disaggregation, collection and disposal can be considered as a public health hazard. While putting in place such essential service and mechanism, the community can also be made aware on unsustainable practices like burning solid waste and their potential adverse impacts on health.

d. Social factors and preparedness

Majority of the households have been residing in the community for many generations (around 100 years). Around 71% of the household surveyed have informed about regular community meeting (once a week) to discuss local issues and challenges. Around 29% of the households have either conveyed that the community does not have regular meetings to discuss local issues and challenges or are not aware of such meetings. All the households who are aware about these meetings have informed that aspects such as hazards, preparedness, warnings, etc. are also discussed in such meetings. However, majority of the households who are aware about such meetings occasionally attend this meeting. Not a single household has reported to such meetings regularly.

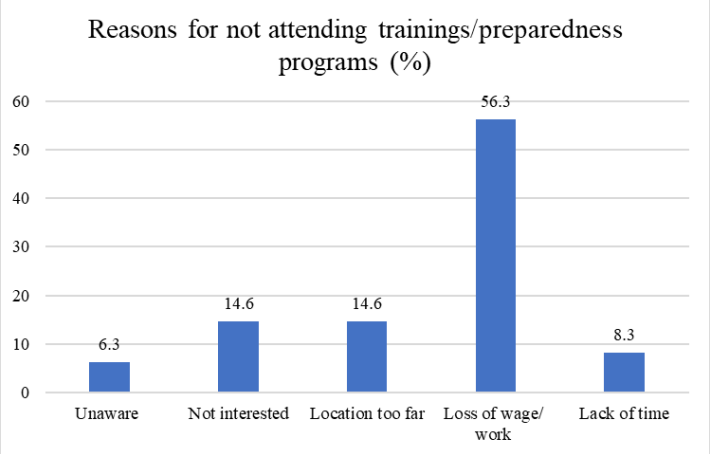


Figure 20: Reasons for not attending training and preparedness programs

None of the households surveyed have participated in specific trainings and preparedness programmes on disaster risk management. Figure 5 shows the key reasons of the households for not attending training and preparedness programs. As the households surveyed are mostly

daily wagers, they fear loss of work and wages if they go for attending such training and preparedness programs. However, all the households have informed that at the family level, they discuss preparedness measures and actions during disasters. This primarily includes discussion on evacuation planning while only 3 households engage in discussion on safe shelters and only 1 household has reported to discuss about emergency stock and kits among the family members. All households perceive that while the community displays a good level of cooperation during normalcy but the cooperation among the community during disaster is poor.

- Lack of awareness among some of the households about the meetings in the community to discuss local issues and challenges indicates communication gap and absence of an all-inclusive approach which can act as a major impediment during disasters. It also highlights that the need for strengthening the existing local mechanisms such as meetings to make them more inclusive and engaging for all the households in the community.
- Care should be taken to ensure participation of different vulnerable groups in such meetings where they can voice out their specific needs and concerns.
- Absence of participation of the households in different training and preparedness programs is a very concerning. This can result in inadequate community awareness, knowledge and skills on potential hazards and appropriate preparedness, mitigation, evacuation and response measures. This also undermines the efforts of government and other stakeholders towards awareness generation and capacity and resilience building of the community against potential disaster risk.
- Different approaches of engaging with the community should be explored and leveraged to ensure their active engagement in such programs. For examples, improved communication and outreach can possibly enhance the participation of the households who currently remain unaware of such initiatives. Similarly, the venue, time and duration of such programs, if finalised in consultation with the community (with due considerations of their availability) can enhance their participation. Likewise, different groups such as students, teachers, community workers, government officials, factory/industry workers can also be targeted separately at their place of work/ engagement to address the concerns such as loss of wages, loss of education, venue, etc.
- Family level discussion on preparedness measures and action plan is quite encouraging as this highlights their interests and/or concerns regarding disaster risk management to safeguard their lives and minimise potential damages and losses.
- Efforts should also be taken in strengthening the social cohesion and cooperation among the community which has been recorded as good during times of normalcy but poor during disasters. Different community engagement activities which bring all the households together for identification of local issues and collaborative brainstorming and planning can be taken up. Various local representatives (political, administrative, religious, cultural, etc.) can play a pivotal role in this regard.

e. Experience of Cyclone Amphan and COVID-19

All the households were affected by both cyclone Amphan and COVID-19 pandemic. COVID-19 pandemic compounded with cyclone Amphan had a significant impact on the households. Majority of the households faced limited/disrupted access to basic goods and supplies along with additional financial burden. With most of the households engaged in informal sector (daily

wage jobs), they suffered from disruption and/or loss of livelihood during the lockdown imposed to curb the transmission of the virus. Many households have also recorded the loss of education due to prolonged shutting of educational institutions due to lockdown. One of the households faced the issue of social stigma during the pandemic. The most common coping mechanism adopted by almost all the household to bear with these financial losses is selling off their assets.

All the households including the ones with senior citizens only received regular alerts and updates on COVID-19 through television, news, and the administration. The key actions they undertook based on the information received include practising physical distancing, regular sanitisation and wearing masks. Members from many households got infected with COVID-19 and stayed at the isolation centre while some members had to undergo institutional quarantine, one household practised home quarantine. There are reportedly no issues faced by these members at the quarantine and isolations centres. While following the laid down restrictions and recommended precautions to keep the family safe from exposure to infection, students faced the challenge of disrupted education while the bread-earners experienced loss of earnings.

The households were adversely affected by Amphan. They key adverse impacts of the cyclone include damage to agricultural land, loss/damage to assets and income loss. The basic services of food supply, water, health facilities were disrupted during Amphan in the community. The households also faced disruption in power supply while the access to markets was also disrupted. The households had access to timely early warning about the cyclone. Early warning mechanisms were activated in the community 2 days before the landfall of the cyclone and the households received information every two hours. Radio, TV and newspaper were the primary media for information and alerts on the cyclone. The households further communicated these warnings and alerts to family members, relatives, neighbours, and other community members/ representatives.

The evacuation routes and safe shelter locations were pre-identified and all the households were aware on it. The households were instructed by the local administration to move to nearest safe shelters. They also received cyclone and evacuation related information through television. Apart from the cyclone related information and instructions, this time the local authorities had also given special COVID-19 related instructions to the households. These included instructions to practice COVID-19 appropriate behaviour such as practising physical distancing, regular sanitisation of hands and wearing masks.

On receipt of the evacuation instructions, all the households surveyed have evacuated to the nearest safe shelter (multi-purpose cyclone and flood shelter) located at a distance of 1 kilometre from the community. The key actions taken by the households before evacuating to safe shelter includes moving their livestock to higher and safer locations and storing the harvested crops at higher and safe locations. One household has reported to use sandbag to prevent water from entering the house. However, a few households were scared to move to safe shelter, primarily because of fear of losing belongings. Despite the fear and concerns, all the households evacuated to safe shelter due to the fear of potential damages by cyclone and also

under the community pressure to evacuate. The key items and belongings the evacuating members carried with them to the shelter included important documents, food, and domestic animals.

Figure 21: Multipurpose cyclone shelter

All the households have reported that COVID-19 protocols were followed both during evacuation and in the shelter. The key COVID-19 related measures practised in the shelter include usage of masks and PPE, physical distancing, availability of sanitisation facilities, medical facilities, provision of basic services while adhering to COVID-19 protocols, proper sanitisation and hygiene and waste collection and disposal facilities, provision of separate facilities for most vulnerable groups such as pregnant women, old-aged and sick persons, young children, etc. The shelter was accessible to all.

The key facilities available at the shelter include piped source of water with 24*7 water availability, dedicated staff for cleaning toilets, bathrooms and drainage, availability of dustbins, provision of segregation was waste (kitchen waste, sanitary waste, etc.). The shelter had facilities for provision of food and drinking water. All the households have recorded that the quality of food and drinking water provided was good and the same was provided in adequate quantity. The shelter had adequate sleeping and renting space for all the inmates. The households have highlighted about safety issues in the shelter. The shelters had a provision of complaint box and the key issues faced by the inmates were resolved by the shelter management team.

All the households surveyed had spent less than 5 days in the safe shelter. On returning back to their houses, most of the households found that their houses were damaged and nearby trees were uprooted. They feel that by moving to the shelter, they were able to safeguard their lives, valuable goods they have carried along with their domestic animals. The community members in general experience damage to their cornfields and houses due to flooding and cyclones. They have highlighted the need for a dam for flood control and for an additional multi-purpose cyclone centre to cater to more population in the area in coming years.

- The shelter in case depicts a good practice of having in place a complaint box where inmates can register their grievances which are duly addressed by the shelter management team.
- Households have shared about fear of losing belongings as among the key concern for not shifting to shelter. This may also include concern for potential thefts in the vacated house while the family members are at the shelter. This can be addressed by strengthening law and order conditions at the local level during disasters.
- Households have also highlighted safety concerns at the shelter. The safety of belongings can be strengthened by installations of CCTV cameras, or putting in place lockers where the inmates can store their valuable belongings. While the safety of vulnerable groups such as infants, young children and adolescent girls can be further strengthened by deploying security personnel at the shelter. The security personnel can be supported by duly trained community volunteers.
- Additional safety measures such as proper illumination of shelter, toilets and bathroom, passages, establishing CCTV at appropriate locations, making proper record of entry and exits of inmates and shelter staff, etc. can be undertaken.
- While the households have highlighted the practices such as maintaining physical distancing, wearing masks and sanitisation were followed during evacuation and shelter management, measures such as thermal screening, recording and monitoring of symptoms have not been talked about, possibly indicating their absence. Such measures along with rapid testing (wherever possible) can be incorporated in the evacuation and shelter management practices.
- From the public health concerns underscored by the ongoing COVID-19 pandemic, physical distancing seems to be a norm which is here to stay. This highlights the need for identifying additional safe shelter for the community (as also recommended by the households surveyed) in due consideration of the projected population growth and/or floating population, if any, in the community.
- The additional safe shelter should also be supported by dedicated shelter management committee and support staff for its efficient operation and maintenance both during times of normalcy and during disasters. The shelter management team and staff should be duly sensitised and trained in COVID-19 appropriate behaviour and other public health measures necessary to be practiced while managing crowd, cooking, cleaning, distributing relief, etc.

Figure 22: Snapshots depicting community members, their houses and assets

2. Kendrapara

Quick summary

The Baghuasuni Village is located in the Rajkanika Block of Kendrapara district. Its neighbouring village is Akhulipada, located in the Akhulipada Panchayat. The baseline survey covers 27 households including some of the women headed households.

Connectivity: The community is not well connected to main road and railway through all-weather roads.

Locational disadvantages: Proximity to low-lying area, river bank and sea coast

Prevalent housing type: Pucca

Average household income: Rs 6300 per month

Predominant source of livelihood: Daily wage jobs or self-employment

Services predominantly present: Electricity (100% households) and water connections (70% households)

Services predominantly absent/inadequate: Absence of at source segregation and door-to-door collection of solid waste collection and safe and proper disposal of the same; Limited water availability of 2 hours only in the households with water connections.

a. Physical location and connectivity

Majority of the households have reported that their houses are not well-connected to main road and railways through all-weather roads. The community is located over a distance of 1 kilometre from the river bank and the sea coast. Most of the houses are located near (300-500 metres) low-lying area which may get flooded during heavy rains, floods and cyclones. Close to 48% of the households are at a distance of 500-1000 meters from the higher ground and/or safe shelters. Seven households have the higher ground and/or safe shelter at a distance of 300-500 metres while seven other households are located over 1 kilometre away from the higher ground and/or safe shelter. The households surveyed have not reported any problem pertaining to contamination/ flooding of key sources of water during heavy rains, floods and cyclones. Neither, they have faced issues such as salination of agricultural fields and soil in the aftermath of floods and cyclones. community is around 4-5 kilometres away from the sea coast. During floods and cyclones, the households store their valuable assets in box kept at safe and higher spaces in the house.

Map 9: Baghuasuni village

- One of the key disadvantages of the community is that majority of the houses are not well-connected to main road and railways through all-weather roads which may disrupt their access to key facilities and services if such arterial connecting roads are damaged during floods and cyclones.

- The close proximity of the community to low-lying area, river bank and sea coast, enhances the exposure of community members and their assets to adverse impacts of heavy rains, floods and cyclones.
- Most of the households are at distance of 500-1000 metres from the higher ground and/or nearest safe shelter. The presence of various vulnerable groups in the community calls for a proper mechanism for ensuring their safe and timely evacuation and transportation to-and-fro safe shelter.

b. Demographic profile of the households surveyed

A total of 27 households comprising of 117 persons were surveyed during the baseline survey. The total number of females and males in the surveyed households are 60 and 57 respectively. The average household size is around 4 and the size of the households surveyed varied from 1 to 9. Around 72.6 % (85 persons) of the residents from the household surveyed belonged to the age group 18-60. While around 17.9 % (21 persons) of residents are from 5-18 years age-group, around 9.3% are those below 5 years (2 infants) and above 60 years (9 persons) (figure 23).

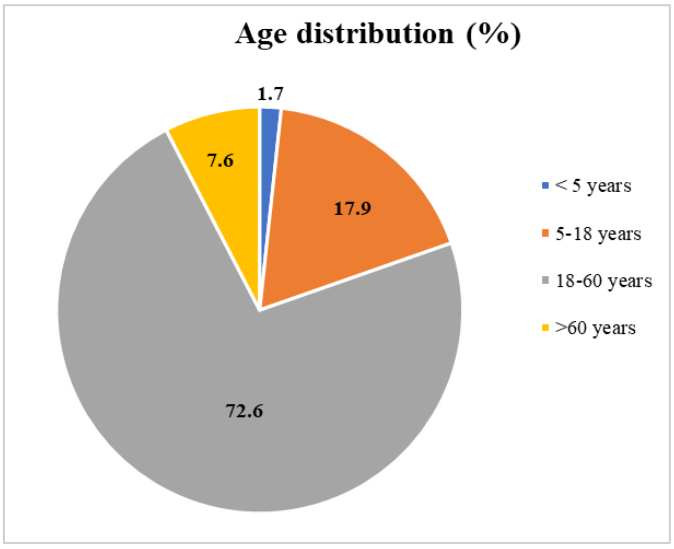


Figure 23: Age distribution (in %) of the households surveyed

Around 37% of households have a higher number of female members than male members, while some households are also women-headed households. Two households surveyed have only female members. Both of them belong to the age-group of 18-60 years. Two households have infants (< 5years) while four households have senior citizens (>60 years). All the twenty-seven households surveyed follow Hinduism. Sixteen of these households belong to general category while five households belong to OBC and six households belong to SC.

Around 60.6% of the resident from surveyed households are illiterate while around 17.9% of the residents have received only primary school education (till grade 7). Close to 7.6% of the residents are educated till secondary grade (8-10) and around 11.9% of the residents are educated till higher secondary level (till 12 grade). There are only two residents who are educated till university or higher level. Among the surveyed households, there is only one household with no illiterate member in the house, rest all households have at least one illiterate member. It may also be noted that both the females in the female-only households are illiterate.

One of the households has one pregnant /lactating woman. Two households have differently-abled members; one of these being the female-only household. Seven households have a total of nine bed-ridden persons/ persons in need of special care. One of these households is the female-only household. One household also have a cardiac patient.

The household income in the community ranges from Rs.500-15000 per month and the average household income is around Rs. 6300 per month. None of the household surveyed have any salaried person. Most of the residents are engaged in daily wage jobs or are self-employed. Members of a few households are also receiving pension; this includes one of the female-only households with differently-abled female member. Only around 22% of the households (6 households) are covered under different health or social protection scheme such as Biju Krushak Kalyan Yojana (BKKY) and Biju Swasthya Kalyan Yojana (BSKY). One out of the two female-only households are covered under BSKY. Almost 44% of households have taken loans in the past. Almost all of them have taken loans from banks with an exception of one household which has taken the loan from a moneylender, indicating the access to financial institutions. Out of the twelve households who have taken loans, only three households were not able to repay in time.

- The surveyed households have two **infants** (below 5 years of age) and nine **senior citizens** (above 60 years of age). There are two **differently-abled persons** and nine **bed-ridden persons/ persons with special need** and one **pregnant/lactating woman**. These are among the key vulnerable groups whose special needs and concerns are to be considered not only in DRR planning but also while undertaking evacuation, response, relief and recovery measures.
- There are two households with **female members** only; one of whom is also differently-abled. Both of these females belong are illiterate and only of them receives pension. These illustrate the cases of multiple vulnerabilities (disability, gender, illiteracy, unemployment) and can be considered as among the most vulnerable households.
- The **high number of illiterate members** in the households surveyed may face challenges in effectively comprehending early warning messages, public awareness material on DRR or other government schemes and programmes. These also include the members of two female-only households.
- There is a large variation in the monthly income of the households surveyed. The average monthly income of household is only around Rs 6300 for an average household size of 4 persons. Further, the absence of salaried and regular jobs among the households surveyed may exacerbate the **economic vulnerability** of the community to disasters as daily wagers are more likely to face loss of wages due disruption caused by disasters.
- In addition to this, the coverage of the households surveyed under different health and social protection scheme is around 22% only. The absence of adequate protection covers to an already socially and economically vulnerable community may adversely impact them during disasters, particularly compound disasters such as cyclone Amphan amidst COVID-19 pandemic.

c. Housing, facilities and assets

All the households surveyed reside in their own houses. Majority (around 63%) of the houses are *pucca* houses while around 37% of the houses are *kuccha* houses. All the houses are single-storeyed only. Around 60% of these do not have any access to the terrace. All the houses have electricity connections while only 70% of the households surveyed have water connections. The households with water connections receive only two hours of water supply daily while the other without water connections are dependent on nearest tube well for their water requirement. Around 81% of the households neither have washroom nor toilets in their houses. Only five of the households surveyed have both washrooms and toilets in their houses while two have only washrooms in their houses. Close to 89% of the households practice open defaecation. There is an absence of proper service for waste collection and safe disposal. Close to 70% of the households burn their solid waste while around 30% of the households use open dumping sites for disposing off their solid waste. The key assets of the households surveyed include agricultural land, pets and livestock. Around 56% of the households have agricultural land and around 52% of the households have pets.

- The key physical capacity of the community is that the majority of the dwellings are ***pucca*** in nature which may provide better safety against strong cyclonic winds, heavy rains and floods.
- However, most of the houses being single storey without an accessible terrace may limit the option of **vertical evacuation** for the community during floods and water stagnation at ground level.
- In the backdrop of COVID-19 pandemic and the need of appropriate public health measures requiring access to adequate quantity of safe water, lack of **water connections** in around 30% of the households can be very concerning. Even in houses with water connection, the **water availability** of only two hours is also an impediment for ensuring COVID-19 appropriate behaviour of regular and proper hand washing and other safe and hygienic practices.
- The prevalent practice of **open defaecation** among the majority of the households may further compromise the public health of the community and may exacerbate risk of disease outbreak of contamination of water sources during cyclones, floods and heavy rains.
- Unsafe and unsustainable practices of **burning solid waste and dumping them in open sites** are prevalent in the community and can be considered as a public health hazard. The solid waste has potential to clog drains and water channels which may lead to issues of water stagnation during monsoon and cyclonic season. Dispersal of waste from the open dumping sites during cyclones, floods and heavy rains may contaminate soil and water sources and may trigger disease outbreak.
- There is a need for strengthening the existing mechanism and service for waste segregation and disposal. The same should also be supported by **educating** the community on the harmful impacts of such practices on human health and the environment and introducing them to appropriate green and sustainable practices.

Figure 24: Types of houses and key assets in the house

d. Social factors and preparedness

Majority of the households have been residing in the community for many generations now (over 60-100 years). Even the newest household in the community is residing for close to 25 years now. Around 93% of the households surveyed have reported absence of any regular community meeting to discuss local issues and challenges while around 7% of the households are not aware about presence or absence of any such mechanism. None of the households have attended any meeting, training or discussion on disaster risk management. The key reason for this is absence of such a meeting, training or discussion in the community. Two households have also reported as loss of wages as the reason for not participating while one household was not aware about if any such meetings, training or discussion were conducted in the community. Only two out of the twenty-seven households surveyed discuss preparedness measures and action plan during disasters with the family members. The primary points of discussion include safe shelter, strengthening of house to mitigate/avoid impacts of disasters, emergency stocks

and kits and evacuation plan. Around 89% of the households surveyed have reported that the strength of community cooperation is very good both during days of normalcy and during disasters.

- The key social capacities of the community are long duration of their presence in the community (which indicate sound familiarity of the functioning of the community) and strong coordination among the community members both during normalcy and disasters. Such social cohesion is very useful in collaboratively managing disaster risk.
- However, the absence of any mechanism for regular meeting to discuss local issues and challenges and specific trainings, meetings and discussions on disaster risk management in disaster prone village is discouraging.
- This indicates the need for enhancing the **community-based disaster risk management** mechanisms and initiatives. This can possibly be done by leveraging the strong social cohesion and coordination of the community. Various representatives of the community can play a crucial role in mobilising the community members and putting in place regular and robust mechanism for dialogue and capacity building on disaster risk management
- Care should be taken to ensure participation of different vulnerable groups in such meetings, trainings and discussions where they can voice out their specific needs and concerns and other members can also be sensitised on the same.
- Absence of family level discussion on preparedness measures and action plan is quite concerning. This highlights the need for educating the community on aspects of **family level preparedness and planning** on disaster risk management to safeguard their lives and minimise potential damages and losses. This can be strengthened both through the relevant public awareness material and also through trainings.

e. Experience of Cyclone Amphan and COVID-19

All the households were affected by both cyclone Amphan and COVID-19 pandemic. COVID-19 pandemic compounded with cyclone Amphan had a significant impact on the households. Due to COVID-19 pandemic, majority of the households faced disruption or loss of livelihood, loss of education and additional financial burden. One household has reported death due to COVID-19. The most common coping mechanism adopted by the household have been selling of assets and taking of loans. Around 81% of the households sold out their assets while close to 78% of the households took loans to bear with the financial losses and additional financial burden triggered by COVID-19. Children of around 59% of the households supported the family by working while around 48% of the households relied on the support provided by the government and NGOs.

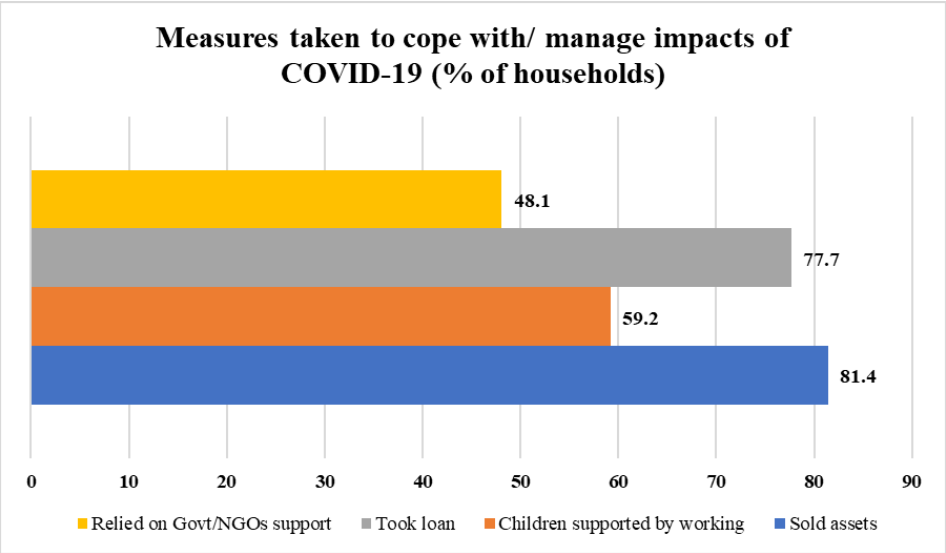


Figure 25: Key measures undertaken by households to cope/manage impacts of COVID-19

All the households received regular alerts and updates on COVID-19 through television, radio and newspapers. The key message received was to stay at home. On receipt of alerts and update, all the households undertook the required precautions and further shared the information with family, members and neighbours. The key precautions the households practised include avoiding public meetings and gathering and regular sanitisation of hands. Members from none of the households were shifted to COVID-19 quarantine/isolation/Temporary Medical Centres.

The households were also adversely affected by Amphan. They key adverse impacts faced by the households surveyed include property damage and disruption or loss of income. All the households suffered property damage while close to 92.5% of the households faced disruption or loss of income. Close to 14% of the households reported loss of assets and around 3.7% of the households reported damage to agricultural land. Many households also faced loss of livestock. The key critical services which got disrupted during the cyclone include food supply and PDS, medical services, sanitation and waste disposal, connectivity, power supply, road connectivity and transportation.

All the households surveyed had access to timely early warning about the cyclone. Early warning mechanism was activated five days before the landfall of the cyclone. The frequency of subsequent warnings was two hours. The primary sources for the community for such alerts, warnings and information were district authorities, local authorities, radio, television and newspapers. The households further communicated these warnings and alerts to family members, relatives, neighbours, and other community members/ representatives.

The village has pre-identified safe shelters and safe evacuation routes to them and all the households were aware of the same. However, all the households have informed that they were not required to shift to the safe shelter. The key instructions they received on the cyclone amidst the pandemic was to stay at home, avoid crowded places and to move to *pucca* houses if required. Accordingly, all the households used different techniques and methods for protecting their houses, assets, livestock and crops. Majority of the household moved their livestock to higher/safe places and stored the harvested crops at higher places. Many households also

created temporary barriers such as that of mud while some of the households also used sandbags for protection.

As the households were not required to evacuate to safe shelters, all the households have stocked kept emergency supplies at home. These primarily included drinking water, dry/packaged food items, important medicines/first aid kit, sanitary needs and emergency lights. They have also safeguarded important documents. Out of these, in majority of households, the food lasted for one day while water and medicine-related stock lasted for two days. During their stay in their houses, the key issues faced by the households were that the area was inundated by flood water and there was no supply of power in the area.

- The households have highlighted the need for a multi-purpose cyclone centre and a public health centre to cater to emergency and medical needs of the community.
- The case of the community where they were not required to evacuate to the safe shelter and had to ensure their safety within the community only highlights the need for strengthening the resilience and continuity of essential services even in the areas likely to be affected but not required to evacuate. Various innovative options such as mobile medical services or door-to-door delivery of essential supplies in such areas could be explored and implemented so that such households are better able to sustain themselves during disasters.
- Trained and skilled volunteers from the community can also play a pivotal role in the management of various aspects within the community, when they are likely to be affected but not required to evacuate.
- The local community's awareness and skills for preparation of emergency kits, safeguarding the valuable assets and staying connected with each other may further be enhanced through relevant public awareness material and training.

Figure 26: Snapshots depicting community members

3. Khordha

Quick summary

Ward No. 9 of Banpur NAC, Khordha has a total population of 893 persons and comprises of 147 households. Broadly, community members belong to minorities (60 households with 376 persons) and OBC category (56 households with 310 persons). The average size of a household in the community is 5 persons. The community includes 87 women-headed households. The baseline survey covers 45 households including some of the women headed households.

Connectivity: Community is not very well connected to main road and railway through all-weather roads.

Locational disadvantages: Proximity to low lying areas. Severe impacts to the settlement during flooding and cyclones.

Prevalent housing type: Pucca
Average household income: Rs 8950 per month
Predominant source of livelihood: Self-employed
Services predominantly present: Electricity and water connections; individual toilets
Services predominantly absent/inadequate: There is a lack of proper training for preparedness and social cooperation among resident. Additionally, the residents face challenges with alternative sources of income.

a. Physical location and connectivity

The community is not well connected with arterial roads, paved roads and railways. It is located in a distance of 500-1000 meters from low lying areas. The high ground or shelters are located in proximity within 500 metres which poses less chances of damage due flooding. The community faces the challenges of water contamination after cyclones and flooding. The residents of the community keep away essential items and assets secured in small containers at safe spaces to prevent from flood damage.

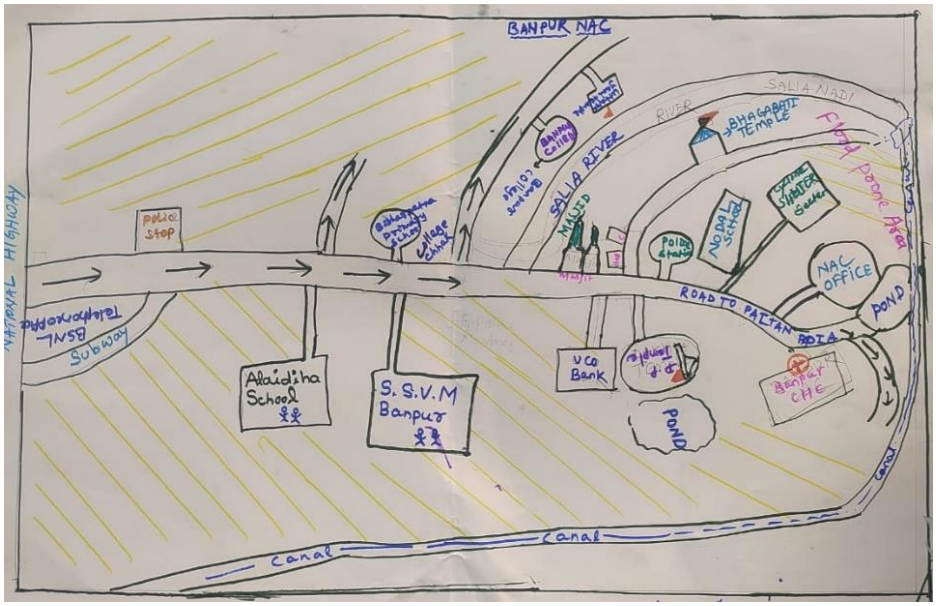


Figure 27: Community mapping, Khordha

- One of the key capacities of the community is its proximity to nearest safe shelter/ higher ground which is less than a kilometer away
- The community is prone to floods during monsoon and cyclonic seasons due to it being near low lying areas.
- The key challenge is a poor connectivity to main road and railways through all-weather roads. In the backdrop of presence of high chances of flooding and of vulnerable groups the connectivity should be strengthened for ensuring safe and timely evacuation and transportation of the community, especially vulnerable groups to the nearest safe shelter during floods and cyclones and access to relief, first aid and fire services.

b. Demographic profile of the households surveyed

The 45 number of households surveyed comprise a total of 231 persons. The total number of females and males in the surveyed households are 120 and 111 respectively. Size of the

households surveyed ranged from 2 to 11 and the average household size is 5. The majority (60%) of the residents from the household surveyed belonged to the age group 18-60. While 26% of residents are from 5-18 years age-group, 3% are those below 5 years and 11% above 60 years.

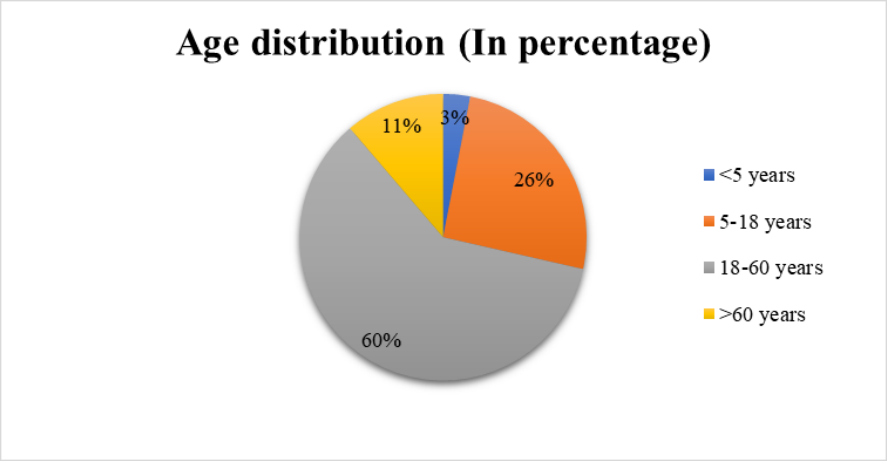


Figure 28: Age distribution (in %) of the households surveyed

The community has a varied population of different social groups with 6.7% SC and 35.5% OBC distribution, respectively. The area is resided by people of the Hindu and Muslim faith. 33% of households have a higher number of females than male members with some households being women-led. The majority of the population of the community are educated and have received till secondary school education. Among the surveyed households, 42% of households have one or more illiterate members.

The household income in the community ranges from Rs.3000-15000 per month with average monthly income being Rs.8950. The majority of the household have members who are self-employed, followed by daily wagers and salaried persons. There are very few salaried persons in the community with only 4 households out of 45 having a salaried member. Only 11% of the households are enrolled under government schemes like Biju Krushak Kalyan Yojana and Rashtriya Swasthya Bima Yojana. Very few households have ever taken loans from societies but none from banks.

- The surveyed households have **7 infants** (below 5 years of age) and **26 senior citizens** (above 60 years of age). These are among the vulnerable groups requiring special assistance during evacuation, response and relief.
- Besides, the identified households with **only senior citizen female members** are among the most vulnerable households with overlapping drivers of vulnerability (age, gender).
- The most common means of living in community is self-employment. There is absence of salaried jobs among majority of the household surveyed. The common features of informal employment include uncertainty and irregularity in income. Often these features become more unpredictable during disasters making the community more **economically vulnerable** to the adverse impacts of a disaster.
- Majority of the households are not enrolled in any government health/social protection schemes which increases the impact and recovery time from disasters.

c. Housing, facilities and assets

All the households surveyed reside in their own houses except for only one household who reside in a rented accommodation. The houses in the community are owned by residents and are pucca. The houses are single-storeyed with access to the terrace and solely used for residential purposes. All the households in the community have electricity and water connections. Houses have both toilet and bathing facilities in the household. The households have access to municipal dustbins for solid waste disposal. All the households own parcels of agricultural land and pets.

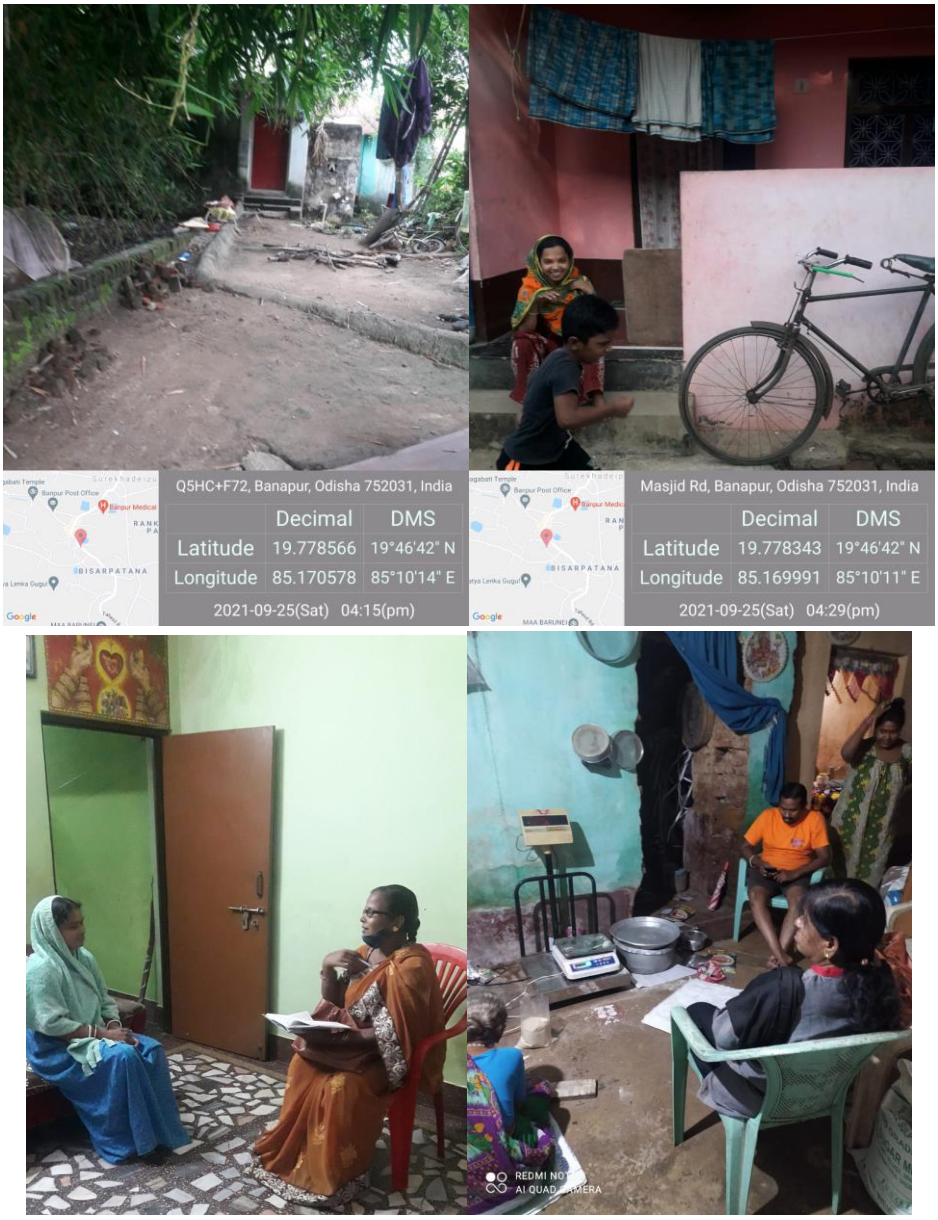


Figure 29: Types of houses in the community and their condition

- The capacity of the area is that majority of the dwelling being *pucca* in nature are strong enough to withstand cyclonic winds and associated heavy rains.
- Due to the unpaved roads, improper drains and proximity to low lying areas the houses are impacted by water logging due to floods that increase chance of making the residents and their assets more exposed and vulnerable to adverse impacts during disasters.

d. Social factors and preparedness

The community is residing in the area for many generations (around 75 years). The community does not have regular community meetings every week. The residents do not usually discuss hazard warnings however they experience good level of cooperation during normal days. The cooperation is slightly lower during the time of disasters. The residents of the community have not attended any disaster management training so the awareness of preparedness, response, and evacuations skills is low. The residents of the household primarily discuss about safe shelters, emergency kits and how to strengthen the house to avoid the impact of disaster.

- There is a lack of awareness and motivation towards community meetings which brings about the **challenge of proper information transfer** and controlling the spread of COVID-19.
- Lack of awareness among majority of the households about the meetings in the community to discuss local issues and challenges indicates communication gap and absence of an all-inclusive approach which can act as a major impediment during disasters. It also highlights that the need for establishing and regularly strengthening the existing local mechanisms such as meetings to make them more inclusive and engaging for all the households in the community.
- Care should be taken to ensure participation of different vulnerable groups in such meetings where they can voice out their specific needs and concerns.
- Absence of participation of the households in different training and preparedness programs is a very concerning. This can result in inadequate community awareness, knowledge and skills on potential hazards and appropriate preparedness, mitigation, evacuation and response measures. This also undermines the efforts of government and other stakeholders towards awareness generation and capacity and resilience building of the community against potential disaster risk.
- Different approaches of engaging with the community should be explored and leveraged to ensure their active engagement in such programs. For examples, improved communication and outreach can possibly enhance the participation of the households who currently remain unaware of such initiatives. Similarly, the venue, time and duration of such programs, if finalised in consultation with the community (with due considerations of their availability) can enhance their participation. Likewise, different groups such as students, teachers, community workers, government officials, factory/industry workers can also be targeted separately at their place of work/ engagement to address the concerns such as loss of wages, loss of education, venue, etc.
- Family level discussion on preparedness measures and action plan is quite encouraging as this highlights their interests and/or concerns regarding disaster risk management to safeguard their lives and minimise potential damages and losses.
- Efforts should also be taken in strengthening the social cohesion and cooperation among the community which has been recorded as good during times of normalcy but poor during disasters. Different community engagement activities which bring all the households together for identification of local issues and collaborative brainstorming and planning can be taken up. Various local representatives (political, administrative, religious, cultural, etc.) can play a pivotal role in this regard.

- The need is to regularize community meetings, preparedness trainings in the community by the local administration and make access to education easier for both children and adults.

e. Experience of Cyclone Amphan and COVID-19

The majority of the households were affected by COVID-19 pandemic. The access to education, livelihood losses in addition to major financial burden were some of the significant impacts of COVID-19 in the community. With common occupation in the informal sector, the residents suffered from loss of livelihood during the time of lockdown and cyclone. The past cyclones affected the households as there was loss of assets and residents had to evacuate. Electricity, road connectivity and access to markets were disrupted in the past cyclone events. Majority of the households relied on loans and assistance from NGOs to cope with the effects of COVID-19.

The residents of the community received information on preparedness for COVID-19 They adhered to the social distancing norm, sanitized regularly, and wore masks. They communicated the information and precautions to the family members and neighbours. The information regarding cyclone was conveyed to the residents four days ahead of the landfall. The NAC authorities, ward councillors conveyed the information of cyclones. Radio, TV and newspaper were the primary media for information and alerts. The residents communicated the warnings and alerts to family, neighbours, and other community members. The evacuation routes and safe shelter locations were pre-identified by the ward authorities and the community members were instructed to stay at home and store essentials and food supplies.

As a precautionary measure, the community moved their livestock and harvested crops to higher safe locations. The community members were not required to evacuate to safe shelters during cyclone. They kept stock of emergency lights and dry food. The stock of emergency food and medicines lasted them 3-7 days whereas water lasted them 1-2 only. The community faced the challenge of flood water accumulation in their houses and roads due to the cyclone.

- Households have shared the general experience that early warning if provided 5 to 7 days in advance can help them prepare accordingly for the upcoming disaster damage.
- Households have also highlighted concerns with proper information transfer. They wish that door to door information sharing by Anganwadi and other officials can be carried out in future.
- From the public health concerns underscored by the ongoing COVID-19 pandemic, physical distancing seems to be a norm which is here to stay. This highlights the need for identifying safe shelter for the community in due consideration of the projected population growth and/or floating population, if any, in the community.
- The households did not shift to safe shelters during past cyclone and flood conditions. This may become a case concern for potential injury and damage as houses are not easily accessible by roads. Actions to enhance the safety of vulnerable groups such as infants, young children and adolescent girls can be further strengthened by promoting timely evacuation.

F.2.5. Reflections for improving school disaster management plan

Schools in vulnerable areas are used as shelters during floods and cyclones. During the COVID-19 pandemic, schools have also served as quarantine centres, isolation wards and Temporary Medical Centres (TMCs). School staff in flood and cyclone prone areas are quite aware of various disaster management aspects. In some schools, headmasters and teachers were also oriented on disaster management through state-level sensitisation programmes on school safety. They were also oriented on COVID-19 guidelines. Some schools have also been provided with safety equipment like fire extinguishers, mikes, ropes, ladders, gas cylinders, utensils, torches, inverters, etc. Staff and students have also been trained by the fire officers. They have been given hands-on experience to handle fire safety equipment.

(a) Consultations with officials of District Education Department, Puri

(b) Consultations with Head Master and senior teacher in Government High School in Banpur NAC, Khorda

Figure 30: Consultations with stakeholders from Education Department and schools

While serving as shelters and critical facilities for COVID-19 pandemic, school and their stakeholders have faced various challenges. Many school buildings are in a very rickety condition and hence, cannot effectively serve the purpose of safe shelters. They are unsafe to house people for any purpose. In some schools, the number of toilets is also inadequate to cater to large number of evacuees. Many schools don't have an alarm system and adequate fire safety measures in place. As the schools have remained closed for a long time now during the pandemic, the awareness and training amongst staff and students have been disrupted. From a disaster management perspective, schools are lacking experienced resource persons, safety equipment, and need district, and block-level training and capacity building programmes. At least one teacher in each school should be trained in disaster management.

The B.M. Bagurai Government High School, Ward No. 08, Bhadrak was used as a shelter during the cyclone Amphan and an isolation centre during COVID-19. It was observed that the school does not have School Disaster Management Plan (SDMP). Neither any disaster management committee nor the teams have been formed in the school. Five first aid kits and just two ABC type fire extinguishers are available in the school. In terms of open space, the school have enough space for the assembly area. There is a lack of sufficient sanitation and hygiene facilities in the school due to which the evacuees faced key challenges the same resulted in open defecation in the school campus.

Figure 31: Bindumadhav Bagurai Government High School, Bagurai, Bhadrak

Ishwar Chandra Government High School, Bolang, Balasore also serves as a cyclone and flood shelter. This school also does not have a school disaster management plan. The poor structure of the school building makes it unsafe for people to take shelter. A very small part of the school is a new building where people took shelter during the cyclone Amphan. The number of toilets present on the school premises is not enough and the same are not well-managed either. The school served as an isolation centre and TMC during the first wave of COVID-19. The teachers were assigned special duty to manage people and the school.

Figure 32: Ishwar Chandra Government High School, Bolang, Balasore

(a) Fire extinguisher

(b) Nutrition garden

(c) Posters on covid responsible behaviour

(d) Dilapidated condition of toilets

Figure 33: Snapshots from Government High School, Banpur NAC, Khordha

The Sahana Project Upper Primary School, Puri was also used for shelter during the cyclone Amphan. Most of the people from the village have to take shelter in this school as the pre-identified cyclone shelter is quite far from the village. The number of toilet facilities is not adequate for usage by large number of evacuees. In the past, school students and staff have received disaster management training from the Church's Auxiliary for Social Action (CASA). An emergency siren, primarily developed for the tsunami early warning is also positioned near the school which has its necessary equipment in the school itself.

Figure 34: Sahana Project Upper Primary School, Sahana, Puri

The identified school in Rambha NAC, Ganjam doesn't have the required medical facilities and first aid resources to cater to the evacuees when the school is being used as a shelter. The available facility is only for the students. Toilets and water facilities also bear a brunt when a

large number of people use it as the facilities are only meant to cater to limited number of students, teachers and other staff of the school. During the COVID-19 pandemic, availability of items like masks, gloves, sanitizers were not available as reserve in the school. All these factors thus led to situations where the COVID-19 guidelines and recommendations were flouted. Lack of adequate space results in violation of the mandatory norm of physical distancing. Schools and other centres that acted as quarantine centres should have adequate measures for security/ provision of security guard in place to ensure that the quarantined persons maintain decorum. It was observed that due to lack of such measures, people under quarantine had flouted rules. The school has equipment such as fire extinguishers, emergency alarm, etc. Emergency evacuation maps are displayed in prominent places and safe assembly areas are demarcated. Regular trainings of the staff, teachers and students also take place regularly in schools but the same does not include trainings related to public health emergencies such as pandemic. Mock drills are not conducted regularly in schools.

Figure 35: School building, Ward No. 9, Rambha NAC, Ganjam

The key considerations and recommendations for improving SDMP are briefly discussed below.

The primary gap identified in most of the schools studied is the absence of the School Disaster Management Plan (SDMP). So, there is a need to develop the SDMP for each of the school incorporating appropriate SOPs and COVID-19 related public health measures. In general, a SDMP comprises of school profile, Hazard, Vulnerability, Capacity and Risk Assessment of the school, the constitution of School Disaster Management Committee (SDMC) and an institutional and financial mechanism for disaster risk management. It lays down key preparedness, capacity building and mitigation measures and includes hazard-specific response plan along with evacuation map and relief and recovery plan.

SDMC consists of parents (12), teachers (2), anganwadi worker (1), ASHA worker (1), ward/village member (1) and student representatives (2). This committee is also in charge of convincing villagers to move to shelters and take care of the school/shelters during evacuation.

SDMPs should be guided by the National School Safety Policy and should support the concept of comprehensive school safety. The comprehensive school safety framework (figure 36) aims

to reduce the risks of all hazards to the education sector (UNDRR, 2017)[6]. It focuses on child-centered and evidence-based efforts to promote DRR throughout the education sector and to assure universal access to quality education. It rests on three pillars; safe school facilities, school disaster management, and risk reduction education. Multi-hazard risk assessment is one of the key central themes of the framework. In the backdrop of manifest ion of complex risks such as witnessed during recent cyclones in the State amidst COVID-19 pandemic, this theme of multi-hazard risk assessment is all the more relevant now than ever before.

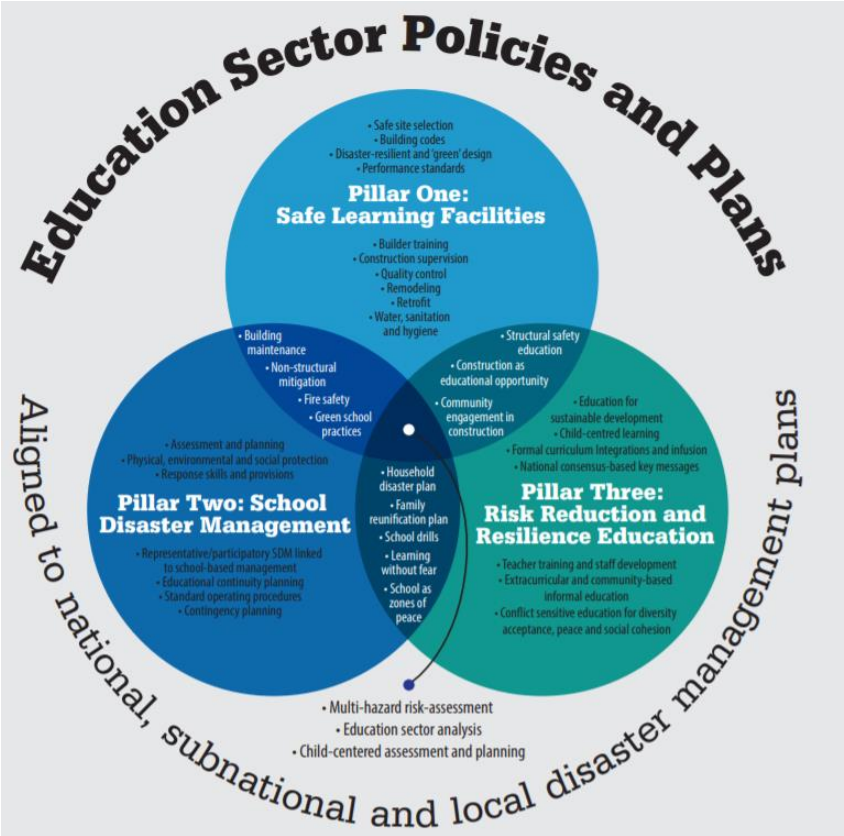


Figure 36: UNDRR's framework of comprehensive school safety

Source: Comprehensive School Safety: A Global Framework (UNDRR, 2017)

Besides, during past management of cyclones and floods and the ongoing management of the pandemic, schools have been repurposed and used as safe shelters, quarantine centres, isolation centres, TMCs, etc. This underscores the need for strengthening the existing role and hence the infrastructural, human resources and financial capacities of schools as critical infrastructure of DRR, playing a central role in the community. The Bokomi (meaning disaster-safe welfare society) concept prevalent in Japan may provide some insights in this regard. The concept is based on elementary **school districts** established by residents, where schools have been developed into a highly resilient disaster public infrastructure through systematic efforts (Shiwaku and Shaw, 2016). It ensures that all schools are at the highest level of safety, through their design and the existence of emergency plans that are regularly updated and tested through drills. In case of any disaster, the school district and nearby community share a symbiotic relationship thus working in close coordination for response and relief. The community is the first responder to any disasters and the schools, in return, can provide safe shelter to the

[6] https://www.preventionweb.net/files/51335_cssbooklet2017updated.pdf

community. The school districts act as the evacuation point, emergency shelter, and awareness generation hub. For instance, during the 2011 East Japan Earthquake and Tsunami, the school districts were found to be very effective in providing safe shelter for students, teachers, and the local community. It further envisages that all-new generations of children develop their capacities to respond appropriately when a disaster hits, to enable them to save their lives and contribute to saving those of others.

Collaborative and inclusive efforts may be undertaken to institutionalize a similar concept in the study area so that the symbiotic relationship between schools and local communities can be further strengthened for efficient management of disasters and making the communities resilient and better prepared for all potential hazards including the biological ones. The concept can be suitably modified to suit the local contexts as depicted in figure 37.

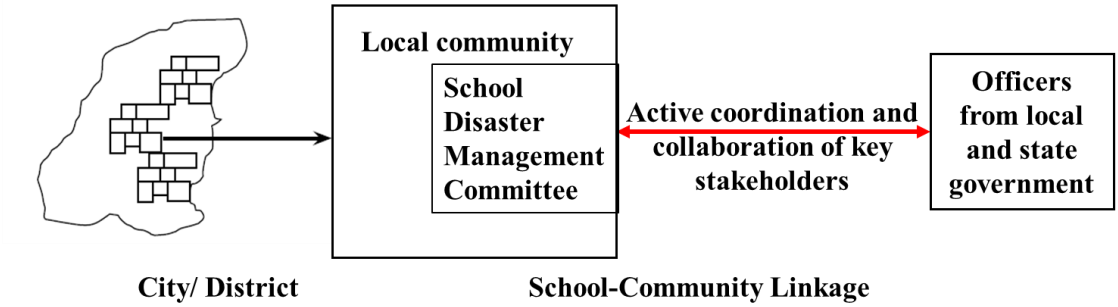


Figure 37: Modified Bokomi concept for establishing school-community linkage for DRM
Source: Adapted from Community Linkages and Disaster Risk Reduction Education, Shiwaku and Shaw, 2016)

Further, based on the consultations, the potential roles of different stakeholders of the school are listed in table 10 which can be incorporated in the SDMPs.

Table 10: Key roles of school's stakeholders

Stakeholders	Role
Student	They should actively participate in training programme and drills organised on SDMP. Senior students are expected to be able to teach/educate the younger ones. Students can inform their parents of what they have learned concerning hazards and risks.
Parents	Parents may join school and other members of society to support their children in learning about SDMP and assisting in disseminating the risk assessment result to the community through participatory approach. Parents and teachers can discuss (through various forms of Parents and Teachers Meetings) about SDMP, IEC materials on school safety and on measures to make school a safer place.
Educators and other professionals	The educators and professionals should enrich their knowledge on hazards, risk and how to implement disaster risk reduction measures. Educators can take the initiative to conduct learning session on disaster and its risk reduction i.e. on a weekly basis during school hours on specific subject matter (geography, biology, etc.). They can bring the students out of the classroom to learn and identify the risk zones and draw the risk map in their school environment.

NGO, CBOs and private organisations	In cooperation with professionals, educators, children and/or community, such organizations can support in developing comprehensive action plan to improve school safety and the level of risk awareness among the school communities. They can support the coalition and partnership among schools to build inter-school network. They can equally develop and provide education materials.

F.3. Outcome 3: Supporting preparedness of shelters and health facilities depending on its necessity

4-1. Review preparedness of shelters based on the recommendations compiled in the activities 1 and 2.
4-2. Identify necessary stock of critical equipment and goods such as soaps, sanitizers and PPEs

F.3.1 Methodology

The study of the preparedness of shelters is informed by the following framework on key functions of emergency shelters (figure 38). The framework lays down five key functions and related parameters that can help understand the effective functioning and preparedness of the safe shelters. These are providing safe refuge to population at-risk, provisioning of food and drinking water, hygiene and sanitation, provisioning of health and psychosocial care and security and other facilities.

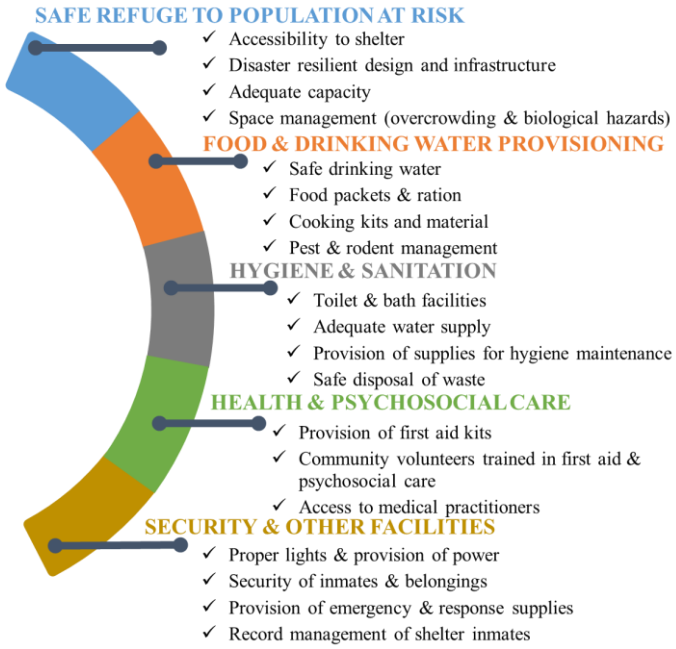


Figure 38: Key functions of emergency shelters

Guided by the framework, project team has developed guide for FGD and Rapid Visual Screening (RVS) for undertaking physical assessment of the emergency shelters and undertaking the FGD with the members of the Shelter Management and Maintenance Committee, wherever available. The guide for FGD and RVS is placed at Annexure 11.

F.3.2 Key reflections

Cyclone and flood shelters were visited in the selected communities. There are different types of shelters being used in the communities. These include Multi-Purpose Cyclone Shelters (MPCS), Multi-Purpose Flood Shelters (MPFS), and shelter-cum-school.

As per the Handbook for Management and Maintenance of Multipurpose Cyclone/Flood Shelters laid down by the OSDMA, the shelters should in place trained and community-based Shelter Management and Maintenance Committees (CSMMCs). It further provides details on composition of such a committee. Accordingly, the CSMMC are to be constituted through a Palli Sabha (Community meeting) convened by the Sarpanch of the Gram Panchayat at the instances of OSDMA and the local BDO. The CSMMC consists of both government and private members. The Block Development Officer of the concerned block is to function as the President of the Committee. Sarpanch of the Gram Panchayat of the Shelter village is to function as the Vice President. One representative of the vulnerable community, selected by Palli sabha or in case of urgency nominated by the President, is to function as the Secretary of the Committee. Such a mechanism supports community ownership and ensures their

involvement in the asset management. The handbook also mentions about trained Task Force for each shelter.

Based on field visit and consolations with key stakeholders, the is learnt that the shelter management committee takes care of the overall management of the shelter. However, it is Secretory who looks after day-to-day maintenance. The committee usually meets three times a year or as and when needed. The key equipment available in some of the shelters include equipment for lighting, cooking food, search and rescue such as cooking utensils, ropes, ladders, ASKA light, torches, first aid kits, stretcher, etc. In many cases, cyclone and flood shelters did not have boundary walls which made it difficult to maintain cleanliness within the shelter premises. It was learnt that although basic facilities are available in most of shelters, bedding for people is a key challenge. In certain cases, there is lack of regular and proper repair of damaged structures and equipment.

During cyclone Amphan, to maintain the COVID-19 pandemic protocols, additional schools were marked and used as a shelters. It was found that cleanliness and maintenance in normal circumstances remains a major challenge in shelters. The shelters that are used for other purposes such as school are better maintained than those which are used only as shelters.

(a) Multi-Purpose Cyclone Shelter, Bolang (b) Cyclone Shelter cum School, Astaranga

Figure 39: Multi-purpose cyclone shelter an schelter-cum-school

Cyclone shelter-cum-school located in Astaranga, Puri is a very well maintained one storey structure. It is used as a school in normal times. It has separate toilet facilities for men and women. There is the power supply to the shelter. There are other facilities like ropes, ladders, utensils, water supply, emergency lights, etc. The shelter has the capacity of 200 people but up to 700 people have been accommodated during the time of need. Similarly, the multi-purpose cyclone shelter of the Bolang village, Balasore has a capacity of approximately 250 people, however, more than 500 are generally accommodated during cyclones.

It is learnt that during Amphan, at the time of evacuation, people were instructed to wear mask and main physical distancing. However, The number of people evacuated to shelter in most of cases much higher than the actual capacity of the shelter, hence making it crowded and difficult to maintain physical distancing. It is learnt that cyclone shelters (during Amphan and Yass) became overcrowded and people were afraid to go inside due to the fear of COVID-19. In some cases, there has been lack of proper arrangements in cyclone shelters due to which people prefer to stay at home during emergencies. Further, efforts may be undertaken to strengthen the

existing mechanism for rapid screening of evacuees to shelters, especially during times of pandemic or outbreak of infectious diseases.

To mitigate the adverse public health effects of the cyclone, there is a need to supply clean water, water disinfectants and water purifiers for the most vulnerable populations. Along with the availability of medicine, it is also important to ensure the access to oral dehydrative salts, mobile health check-ups and health camps and medicated mosquito. It is learnt that during cyclone Amphan, people were given masks and hand sanitisers in the shelter as a precautionary measure for the COVID-19 pandemic.

Further, it is informed that to manage the issue of overcrowding during the ongoing pandemic, alternate safe buildings (often schools) were identified as shelters. However, in many cases, the issue of lack of adequate infrastructure and facilities to cater to large number of evacuees was experienced. Some schools had adequate toilet and water facilities, medical and first aid supplies to cater to their students and staff, however, the same were not adequate to large number of evacuees during emergencies. Similarly, there were cases where the availability of items like masks, gloves, sanitizers were not available as reserve in the school being used as shelters. Thus, it is important to assess the capacity (full and restricted, as in case of ongoing pandemics) while identifying the alternate buildings for repurposing them as safe shelters. While assessing such capacity, along with assessing the space available, the capacity in terms of basic services and facilities available should also be effectively assessed.

Figure 40: Snapshots of shelters in the study area

F.3.3 Draft guidelines for shelter management

The existing emergency shelters can be effectively managed under the COVID-19 pandemic in a cyclone/ flood-prone area by following the below guiding principles which can be sub-divided into seven main headings.

1. General use of an emergency shelter and its management
2. Role of the stakeholders and coordination between them
3. Capacity and space management utilizing COVID-19 protocols
4. Time management as per the early warning given for evacuation, coupled with the ongoing COVID-19 pandemic
5. Role of the volunteers and coordination between them
6. Operations management to make sure that the entire process is carried out smoothly
7. Features of shelter under the COVID-19 pandemic in a cyclone/ flood-prone area

1. General use of an emergency shelter and its management

i. An emergency shelter is a type of critical infrastructure for use of the community members. They offer safe spaces to the evacuated population till it is favorable for them to return to their dwellings. It provides shelter to the vulnerable and affected people and reduce the destructive impact at the time of a cyclone/ flood. With the ongoing COVID-19 pandemic in India since March 2020, it is necessary that the shelter management and maintenance committee follow hygiene practices to curb the spread of the virus.

ii. The Indian state of Odisha has faced the brunt of many cyclones, recent ones being cyclone Amphan/ Yaas/ Gulab, leaving behind flooded areas and coupled with the ongoing danger of the COVID-19 pandemic. Therefore, these emergency shelters in the cyclone/ flood-prone state of Odisha are a vital tool for taking the community-based disaster response initiative forward.

iii. The shelters should be safe, secure, inclusive, and hygienic.

iv. The shelter can be used by all affected people irrespective of their caste, class, creed, gender, and language. Special attention is to be paid to the women, children, elderly, and persons with disabilities.

v. With approval of the shelter management and maintenance committee, the shelter can be used for social, cultural, and other programmes, but nobody should be allowed to use the shelter premises permanently. The programmes should be held by abiding with the COVID-19 protocols.

vi. No illegal, illicit, criminal, or divisive activities will be allowed inside the shelter premises.

vii. The shelter equipment's should be stored in good condition and maintained for use during a disaster. A log book should be maintained for keeping a record of all the equipment's to avoid any misplacement or theft. Some important equipment's are – generator sets, torch lights, first aid kits, kitchen utensils, foldable stretcher, wheel chair, radio, ladder, tarpaulin cover, rope, dust bins, etc. Additionally, COVID-19 related supplies such as temperature check and oxygen check machines, shower caps, face shields, face masks, hand gloves, sanitizers, PPE kits, etc. should be stored. There must be provision of kits for performing COVID-19 rapid antigen tests on the affected people who will be taking shelter in the building.

viii. There may be some shelters which are being previously used as COVID-19 facilities to quarantine people. Such shelters should be thoroughly sanitized to prevent the spread of infection and also to make the incoming evacuees feel protected.

2. Role of the stakeholders and coordination between them

i. The affected people are entitled to non-discriminatory, equitable, inclusive, and respectful access to emergency shelters when struck by cyclones/ floods under COVID-19 pandemic. All stakeholders in the state of Odisha are accountable to be transparent and just while providing such recovery support.

ii. The vulnerable people such as women, children, elderly, physically challenged, terminally ill, illiterate, economically weaker sections (EWS), minorities, SC/STs, etc., require additional support and facilitation to recover. Therefore, they should be assisted and supported without any discrimination.

iii. There should be a dedicated Shelter Management and Maintenance Committee (SMMC) consisting of 20-25 people. Such a committee should be formed for a single shelter.

iv. The headmaster/ Sarpanch of the Panchayat/ executive officers of the ULBs or person in-charge should be a member of the SMMC. This committee should have trained male and female representatives from different organizations and from different sections of the society. This will help in effective functioning of the shelter.

v. If the emergency shelter is a school during normal times, then it is the duty of the headmaster of the school to monitor that the shelter is kept clean. Therefore, it is the duty of the person in-charge to monitor the cleanliness when the shelter is serving as a community hall, training centre, etc.

vi. Institutionalization of a sustainable shelter management and maintenance system will ensure long term sustainability of the shelter building. This should include community participation and Government support during a disaster event.

vii. The management and maintenance of the shelters are best done by the local community and ULBs because it brings a sense of ownership, they are in a better place to manage and maintain the shelter on a day-to-day basis, and it is not administratively possible for the central organizations to manage the local needs of a shelter. This will also keep the synergy amongst the affected communities high and positive.

viii. The SMMC should cooperate and coordinate the day-to-day maintenance responsibilities of the shelter with the local community.

ix. Any dispute regarding the shelter management and maintenance will be brought to the notice of the Odisha urban local bodies (ULBs) or the Odisha State Disaster Management Authority (OSDMA).

x. The committee members should follow adequate COVID-19 protocols and should promote vaccination while helping the affected people.

xi. There should be active participation from the local community and local stakeholders to identify other potential hazards around the shelter, such as, snake bites, water stagnation, vector borne-diseases, improper disposal of waste, etc. This will help in proper management of the shelter, especially during COVID-19 when external assistance is challenging owing to the travel restrictions.

xii. The different stakeholders involved in the process should be focused, work diligently, and have the right attitude of serving the affected people. Proper arrangements should be made

to help them access the relief materials, finance, and knowledge of the surroundings. This will help the people to overcome their losses and recover at the earliest.

xiii. It is important that the stakeholders associated with the smooth functioning of the shelter establish a system of identifying all genuinely affected households so as to ensure that they are included in the shelter. A detailed inventory of the communities is usually available in the offices of the Urban Local Bodies (ULBs). The landless population, SC/ STs, socially excluded families, women-headed households, squatters, tenant population, etc. are usually the most vulnerable and in dire need of support, in the aftermath of a disaster.

xiv. Providing financial assistance for the overall shelter management process by releasing funds timely through a transparent, accountable, and quick mechanism. There may be convergence with other relevant schemes such as Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Clean India Mission (or Swachh Bharat Abhiyan), etc., through proper channel.

xv. Ensuring the communities in distress of continuous access to basic services and infrastructures, such as water, sanitation (toilets, waste disposal, sewage), street lighting, safety and protection, etc.

xvi. Conducting capacity building training and awareness programs to encourage the local organizations to get involved in the process, because only collectively the affected communities can overcome the brunt caused by cyclones/ floods under the COVID-19 pandemic.

3. Capacity and space management utilizing COVID-19 protocols

i. The shelter should have provision for separate halls for men and women/ children. There should be enough space so that each person is at a distance of 2 meters or 6 feet from each other. Wherever necessary, wooden partitions can be used to create separate halls.

ii. In view of the COVID-19 pandemic and its requirement of physical distancing, the effective capacity of the shelter may be reduced. This issue should be addressed by the Government and the SMMC and acted upon accordingly.

iii. The shelter should have provision for separate toilets for men, women/ children, and persons with disabilities. It is preferable that the bathroom fixtures are of no-touch type so as to make sure that there is minimum contact to avoid spreading the virus.

iv. There should be extra rooms to be used as a general sick room or as a labour room for pregnant women. Additionally, there should be provision for rooms for isolating COVID-19 positive patients. The patient can be isolated from rest of the group to avoid spreading the virus and if required can be shifted to the nearby healthcare center for advanced treatment.

v. There should be provision for a store room to stack the relief materials, medicines, supplies for COVID-19, etc. for management during emergency.

vi. The dedicated area for dining should have adequate space for queues after duly considering the norms of physical distancing. This should be marked with chalk/ tapes/ paint on the floor along with appropriate signages displayed in the local language.

vii. There should be designated spaces at the entrance of the shelter for sanitizing the evacuees and disinfecting their belongings before they enter the building.

viii. Members belonging to the same family should be grouped and made to stay together with limited or no physical interaction with others in the shelter, to avoid transmission of infection.

ix. The ceiling fans and lights should be installed at regular intervals (2 to 3 feet) in the shelter in accordance to the room sizes.

4. Time management as per the early warning given for evacuation, coupled with the ongoing COVID-19 pandemic

i. On receipt of early warning through media or other means, the shelter building should be vacated (if being used for some other purpose) and kept ready for use. Temperature check/ face masks/ hand gloves should be kept ready for distribution, liquid soaps/ disinfection gels/ sanitizers placed at regular intervals. Personal Protective Equipment (PPE) kits should also be available for first-line volunteers.

ii. The activities inside the shelter (dining, bathing, etc.) should be divided into staggered timings/ schedules to avoid crowding and to restrict the interaction of people inside the shelter.

5. Role of the volunteers and coordination between them

i. The volunteers should have trained male and female representatives from different organizations. They should be trained in search and rescue operations and should have the knowledge of the basic first aid to be provided in case of an emergency. They should also have an idea of the basic precautions to be provided to a COVID-19 positive patient.

ii. The volunteers should themselves have PPE kits on while helping the affected people during evacuation.

6. Operations management

i. For smooth functioning of the shelter, it is important that the at-risk population are convinced to evacuate to the shelters amidst the fear of contracting COVID-19, and to see that they do not flee the shelters or refuse relief aid. This is particularly important in the COVID-19 red zones.

ii. The affected people should have access to a shelter without having to cross any natural barrier (such as river, creeks, etc.) and within the vicinity of 2.25 Km from their residences, during an emergency situation.

iii. Physical distancing and hygiene practices are critical for efficient management of shelters.

iv. The stakeholders and volunteers should be adequately trained to perform the required roles even with limited support from outside, because owing to COVID-19 travel restrictions external stakeholders may not be able to provide assistance in the affected areas immediately.

v. Hygienic pre-cooked meals or pre-packaged meals should be provided to the evacuees, to avoid transmission of infection. Meals should be served in disposable dishware to avoid infection.

vi. The shelters should have provision for rainwater harvesting. This will be useful in overcoming any issue of shortage of water especially during COVID-19, which has necessitated frequent hand washing to curb the spread of the infection.

vii. For registering the evacuees, a digital database should be created at the shelter level. Such a platform can be integrated with apps/ websites such as Aarogya Setu. This will be helpful in listing people who are at high-risk and people who are vaccinated or not.

viii. Since COVID-19 pandemic is an additional hazard faced by cyclone affected communities, and coupled with floods, knowledge dissemination amongst them will be an important tool to manage the shelter. If the people are aware of the physical distancing norms, that will help keep the risk of spreading the virus, at bay.

ix. Mechanisms such as storage area for materials, local capacity building, monitoring systems for health and security, information dissemination amongst the population, grievance addressal systems for the people, etc., are factors that will facilitate the process of managing shelters for the survivors in the most hassle-free manner.

x. Transportation of the affected communities to the safe shelter locations can pose a major logistic issue for the state/ district government. There should be different options for the purpose and care must be taken to ensure support provided by different humanitarian agencies consider the norms of COVID-19.

xi. The shelter should have continuous access to basic services, such as water supply, sanitation, electricity, and transportation. The shelter should be in close proximity to other infrastructures, such as health, education, communication services, banks, and markets.

xii. The shelter should be safe for women, elderly, and children. Also, safe and accessible to people with disabilities. The shelter should be sensitive to the specific needs of pregnant women, breastfeeding women, women with young children, and single women.

xiii. The toilets and bathrooms made should enable men, women, and people from the transgender community to use it with adequate privacy and ensure safety/ security. Additionally, 1 in every 20 toilets should be ergonomically designed for people with disabilities.

xiv. Adequate space and provision for female menstrual needs, such as availability of and disposal of sanitary napkins should be ensured.

xv. Solid waste disposal arrangements should be located at a safe distance from the shelter to prevent further health hazards, keeping in mind the COVID-19 scenario. As a practice, and if possible, segregation of waste at the source should also be encouraged. Garbage containers of 50 to 100 litres should therefore be provided at the designated locations.

7. Features of shelter under the COVID-19 pandemic in a cyclone/ flood-prone area

i. Since Odisha has a warm and humid climate, the following climatically-sensitive design parameters should be considered to ensure desirable comfort level in the shelter – maximise ventilation and minimise entry of direct sunlight, ceiling should facilitate good air circulation and ventilation which is preferred for a COVID-19 scenario, and roof should have adequate overhangs and slopes for rain water drainage.

ii. For the shelters, the foundation should be at least 300 mm deep, the plinth should be at least 150 mm higher than the highest expected flood level, and the masonry walls should be between 350 to 450 mm thick. Since Odisha is prone to cyclones and floods therefore, the roofs should be anchored very well to save it from strong winds and the joints should be leak proof to protect the shelter from water

iii. The shelter should be structurally safe (as per Indian Standard codes) to survive the ensuing cyclone/ flood. It should be situated above the high flood level (HFL) and be able to withstand high speed wind and have all the safety facilities with respect to COVID-19.

iv. The structural safety concerns of the shelter are to be addressed by adopting disaster resilient design and construction materials. "Proof checks" should be carried out at all stages to ensure quality. This can also be done by performing Rapid Visual Screening of the buildings to check its structural and non-structural preparedness. This is an important initial step in managing shelters because a robust structure will be a safe shelter for the survivors from the vagaries of nature.

v. It is important that the shelters are disaster resilient so that the evacuated population is not further inflicted with any loss of life or injuries due to other potential risks in the shelter. This may give rise to other cascading and compound risks.

vi. Fire risks should be assessed and mitigated for the shelters having provision for heaters and cooking facilities. Such areas should be adequately ventilated and fire resistant materials should be used.

vii. Storage spaces for the different types of supplies should be adequately provided and its safety/ security should be taken care of.

viii. It is preferable that the shelter is on a raised platform and has stilted floors so that the flood water can pass through the stilted floor without affecting the first floor of the building.

ix. The ground floor of the shelter can be used as a shelter for the rescued livestock and cattle. Additionally, the relief materials, medicines, supplies for COVID-19, etc. can be stacked here for management during emergency.

x. The shelter should have a ramp facility for persons with disability. The steps should have the universal tread size of 300 mm and riser of 150 mm. A contrast colour band to be used in the steps to make it visible during deemed light period. On both sides of the ramp and staircase, handrails should be fixed for safety purpose.

xi. The accessibility to the shelter should be free of any obstruction. The approach road will be used for evacuation and relief and therefore should not be affected by the cyclone/ flood. As far as possible, the approach road should preferably be "an all-weather road" and above the HFL.

xii. The risks of COVID-19 have compounded the challenges for shelter management. The disaster-resilient features of emergency shelters should therefore consider the critical aspect of natural ventilation. Natural ventilation of closed and crowded settings is considered to be very effective in ensuring fresh air circulation and potentially curbing the spread of virus.

xiii. In case of power cuts, generator set should be available as a backup. Additionally, solar energy equipped illuminations should be installed.

xiv. The shelter should be prominently placed such that it is visible against tree cover or any other natural barrier.

xv. When not in use as an emergency shelter, during normal times it can be put to use as a school, community halls, Anganwadi centres, training centres, marriage halls, and other social gatherings, etc. Users can pay a nominal fee which can be deposited and used for maintaining and repairing the shelter. The rate of user fee will be decided by the SMMC. If such programmes are shut under the COVID-19 pandemic, the economic loss can be managed either by increasing the rate of user fee or through generous donations from various organisations.

F.4. Outcome 4: Supporting preparedness of shelters and health facilities depending on its necessity

4-1. Identify and develop effective public awareness tools and/or guidelines based on the lessons and good practices acquired by the activities 1 and 2 to share knowledge with other communities in the State and other States in coastal region such as West Bengal and Tamil Nadu.

4-2. Test the effectiveness of the public awareness tools and/or guidelines in a pilot community selected from target communities during monsoon season. Review preparedness of shelters based on the recommendations compiled in the activities 1 and 2.

F.4.1 Methodology

The development of the public awareness tools/guidelines is guided by the following framework of change management (Figure 41). The ADKAR (Awareness, Desire, Knowledge, Ability, and Reinforcement) framework of change management is important to ensure that the envisaged change in risk awareness and perception of the local community and other stakeholders is sustainable and they believe in bringing such a change.

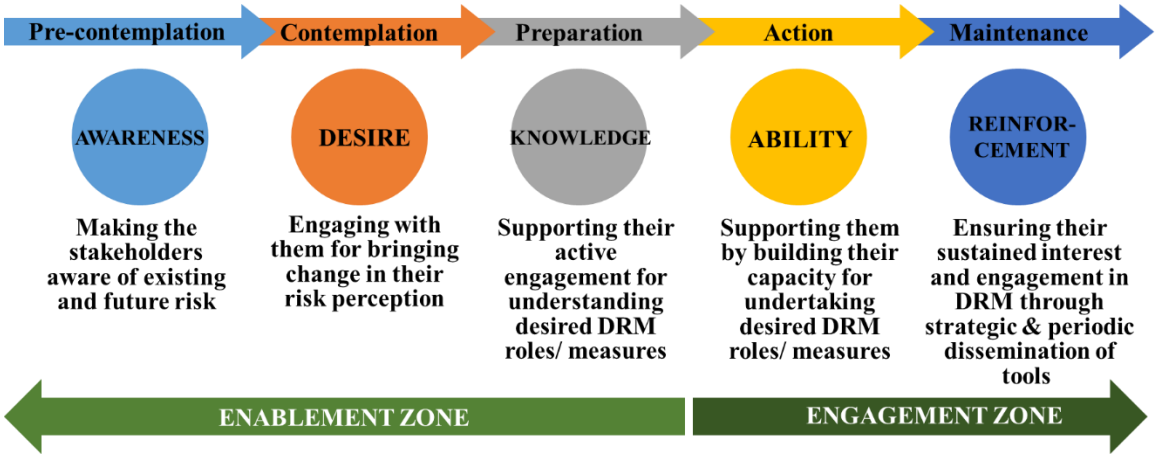


Figure 41: ADKAR framework for bringing change in risk awareness and perception

Through direct engagement with the community at the household level in one of 6 selected communities, the project team has undertaken audience research. Balasore district has been selected to test the effectiveness of the public awareness tool. The audience research will help the project team to better understand the need of the target communities, the effectiveness of the usage of the existing public awareness tools, the gaps in dissemination and usage at the last mile level. This will also help the project team to identify the areas where more focused awareness and change of community perception is required. The audience research is being undertaken with the help of the developed In-depth Interview (IDI) guide for reviewing effectiveness of existing public awareness material on cyclones, floods and COVID-19. The IDI guide for the audience research is placed at Annexure 12. This is being further supported through desk-based study of the key public awareness material on COVID-19, floods and cyclones which the project team could access along with consultations with key stakeholders.

F.4.2 Key reflections

Key reflections from desk-based study, filed-based consultations and audience research are discussed below.

Desk-based study

The Health & Family Welfare (H&FW) Department, Government of Odisha has developed varied public awareness material on COVID-19. The key points highlighted in some of these are tabulated below:

Name of material and department	Key information covered
Novel Coronavirus (COVID-19): Protect yourself and others by Health & Family Welfare Department,	**Do-s** • Frequent handwash with soap and water or alcohol-based hand rub, even when hands are visibly clean • Cover nose and mouth with handkerchief/tissues while sneezing and coughing

Name of material and department	Key information covered
Government of Odisha (English)	• Immediately discard the used tissues in closed bins • Consult doctor on feeling unwell (fever, difficult breathing and cough) • Wear mask/ cloth covering nose and mouth while visiting doctor • Contact nearest Government facility on having these symptoms • Avoid large gatherings **Don't-s** • Don't have close contact with others having symptoms • Don't touch eyes, nose and mouth • Don't spit in public **Additional information** • Health helpline number 104, mobile and email • Handles of social media pages of the HFW Dept.
Wash your hands by H&FW Odisha, UNICEF and WHO India (English)	• Wash hands with soap and running water when they are visibly dirty • If not visibly dirty, frequently clean them using alcohol-based hand rub or soap and water
Protect yourself and others from getting sick by H&FW Odisha, UNICEF and WHO India (English)	• When all to wash hands with soap (after coughing or sneezing, after using toilet, before and after caring for sick person, before, during and after cooking, before eating, when visibly dirty, after handling animals or animal waste)
Protect others from getting sick by H&FW Odisha, UNICEF and WHO India (English)	• Avoid close contact when experiencing cough and fever • Avoid spitting in public • Seek medical case early on experiencing symptoms • Share travel history with health care provider • Clean hands after coughing or sneezing and when caring for the sick
Reduce the risk of Coronavirus infection by H&FW Odisha, UNICEF and WHO India (English)	• Get tested on returning from the affected countries • Limit the contact with others on returning from affected country or after coming in contact with infected person • Call control room on developing symptoms after returning from affected country • When all to wash hands with soap (after coughing or sneezing, after using toilet, before and after caring for sick person, before and after cooking, before eating) **Additional information:** • Control Room number • Name of facilities for getting tested on returning from affected countries
Corona virus by H&FW Odisha (English)	• How the virus spreads through droplets or touching infected surfaces • Maintain distance of 1 metre • Avoid contact with objects (food, utensils, cup, towels etc.) of sick person

Name of material and department	Key information covered

Home isolation advisory by H&FW Odisha (English)	• On returning from affected countries or getting in contact with infected person and asymptomatic, 14 days of home isolation and self-monitoring for another 14 days
	• Guidelines for home isolation:
	  ○ Well-ventilated non-AC room
	  ○ Windows kept open during day time
	  ○ Attached or separate bathroom for suspected patient
	  ○ Do not share utensils, linen or other items
	  ○ Frequent hand washing with soap and water after toilet or contact with body fluids
	  ○ Follow personal hygiene
	  ○ Cover mouth and nose while coughing or sneezing
	  ○ Disinfect soiled linen, clothes, towel with bleach, wash and sun-dry before next use
	  ○ Incinerate soiled mask, tissues, pad
	  ○ Mop the room with bleach solution
	  ○ Use bleach solution to clean furniture, wash basin, toilets, etc.
	  ○ Alcohol based hand rub at the room entrance to be used by care giver
	  ○ Do not allow any visitors
	  ○ Visit nearest Govt. Hospital immediately on having fever, cough breathing difficulty

School advisory by H&FW Odisha (English)	• Avoid large gatherings of students during school time
	• Class teachers should be alert to notice children signs of symptoms and should immediately inform parents to get the child tested
	• Ask parents to prevent child from attending the school till advised by treating doctor
	• Advise teachers, staff and students to practice simple public health measures and respiratory hygiene
	  ○ Cover mouth while sneezing and coughing
	  ○ Do not touch eyes, nose and mouth
	  ○ Throw away used tissues in a bin and wash hands after coughing/sneezing
	• Regularly disinfect frequently touched surfaces such as door knobs, switches, desk tops, hand railings, etc.
	• Ensure availability of soap and eater in rest rooms all the times
	• Provide foot operated pedal bins in each classroom and rest room
	• In case of hostel, regularly monitor health status of student and staff. Contact local medical authority in case of suspected cases

Work place advisory on COVID-19 by H&FW Odisha (English)	• Ensure workplace is clean and hygienic (surfaces and objects-desks, tables, keyboards, etc. are cleaned with disinfectants • Promote regular and thorough hand washing by employees (availability of soap and water in washing areas; availability of running water; display of posters illustrating steps of hand washing) • Promote good respiratory hygiene in work place

Name of material and department	Key information covered
	• Advise employees to stay at home when they have flu like symptoms • Avoid hand shakes • Avoid conducting large gatherings • Avoid unnecessary travel • Do not use biometric attendance machine for the time being **Additional information:** Illustration of six step of proper handwashing (for atleast 20 seconds)

Figure 42: Snapshots of public awareness material on COVID-19

The public awareness material on COVID-19 by H&FW Department and other agencies demonstrate good use of infographics and illustrations for supporting the key point put forward. Almost all material provides additional information on helpline or control room number along with mobile numbers, email id and handles of different social media pages of the Health &

Family Welfare Department. These are physical pamphlets and posters are also supported by various audio-visual material such as appeal by Hon. Chief Minister of Odisha, celebrity bytes, etc. developed for broadcasting on radio and television along with advertisements and creations developed for different social media platforms.

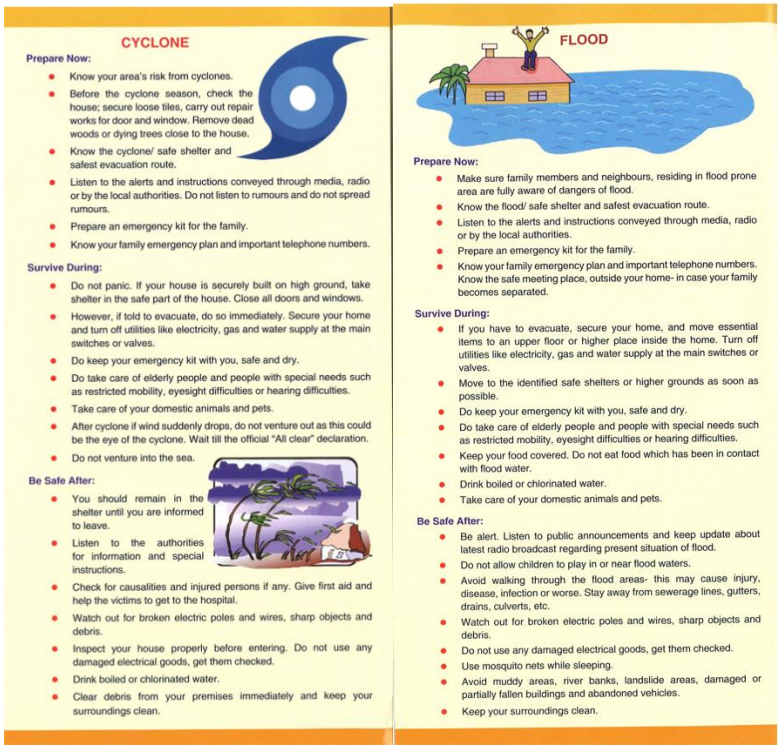


Figure 43: Public awareness material on cyclones and floods

There are separate dedicated public awareness material on different hazards present in the state including cyclones and floods (figure 43) developed by the OSDMA. The existing public awareness material on cyclones and floods lay down key points pertaining to before, during and after of cyclones and floods. These include knowing the risk from cyclones and flooding in the area, checking for condition of house and its non-structural elements (such as loose tiles, door, windows, etc.) before the cyclonic and monsoon season, identifying the nearest safe shelters and safe evacuation route, preparing family emergency kits along with laying down family emergency plan and important telephone numbers. For during the cyclones and floods, public awareness material lays down points to be undertaken if asked to evacuate such as securing home, turning off utilities, carrying the emergency kits, taking care of people with special needs, keeping the food covered and not eating the food exposed to flood water, taking care of domestic animals and pets, etc. Similarly, it also highlights the key considerations within the house if one is not required to evacuate. The key information covered by public awareness material for the aftermath cyclones and floods includes the need of staying in the shelter till informed to leave, checking for casualties and injured persons, if any, providing first aid and taking them to hospitals, inspecting the house properly before entering, not using damaged electrical goods, drinking boiled or chlorinated water, using mosquito nets while sleeping, avoiding muddy areas, river banks, damaged or partially abandoned vehicles, clearing debris from the premises and keeping the surrounding clean.

Apart from the hazard specific do-s and don't-s, public awareness material is also available on Community Involvement in Shelter Management and Disaster Preparedness by OSDMA (figure 44). It talks about the Multipurpose Cyclone Shelters (MCS) and Multipurpose Flood Shelters (MFS) constructed in the state and respective community-based Cyclone/Flood Shelter Management & Maintenance Committee (CSMMC/FSMMC), their composition and key facilities available in these shelters. The public awareness material highlights the key principles of shelter use, multiple uses of the shelter buildings and provision of corpus fund for its maintenance. Further, it discusses the key role of community in disaster preparedness and shelter management.

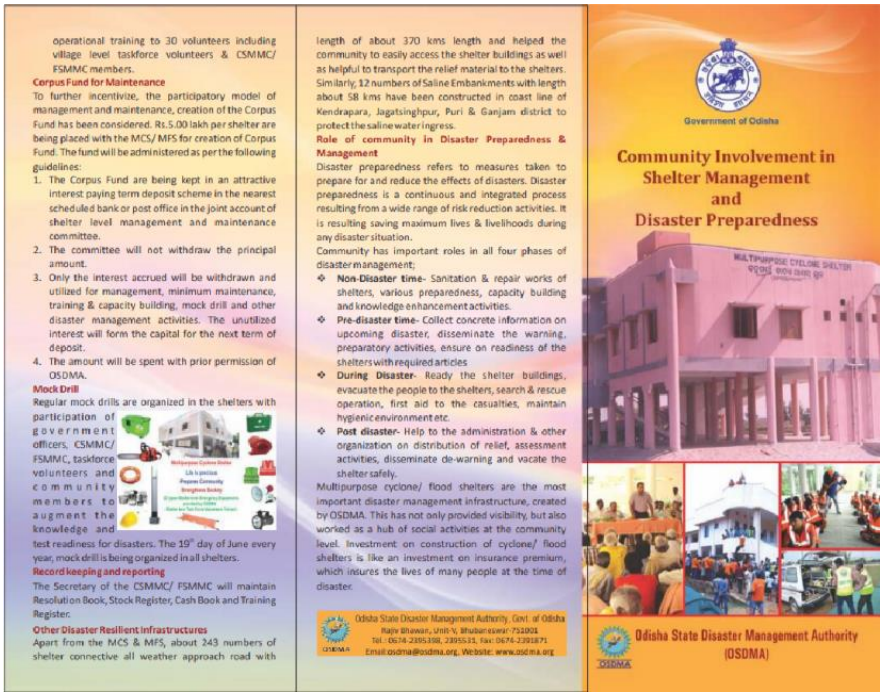


Figure 44: Public awareness material on shelter management and disaster preparedness

However, the project team could not access any dedicated public awareness material catering to both cyclones/floods and COVID-19 pandemic, especially for stakeholders and institutions such as shelters, schools, MSME units and health centres. Thus, it is perceived that there is a gap in the availability of stakeholder/ institution specific public awareness material which caters to aspects of compound hazards events such as cyclones/floods and COVID-19 pandemic.

Consultations with stakeholders

Throughout different activities of the project, the project team has closely engaged with different stakeholders such as officials from district and local administration, school staff, shelter management and maintenance committees, village/ ward disaster management committees, MSME units, etc. During these engagements, the project team has attempted to gauze the gap in current awareness & need of various stakeholders for enhancing the existing public awareness material.

The consultation with Health Officials indicated the need to revamp the existing public awareness initiatives and highlighted that in rural areas, it is important to spread awareness on epidemic, health hazards and other natural hazards through loudspeakers, distribution of

posters and pamphlets designed in local dialect, organise village meetings and create WhatsApp groups.

In the backdrop of COVID-19, there has been a proliferation of orders or government communications, notifications and guidelines aimed directly at citizens, as well as for internal communication to government officials. Consultation with different stakeholders suggest that these are often complicated and phrased in ways that are difficult to comprehend for either panchayat leaders or many field-level officers and staff which sometime act as impediment in their effective implementation. For instance, the lockdown necessitated the closure of public spaces like village markets, places of worship and industries and enterprises, while ensuring that essential enterprises and services remain open but what all constituted essential was also revised over the course of the lockdown.

In case of Ganjam, it is learnt that a sustained campaign is being held through rath/caravan where information regarding various aspects of COVID-19 pandemic is being disseminated in the communities. Besides, wall paintings and flex with information related to the pandemic, vaccination and important toll-free numbers have been put up in all important locations. For managing the cyclone and pandemic situation, a WhatsApp group was also created for Ganjam district where the community members could directly post their grievances for the block/district administration to take note of. In addition, a helpline number has also been created for the whole district that gave real time solutions to the community or passed on the grievances to relevant authority. This was used effectively when the migrant population had returned to the district/community.

Figure 45: Public awareness material on COVID-19 pandemic displayed in public places and villages, Ganjam

Audience research

To better understand the effectiveness of the existing public awareness tools and map the gaps in their dissemination and usage at the last mile level along with need of the target communities, audience research was conducted at the household level in the selected community of Balasore District. It was undertaken with the help of the developed In-depth Interview (IDI) guide targeted at reviewing effectiveness of existing public awareness material on cyclones, floods and COVID-19. The effectiveness of the existing tools was assessed based on the following five parameters, namely, accessibility, understandable and actionable, credible and trusted,

relevant and dissemination. The key findings of the analysis of audience research are discussed below.

1. **Accessible**

The key sources through which/whom the community access the public awareness materials on cyclones, floods and COVID-19 are newspaper, television and the local administration. The public awareness materials are mostly displayed at public places and are also made available/ distributed at household level. Households surveyed have informed that such public awareness material are available free of cost i.e., they do not have to pay fees to access or buy them. Most of the households recalled getting sensitised on cyclones, floods and COVID-19 through leaflets distributed and announcements made through mike by ASHA, Anganwadi workers and other personnel from local administration. Apart from the cyclone and flood specific information, the COVID-19 related information in these public awareness material and campaigns focused on promotion of use of mask, sanitisers and soaps among the masses. Besides, the local administration, various volunteer groups and non-governmental organisations also provide public awareness material to the community.

The community has access to public awareness material in both physical form (often distributed and explained by the ASHA and the Anganwadi workers) and digital form. Digital form (such as those using mobile services) is also used for dissemination of warning. The community is able to further disseminate information received in digital form by directly forwarding them to others or to make announcements. However, many households have reportedly faced difficulty sometimes in accessing the digital material due of internet connectivity issues. The households surveyed have highlighted the crucial role of ASHA and Anganwadi workers in supporting the last mile dissemination of information and have suggested further building their capacities in this regard through appropriate trainings.

2. **Understandable and actionable**

The households surveyed find the existing public awareness material mostly easy to read and understand and sometimes only face difficulty in understanding them. They find the existing material interesting and are willing to receive more of them for enhancing their understanding and awareness on related aspects. They have informed that audio and video messages and information through television are easy to access and understand by different members of the households, particularly the differently-abled persons.

For making the public awareness material more interesting and easier to understand, the households have suggested supporting their dissemination and explanations through street plays, village meetings and appropriate trainings. The understanding on different public awareness material can be enhanced through door-to-door campaigns by ASHA and Anganwadi workers of the community.

The households reported that mostly the information received through different public awareness materials is actionable, i.e., easy to act on. In this regard, they recalled that information they could easily act on the information and instructions from Government

agencies on COVID-19 and cyclone Amphan. The received information was also useful as it helped the community in preparing better to face the effects of both clones and floods.

3. Credible and trusted

The households surveyed find the information received through different public awareness materials reliable and did not report of any case where wrong information was provided in such materials. Besides, the households highlighted that of all of the different source agencies/ organisations providing such materials and information, they trust and depend most on those received from local administration.

4. Relevant

The households find the existing public awareness material relevant to the challenges they faced before, during and after cyclones, floods and COVID-19. They are willing to learn more on the COVID-19 pandemic and potential fear/panic amidst masses during pandemic and floods and cyclone and how the same can be effectively addressed. They suggested they can be made more suitable for different groups such as children, old aged persons, women, differently-abled persons by making good use of existing and emerging technologies.

5. Dissemination mechanism

All the households prefer household level dissemination of the public awareness material and are interested in understanding the materials at the time of dissemination. Currently, ASHA and Anganwadi workers explain the material during the dissemination.

The existing frequency of dissemination allows them adequate time to understand and act on the provided information. During floods and cyclone period, they prefer getting related awareness material and information atleast 7 days in advance so that they better prepared and aware on necessary actions to be taken. They have informed that during COVID-19 and cyclone time, they are receiving such material every two days and suggest that this frequency can be made every 7 days. The households have informed that during the COVID-19 and cyclone, they were also provided with the mask and sanitiser every two days along with the relevant information/ public awareness material. They have also highlighted the need for supporting the public awareness material with adequate training of the households so that they are able to act on the related information more effectively.

- The public awareness material is easily and freely accessible to the local community.
- Most of the material is bilingual and is available in both Odiya and English.
- Most of the material is easy to understand and act upon. However, consultations with stakeholders have indicated the need to further simply the COVID-19 advisory/ guidelines related material for making them more actionable at the last mile.
- There seems to be the need for developing stakeholder specific public awareness material for enhancing their understanding of risk and respective roles during compound hazard events.
- While there seems to be adequate public awareness material on both COVID-19 pandemic and cyclones and floods separately, there is absence/ lack of public awareness material catering to both the risk and hazard events.
- The local community relies most on the public awareness material provided by the local administration and field personnel such as ASHA and Anganwadi workers play a great

role in last mile dissemination of these material. Thus, any dissemination strategy should actively engage the local administration and enhance the capacity and knowledge of such field personnel for ensuring effective transfer of knowledge and skills to the local community.

- The community has suggested increased use of technology and digital public awareness material to enhance the accessibility and usability by differently-abled and old aged persons.
- The community has identified the need for supporting the awareness material with appropriate training and capacity building activities so that the community is better able to enact on the key information provided through these materials.
- The community has shown keen interest to learn more on the pandemic and way of addressing the fear and panic among the masses during compound hazards events such as COVID-19 pandemic and cyclone Amphan.
- The discussion on the existing dissemination strategies illustrates the need of reinforcing the shared information time and again, especially at the onset of monsoon and cyclonic seasons and/or known periods of disease outbreak to timely enhance the preparedness of community much before the onset of disasters.
- The review of awareness material of COVID-19 pandemic reflects good use of illustrations for different critical public health measures such as six steps of hand washing. Such illustrations help in effective conveyance of the key message and makes the information easy to act on. Similar aspects may also be incorporated in the public awareness material discussing about key public health and disaster risk management measures to be undertaken at schools, offices, shelters, factories, health centres such as proper disposal of sanitary/ medical waste, recording keeping in shelters, crowd management in public places, preparation of emergency kits, etc.

F.5. Outcome 5: Promoting MSMEs' resilience by identifying business continuity risks under biological and natural hazards and critical needs

5-1. Conduct quick risk assessment of the impact caused by natural and biological hazards on MSMEs in the target communities and identify critical needs for business continuity and effective public support by local (and State) governments under biological and natural hazards.

5-2. Plan and conduct workshops in each target community to promote critical public support for MSMEs by local (and State) governments.

F.5.1 Methodology

The overall methodology to study the risk of MSMEs to cyclones/floods amidst COVID-19 pandemic, key impacts and their critical needs is guided by the following framework (Figure 46) used by UNDRR and RIKA India to develop the Quick Risk Estimation (QRE) tool for MSMEs. The template caters to Outcome 5 of the study. The framework identifies the key internal and external factors in the functioning of MSMEs which can increase or decrease the risk of MSMEs which is further aggravated during natural and biological hazards. Using this framework, the risk of the MSMEs is assessed across four internal processes, namely, human resources, operations, finance, and technology/ innovation. The three key external factors having a direct/ indirect impact on the risk of MSMEs studied by the framework are exposure of MSMEs to various hazards (including biological and NATECH), market changes, and government regulations.

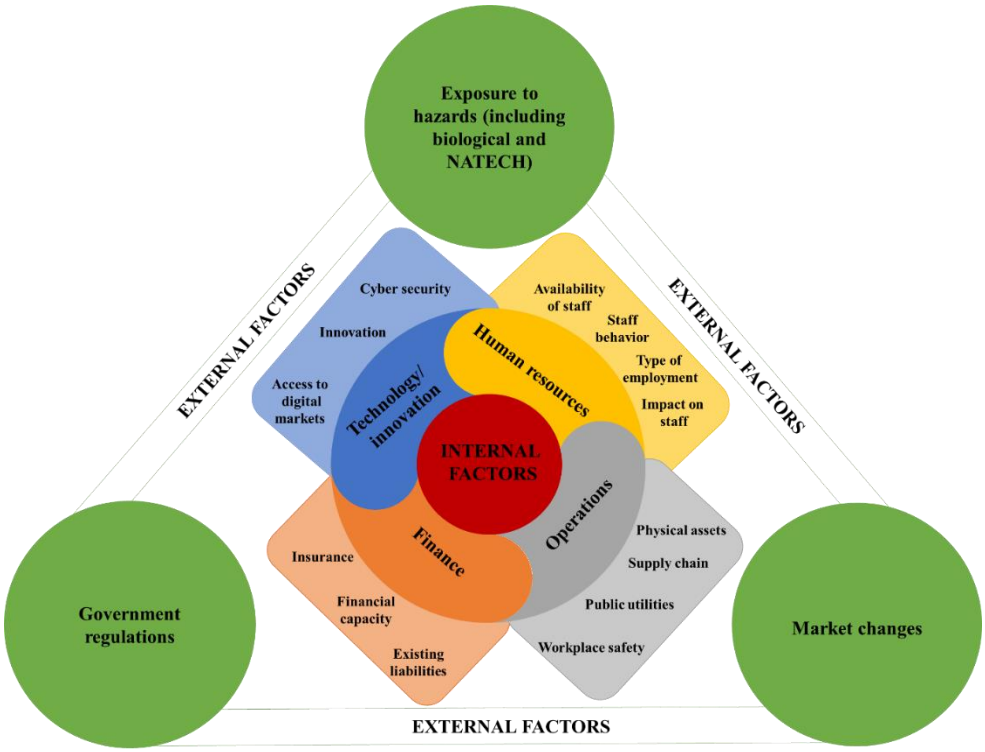


Figure 46: Framework for understanding risks of MSME

Source: Adapted from Conceptual Framework for QRE tool for MSME, UNDRR, 2020[7]

Guided by the framework, the questionnaire used in the tool has been developed (placed in Annexure 10). The tool, earlier available in English and Spanish, has now been translated to Odiya for ensuring better usage by the expected MSME clusters in study area. In addition, IDI guide has also been developed for engaging with the members of different MSME units in the study area. The same is placed in Annexure 14.

Selection of MSME units

In each of the six communities, different MSME clusters and respective units been identified with the help of field staff and local representatives. Table 10 lists down the identified MSME clusters in each of the communities.

[7] https://www.businessqre.net/aboutTool

Table 10: List of selected MSME clusters in the study area

District	MSME clusters
Balasore Baliapal Block (Rural)	Bamboo Coconut coir Sabai grass work
Bhadrak Bhadrak Municipality (Urban)	Soil Lamp Food processing
Ganjam Rambha NAC (Urban)	Agarbatti making
Kendrapada Rajkanika Block (Rural)	Coir Agarbatti cluster
Khordha Banapur (Urban)	Bamboo works Cane works Phenyl and chemical units
Puri Astarang Block (Rural)	Fish pickles, Bamboo basket making Agarbatti making Pottery work

F.5.2 Key reflections

Local handicrafts and MSME units were visited in the selected community. It was found that the MSMEs has been badly hit in recent disasters, especially the COVID-19 pandemic. Many units have been closed for more than a year because of the unavailability of raw materials as the transport system was disrupted. Many skilled labourers and handicraft workers have lost their jobs and livelihoods. Most importantly, these workshops were providing employment to women who supported their families. Because of this entire disorganization, the workers lost livelihood or had to find other alternatives sources of livelihood. MSMEs got affected during COVID-19 at varied scales, mainly in terms of loss in turnover.

As relief measures, loan amounts were enhanced up to 20% and relief in repayment up to one year was also offered. Besides, 5% top-up subsidies were also provided by the State Government. MSME cluster usually includes workers, material suppliers and assistance providers. MSME clusters such as coir cluster are provided support in the Scheme of Fund for Rejuvenation of Traditional Industries (SFURTI) programme. In Balasore, it is learnt that government has announced that the workers would be provided training in other handicrafts and their products would be brought by the government.

The coir factory in Bolang village in Baliapal block of Balasore district used to employ 40-50 women who made their living by making dolls, handicrafts, wall hangings, etc. out of the coir. The coir factory had to be closed due to disruption in the supply of the raw materials. Besides, as the markets were closed, there was no demand for their products too. After losing their livelihood from the coir industry, they tried poultry farming and agriculture. The cyclone Amphan and Yass ruined their efforts. The coir factory has now been completely closed.

Figure 47: Coir factory in Bolang village, Balasore

Baya Baba Mahila Nadiakata Silp Samabaya Samiti (Ltd.) is a coir factory located in Akhulipada village of Kendrapara. It makes a large variety of products, ranging from small handicraft dolls to mattresses for beds. Around 40 women work in the factory. They come early morning by 4 am and leave by 11 am so that they can also engage in other work for additional income. Their monthly income ranges from Rs. 4000-8000, based on the skills they have. They make handicrafts and also use machines to make fine coir mattresses and sofas' fillings. The workshop was closed for almost one year as the markets were closed and there was no demand for their products. After the unlock phases, they have resumed working and the workshop is working in its full capacity. As they source their raw materials locally, they have not faced many issues. They sell their products in the local market as well as outside markets.

(a) Consultations with local handicraft and artisans in the study area

(b) Consultations with members of Baya Baba Mahila Nadiakata Silp Samabaya Samiti (Ltd), Kendrapara

Figure 48: Consultations with members of MSME units in study area

In Ganjam, women involved with Agarbati making have faced the brunt of the pandemic. Their sales have reduced considerably, especially during the lockdowns and shutdowns. As a private entity used to provide raw material and take back the finished product, the frequency of this has reduced significantly. As agarbatti making is a strenuous and time consuming task, the group had decided to buy machinery to expedite the work and also work towards developing

direct market linkages. But, with the current pandemic and ensuing crisis all of these factors have taken a back seat.

Figure 49: Agarbati making in Ganjam

To meet exigencies faced by MSME units, business establishments and others dependent on daily wage including the returnee migrant workers, especially during COVID-19 pandemic, number of steps have been undertaken in Ganjam. The most important measures undertaken include coordination with the existing government schemes and programmes including those under Odisha Livelihood Mission, MGNREGA, Mission Shakti, etc. Relief packages have also been designed to meet the requirements of these groups. Since, the selected block/NAC is SHG intensive, micro-plans have also been prepared and bank linkages drawn for the SHG groups. Assistance from CFI, CMRF are other measures undertaken to meet various financial exigencies after requisition is placed before the SRC through the district administration.

In case of Khordha district, since the COVID-19 induced lockdown, most of the rural artisans have been out of work. With frequent and extended lockdown and travel restrictions, production of various handicraft items has stopped substantially. Huge unsold inventory has piled up. There has been no sale either through exhibitions or through orders. They are facing issues of inadequate capital to reinvest. The artisans have neither food for daily consumption nor enough savings to meet medical expenses. Most artisans are now looking for agricultural work or to migrate again. Their revenue from sales has significantly reduced, leading to decrease in working capital availability. The shortage of raw material has resulted in fewer workdays and overhead costs have increased due to low production and sales.

Raj Kishore Ram, a native of Banpur NAC founded Ma Bhagabati Cane and Bamboo Hasta Silpa Samabaya Samiti in 2000. The Samiti has 50 members constituting cane and bamboo artisians. “We have stocks of worth Rs 400000 in our godown. But there is no market to sell. Our artisians are now migrating to other states for wage labour. We have not received any assistance from government,” he narrated. “Government should take necessary steps to immediately buy stocks at a fair price,” urged Bharat Pradhan, a cane artisian who works with Ram. For artisans like Bharat, the living expenses have risen due to rising prices of essential

commodities and increase in precautionary medical expenditure due to fear of the coronavirus. On an average, the artisans used to earn about Rs 10,000 per month before the lockdown. Now, they are struggling to earn hardly around Rs 3000-4000 per month. It is learnt that the situation of MSME units has been worsening since the COVID-19 hit the country's economy.

(a) A cane artisan making household furniture

(b) Huge stock of bamboo and cane furniture in the godown of Ma Bhagabati Cane and Bamboo Hasta Silpa Samabaya Samiti

Figure 50: Snapshots of products of MSME unit in Banpur NAC, Khorda

It is informed that there is an urgent need for GST relief for one year for rural and tribal artisans working in the MSME sector. This will reduce the burden of rate of interest for existing business loans. Support in sales through corporate orders for various handicrafts is also required. Members and artisans working with MSME units require immediate support in accessing essential commodities, social entitlements and support for basic healthcare expenses. Once the immediate sustenance needs are addressed, the medium term measures to sustain businesses and getting the units back on profitable track is going to be a challenging task. Working capital loans at zero or minimal interest rates to act as revolving funds may help the units. Easing the movement of raw materials to restart and continue production and supply of raw materials on credit, directing retailers in the organised sector not to cancel orders and providing platform such as free exhibitions stalls for one year when the start refunctioning are need of the hour.

It is informed that there is a need to put provision of hassle free disbursement of loans vis-à-vis enhanced liquidity for MSMEs, especially in rural sectors. The banking sector should percolate the significant cut in repo rate announced by the RBI over the last few months. For instance, it is important to support short-term financial needs of existing start-ups and MSME units (e.g. with loan guarantees, direct lending, grants or subsidies) with minimal bureaucracy, and help secure jobs and incomes of their workers. The value chains of MSMEs should be enhanced further, thus, making them more structurally competent to add to their efficiency. It is important to enhance capacities and skill of rural and tribal entrepreneur's and MSME units on the latest trends and technologies; television, mobile, internet, etc. Investments in skills and online training, to prevent skills depreciation and encourage upskilling of start-up workers should be promoted.

F.5.3 Draft guidelines for MSMES and state/district government

1. Introduction

This chapter discusses the broad overview of the MSMEs in India, their governance and recent challenges prevalent in the sector.

Overview

Micro, small, and medium-sized enterprises (MSMEs) effectually offer the majority of jobs in the world economy. These can be directly tied into global, regional or local value chains with many of them being involved in industrial activities. MSMEs tend to create large employment opportunities at comparatively lower capital cost than large industries in addition to helping in economic growth of rural areas. Khadi and Village Industries (KVI) are two most popular representations of MSMEs in India. They create avenues for sustainable employment of local artisans. In India, overall contribution of MSMEs to the Gross Domestic Product (GDP) is at 30 percent. Under the Micro, Small and Medium Enterprises Development Act, 2006, the MSMEs are classified into two types which are:

i. Manufacturing enterprises, engaged in the manufacture or production of goods of any industry specified in the first schedule of the Industries Development and Regulation Act, 1951; or performing a value addition to the final product having a distinct name or character or use.
ii. Service enterprises, which provide services.

The MSMEs are categorized into three tiers viz., Micro, Small, and Medium based on investment in plant, equipment and annual turnover. According to government notification of 01.07.2020 the categories were modified such that the investment threshold was increased and turnover was included in the criteria of categorization. As per the revised classification, in a micro enterprise, investment in plant and machinery or equipment does not exceed one crore rupees and turnover does not exceed five crore rupees; in a small enterprise, investment in plant and machinery or equipment does not exceed ten crore rupees and turnover does not exceed fifty crore rupees; and in a medium enterprise, where the investment in plant and machinery or equipment does not exceed fifty crore rupees and turnover does not exceed two hundred and fifty crore rupees.

Governance structure

The ministry for MSME consists of two divisions: a) Small & Medium Enterprises (SME) Division that primarily manages the administrative supervision, vigilance, media, implementation of the schemes relating to Performance and Credit Rating and Assistance to Training Institution, among others and assistance to training institutions; and b) Agro & Rural Industry (ARI) Division, that looks after administration of two statutory bodies viz. the Khadi and Village Industries Commission (KVIC), Coir Board and a newly created organization called Mahatma Gandhi Institute for Rural Industrialization (MGIRI). It also supervises the implementation of the Prime Minister's Employment Generation Programme (PMEGP).

Some of the major schemes which strengthen the MSMEs are related to:

a) Employment generation - Prime Minister Employment Generation Programme, PM Formalization of Micro Food Processing Enterprises Schemes

b) Financing schemes - Credit Guarantee Scheme, Emergency Credit Linked Guarantee Scheme
c) Promotion of business - ISO 9000/ISO 14001 Certification Reimbursement Scheme, Cluster Development Programme
d) Technological advancement - ISO 9000/ISO 14001 Certification Reimbursement Scheme

At the state level, Department of Micro, Small & Medium Enterprises have been created to promote, and enhance the MSMEs in the state through guidance and scheme implementation. The state level departments in addition to General Manager District Industries Centres of each district rejuvenate, facilitate for obtaining financial assistance from various financial institutions and thrust for facilitating and co-coordinating the growth and development of the MSME sector.

Prevalent challenges in MSMEs

MSMEs in India are a part of the unorganized sector due majority of unregistered enterprises. According to the Economic Survey of 2018-19, 93 percent of unincorporated non-agricultural enterprises are not registered. These units employ vulnerable workforce of informal nature with no written job contract, or paid leave and social security benefits. Disaster impacts are magnified for the vulnerable groups due to these disadvantages. Due to COVID-19, MSMEs were affected by crisis from both the supply and demand side. Labour unavailability due to lockdowns and supply chain disruptions were primarily considered to affect MSMEs. According to a survey by FICCI, 73 per cent of businesses reported reduction in orders, and 60 per cent reported supply chain disruptions due to COVID-19. This underlines the current need to focus on recovery of MSMEs to aid in overcoming the crisis and support in sustaining of livelihoods in regions where economic activities are being disrupted by pandemic and disasters.

2. MSME Profile- Odisha

This chapter discusses the prominent MSMEs in Odisha and the impact of disasters on them.

Major MSMEs in Odisha

In Odisha MSMEs provide the second largest employment after agriculture. Micro, Small & Medium Enterprises (MSME) Department established in 2011 has been active in promotion of the local handicrafts, coir and small industries. As of 2018, 3.91 lakh MSMEs are operating in the state of Odisha. The informal sector is the largest provider of job opportunities in Odisha with more than 80% proportion of workers under self-employment and casual labour. Some of the prominent MSMEs clusters in the state relate to bamboo craft, handicrafts, food processing, coir, handloom etc. Figure 51 shows the growth of MSMEs in Odisha that has significantly increased since 2014-15.

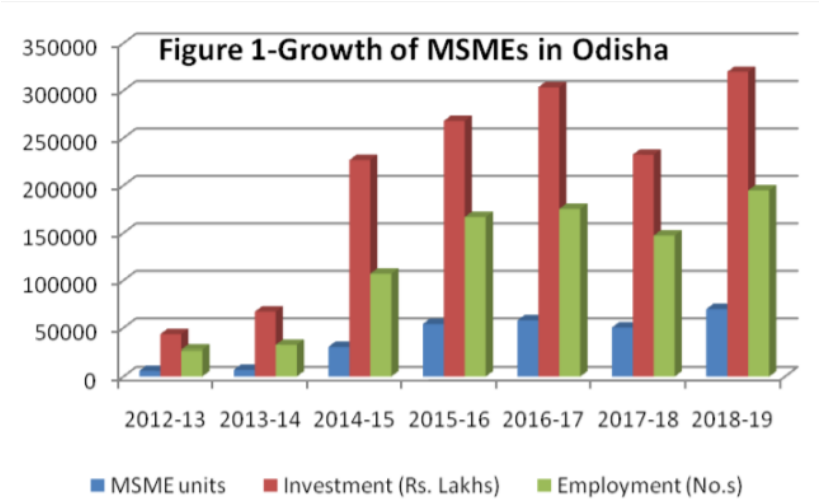


Figure 51: Growth of MSMEs in Odisha

Source: Odisha State Profile 2019-20

Odisha contributes 40% of the goods for export from the MSMEs of India. However, over 61% of the MSME units in the state deal with repairing and servicing industry due to lack of literacy, credit and skill training opportunities. These generate 43.1 per cent of the total employment opportunities created through MSME units.

MSMEs have made praiseworthy contribution to the rural economy as well as national economy at large. But MSME sector face financial constraints and does not get the desired market reach for the products. To curb this, government of Odisha has in past taken action in the lines of youth innovation funds, trade fairs, Entrepreneurship Development Programme to train 32858 youths along with online 4week trainings for entrepreneurs etc. District level facilitation cells promptly work towards project clearance and investment. Under the Micro & Small Enterprises Cluster Development Programme, 54 clusters have been identified and implementation has been ongoing for 5 clusters as of 2019.

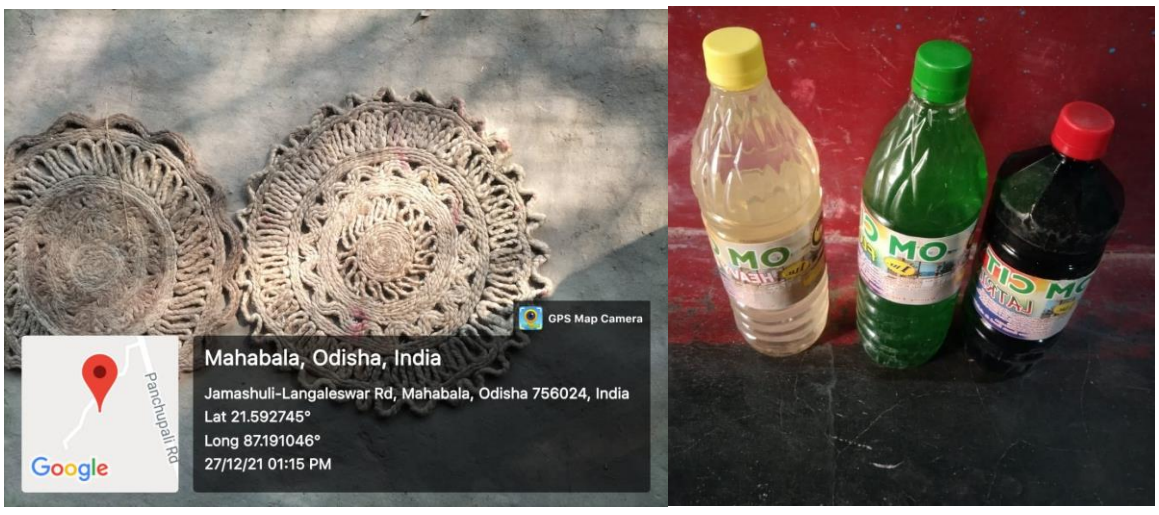


Figure 52:Types of goods produced by MSME units in study area

Impact of disasters on MSME units

The coastal districts of Odisha namely Puri, Khorda, Ganjam, Balasore, Bhadrak, Kendrapara, and Jagatsinghpur are every year hit by massive cyclones that damage lives and infrastructure. Odisha was hit by eight major cyclones since super cyclone of 1999 and suffered losses of life

and property worth ₹31,945.80 crore in total. In recent years, cyclone Fani affected over 50,000 MSMEs and Rs 4000 crore of production and properties in the state. Several MSMEs are part of a supply chain that cater to large industries like machinery, steel etc. A delay on the side of the MSMEs can have huge consequences on the overall supply chain. The challenges they face during disasters can have a domino effect on the supply chain. Cyclone Amphan damages were lower and did not reflect significant loss to industry however the combined effect of COVID-19 was larger in 2021 with estimated revenue loss of Rs 10,000 -15,000 crore.

Impact of COVID-19 pandemic on MSME units

The economic impact of COVID-19 on businesses caused by lockdown, disrupted supply chain and decline in demand requires the MSMEs to respond in a range of ways that ultimately affected the lives of people engaged in the business. Two thirds of MSMEs in India are operated by socially vulnerable groups (Scheduled Caste/Scheduled Tribe/Other Backward Classes) and 20% by women. In Odisha, industries which are directly dependent on the Western and Northern final product markets, had a difficult time to come back to business after the pandemic was hit. There has been no sale either through exhibitions or through orders and as a result huge unsold inventory has piled up with no capital for reinvestment on business. In the longer-term, these impacts have largely been driven by layoffs and wage cuts which have lowered family incomes, pushing some into poverty and negatively affecting physical and mental health, living standards and child development. The economic crisis in the Indian subcontinent induced by the COVID-19 pandemic has further highlighted the risk of overlooking the direct and indirect links between business and human rights.

3. Business continuity planning

MSMEs are at a high risk of being of brutally impacted by the larger effects of the outbreak of COVID-19 and are also the ones who are important to ensure survival of their business and well-being of their community. Ensuring business continuity in time of disasters is critical to the overall functioning of businesses. The International Organization for Standardization (ISO) has defined a business continuity plan as standard procedures that guide organizations to respond, recover, and restore to a pre-defined level of operations following any disruption. It essentially covers the aspect of identifying possible internal and external risks, determining how those risks will affect operations, employing safeguards and measures to mitigate the risks, testing and reviewing procedures to ensure they work.

Majority of the MSMEs do not have a business continuity plan or a recovery plan. MSMEs that improve during the pandemic will find it beneficial to draw up business continuity plans to be better prepared in future. Using the framework (figure 46) , risk of MSME sector can be assessed across four internal processes, namely, human resources, operations, finance and technology/ innovation. The three key external factors having a direct/ indirect impact on the risk of MSMEs studied by the framework are exposure to various hazards (including biological and NATECH), market changes and government regulations. Based on this the following chapters discuss the guidance for MSME to manage their business by building on their experience with COVID-19 for drawing up their plans. The guiding principles have been sub-divided into following headings for the MSMEs to effectively manage their businesses under the COVID-19 pandemic in a cyclone/ flood-prone area.

- Role of MSME to ensure business continuity
- Role of the MSMEs in supporting local communities
- Role of local governments

4. Role of MSME to ensure business continuity

Business recovery and continuity needs to lead to good business results in directing for the affected business to be resilient in future. MSME units may use scenario techniques and knowledge gained from affected business partners, reliable media reports in order to design up their business continuity plans. To ensure business continuity some aspects related to preparedness, human resource management, operations management should be taken into consideration. Following subsections discuss the actions towards the same for MSME units.

General instructions for preparedness of MSME units

i. The MSMEs should develop a Business Continuity Management Plan and chalk out the scope, objectives, and the activities needed to be carried out to maintain business with less impact from disasters. The actionable should be conveyed to the various stakeholders and employees.
ii. The MSMEs should carry out a detailed business impact analysis identifying the most important assets, available resources and impact of disruptions.
iii. As a part of regular activity, the information on employees' health (temperature scans, mental health) should be collected. The MSME units should make sure employees comply with instructions from local authorities. It would be essential to assess the impact on migrant workers and provide aid to them.
iv. With the ongoing COVID-19 pandemic in India since March 2020, the MSME units in their premises must follow hygiene practices to curb the spread of the virus amongst the employees. Regular sanitization should be done every day. Reasonable stocks of disinfectants and personal protective equipment (PPE) should be available in the premises.
v. Odisha has faced many cyclones, that have resulted in flooded areas and coupled with the ongoing danger of the COVID-19 pandemic pose a higher risk to businesses. Therefore, keeping spare parts in separate locations or old equipment as emergency replacement to restart operations can be vital for taking the business continuity approach forward.
vi. Fire risks should be assessed and mitigated for the MSMEs dealing with chemicals. Such units should be adequately ventilated and materials used should be fire resistant.
vii. The MSME units should stock essential flood protection material such as sandbags, plastic sheets etc. Training the staff on how to use these materials will ensure that all precautions can be placed in minimal time.
viii. The businesses should keep essential documentations and data safe with backups at different offsite locations or on cloud.
ix. The MSME units should pay special attention to the availability of supplies. Alternative suppliers should be identified for sustaining the production. The supplies and inventories should be stored at different physical locations to prevent damage to all stock.
x. A logbook should be maintained for keeping a record of all the equipment to avoid any misplacement or theft during lockdown and calamities.

Staffing and space management utilizing COVID-19 protocols

i. In case of high absenteeism due to COVID-19 infection, the MSMEs should have backup of third-party manpower.
ii. The employees of the MSME units should be provided with multi-skill training to take up unfamiliar roles during emergency.
iii. The MSMEs should have provision for separating damaged goods, supplies, raw material. There should be provision of selling damaged finished goods at discounted price. In case of perishable items, the MSME should contact the local government in order to ensure that disposal conforms to local procedures and avoid illegal dumping.
iv. There should be proper staff management to ensure enough space so that each person is at a distance of 2 meters or 6 feet from each other. Shifts should be aligned such that there is limited interaction and 6 feet apart distance is maintained. Wherever necessary, wooden partitions can be used to create separate work spaces and proper ventilation should be ensured.
v. There should be designated spaces at the entrance of the units for sanitizing the employees before they enter the building.

Time management as per the early warning coupled with the ongoing COVID-19 pandemic

i. On receipt of early warning through media or other means, the MSME unit's buildings should be vacated in an organized manner. There should be safe distances maintained along with employees wearing masks.
ii. The activities inside the MSME unit's building should be divided into staggered timings/ schedules to avoid crowding and to restrict the interaction of people inside. Open areas should be preferred for majority of the activities to prevent direct contact.
iii. The MSME unit should have employees identified and trained in rescue operations and first aid. These employees should act as volunteers during emergency to assist in evacuation. They should also have an idea of the basic precautions to be provided to a COVID-19 positive patient.

Operations management to make sure there is minimal business loss

i. The MSME units should increase awareness of employees and management on the information required to support insurance claims so that these can be submitted at the earliest and the claims process can be expedited with minimum hassles.
ii. It is important that the vulnerable and terminally ill employees are provided with options of offsite work or work from home facilities to avoid the fear of contracting COVID-19 while commuting to work or at work. This is particularly important for employees coming from the COVID-19 red zones.
iii. The MSME should ensure that all employees receive prompt medical attention and precautionary measures are taken to protect them against diseases before they report to work.
iv. MSME should establish a business recovery plan and identify a recovery team with clear responsibilities for all components of the recovery plan. It would be beneficial for the recovery team to calculate the cost for each component in the recovery plan.
v. In case of irreversible damage to the equipment, the MSME should be flexible to adopt new technology. Due consideration should be given to minimize lead time for installation and training for using new equipment and technology.

vi. The MSMEs should periodically run analysis of financial forecasts. Factors beyond control like increase in suppliers' charges, lockdown, increase in taxes should be considered to assess cash flow and profits. The financing structure should be planned such that it meets the new needs of the business.

vii. Planning of communications, and intelligent communication with different stakeholders (including employees) at the right time is necessary. Transparency in communication would set the pace for your efforts and to keep in control the ongoing processes.

viii. The MSMEs in the similar field of work can collaborate and share knowledge on handling challenges, new technologies and to develop collective standards for businesses within an industry or the specific region.

ix. Transportation of the finished goods to the market locations (other than local markets) can pose a major logistic issue for the MSME clusters. There should be different options for the purpose and care must be taken by local/state government to ensure support is provided by different humanitarian agencies by considering the norms of COVID-19.

x. Planning on a robust sales strategy is important to sustain a business post calamity. In order to reopen and re-establish businesses, MSME members should attend promotional campaigns or events organized by government or business membership organizations during the COVID-19 pandemic to strengthen marketing.

Checklist for emergency supplies to be stored on-site

- ✓ First aid kits
- ✓ PPE kits and masks
- ✓ Sanitizer
- ✓ Emergency lights and flashlights
- ✓ Alternate communication systems (radios etc.)
- ✓ Plastic covers and tarpaulins

5. Role of MSME in supporting communities

MSMEs are capable of creating employment opportunities for the vulnerable and marginalized population. They can establish linkages toward the sustainable development goals through providing services to the local communities. Some of the actions that the MSMEs can adopt in their business practices to contribute towards the local community are discussed in this chapter.

Potential actions by MSME for supporting local communities

i. The MSMEs should actively participate in government programmes or develop actions on sustainable community that can bring together relevant stakeholders through a common platform to analyze, discuss, and act on resilience, and sustainable development.

ii. Enforcement of strict policies and practices that do not discriminate against the poor should done by MSMEs. They can recruit, train, and employ local community members, including those living in poverty due to the lockdown, in-migrated workers, and integrate them into the MSME value chain.

iii. The MSME should adopt equal renumeration policies and exclude preferences based on gender, religion and other discriminatory grounds. Inclusion of social impact as a core business strategy, organizing career coaching opportunities for the young adults of local community would enhance access to financing and add to the enterprise's goodwill.

iv. In view of the COVID-19 pandemic and increasing disasters in the region, the MSMEs can directly engage with community members to promote local and responsible sourcing practices and climate adaptive practices.

v. The MSMEs with support from local governments can develop business models to help artisan groups, SHGs of the region, who have lost income due to COVID-19, to sell their products beyond local markets. They can assist the groups to achieve certifications and trainings to enhance their business.

6. Role of local governments

Central government's initiatives like 'Start Up India' highlights the increasing focus on nurturing indigenous industries however it is the local governments that are crucial responders to business damages caused by disasters. The central agencies are better equipped than local governments to perform post-disaster financial, technical and political support roles. Establishing a preparedness co-operation and mobilization at local level can aid in providing relief to affected MSMEs promptly. Contribution of other local stakeholder institutions can add benefits to the overall functioning of MSMEs post disasters. Some of the key actions are discussed in this chapter.

Role of the stakeholders and coordination between them

i. The state and local government should support the rebuilding of the damages in the industrial site post disaster, and take adequate actions to ensure these MSMEs have precautions against natural calamities like cyclones and floods. Additionally, they should review existing plans to ascertain free flow of natural drains and prevent biodiversity loss.

ii. For smooth functioning of MSME units, the state government should have policies and SOPs to guide the tax and revenue departments in order to ensure waiver of taxes/tax holidays post the calamity period.

iii. The state government should provide adequate directions to co-operative societies/ banks/insurance agencies on cyclone relief measures for MSME sectors and carry out proper implementation of the same.

iv. There should be a helpline established by the state government which can assist MSMEs to assess losses from disasters and file for insurance claims.

v. The central government should design schemes to help MSMEs in micro-franchising This will help in the poverty alleviation of the local communities.

vi. Banks need to have a proactive approach to ensure revival of MSME clusters through assistance on accounts, book-keeping, overdraft, capital limit increase etc.

vii. The local government should motivate MSME units to set up disaster management fund at local level for emergency support to local community members.

viii. The MSMEs can engage local community for management and maintenance of the premises after disaster. Local community participation would bring a sense of ownership and options for livelihood.

ix. The MSME management and employees should follow adequate COVID-19 protocols and should promote vaccination while helping the affected community members and kin of employees.

x. There should be active participation from the local community and local stakeholders to identify potential hazards around the MSME units, such as hazardous chemical leaks, water stagnation, vector-borne diseases, improper disposal of waste, etc. This will help in the

proper management of the post-disaster issues, especially during COVID-19 when external assistance is challenging owing to the travel restrictions.

7. Conclusion

The governments in India have been active towards development of schemes and actions towards minimizing business losses of MSMEs. Policymakers actively have addressed in most areas the issues faced by MSME units due to COVID-19. The challenges are being typically addressed by initiatives of various kinds, with varying degrees of success. Most of the MSMEs in the state of Odisha do not have enough in-house technical expertise, and access to expertise in their area to help them develop a business continuity and recovery plans. To support MSMEs in risk proofing their businesses, the local authorities and district level industrial centers can help to support business owners in identifying risks to their business and mitigate them.

MSMEs act as catalysts of local socio-economic recovery and requires investment to rebuild infrastructure and financial back-up. The guidelines in this document provide a general list of recommendations to strengthen risk awareness and communication between business owners. In addition, it familiarizes the MSMEs with their potential, roles and cooperation with other stakeholders to manage disaster impacts. It emphasizes on the need of resilience in the enterprise setup and highlights actions that are essential to allow MSMEs to graduate from survival to sustainable status.

G. Project deliverables and timeline

The key deliverables of the study along with the timeline are mentioned in table 13.

Table 11: Key deliverables and indicative timeline

#	Key outputs	Timeline
1.	Inception report	Draft: 26th January 2021; Final: 5th March 2021
2.	Mid-term Progress Report	30th April 2021
3.	Progress report	30th September 2021
4.	Draft final report	31st December 2021
5.	Final report	28th February 2022

H. Annexures

Annexure 1 Impact of COVID-19 in the study area and details of health facilities

Table showing impact of COVID-19 in Odisha (As of 15.03.21)

Confirmed	Active	Recovered	Deceased
3,38,258	557	3,35,730	1918

Source: Odisha Government Dashboard (https://statedashboard.odisha.gov.in/)

Table showing impact of COVID-19 in the selected districts (As of 15.03.21)

S. No	District	Confirmed	Active	Recovered	Deceased
1	Balasore	12,480	36	12,343	96
2	Bhadrak	7,515	8	7,478	25
3	Kendrapada	9,155	0	9,126	28
4	Khordha	53,330	57	52,924	339
5	Puri	14,502	11	14,370	118
6	Ganjam	21,911	8	21,647	248

Source: Odisha Government Dashboard (https://statedashboard.odisha.gov.in/)

Table showing healthcare facilities available during COVID-19 in Odisha

TMC		COVID Care Center		COVID Hospitals		
No.	Total Beds	No.	No. of beds	No.	No of Beds	ICU Beds
17,647	8,26,079	178	21059	48	7328	710

Table showing healthcare facilities available during COVID-19 in selected districts

TMC		COVID Care Center		COVID Hospitals		
No.	**Beds**	**Name**	**Capacity**	**Name**	**Capacity**	**ICU Beds**
Balesore						
1,017	34,275	Adarsha Vidyalaya, Sutei Remuna	100	Jyothi Hospital (DCH)	100	20
		CIPET, Remuna	100			
		FM College Hostel	100			
		Govt. Polytechnic, Remuna	70			
		NOCCI, Remuna	250			
Bhadrak						
251	25,121	AB High School, Basudevpur	150	Salandi Hospital (DCH)	116	4
		Bhandaripokhari College (News SC & ST Hostel)	100			
		Chandabali College	100			
		CRS High School, Tihidi	100			
		Govt Polytechnic	100			
		IIT Charampa	100			
		Odisha Adarsha Vidyalaya, Dhamnagar	150			
		Odisha Adarsha Vidyalaya, Olanga	150			
		Royal Residential College	150			

TMC		COVID Care Center		COVID Hospitals		
No.	Beds	Name	Capacity	Name	Capacity	ICU Beds
		Sendhatira High School	100			
Kendrapada						
1,152	51,037	Bayababa College, Chadeiguan, Mahakalpara	100	COVID Health Care Institution, Chhata (DCHC)	90	0
		Birupa College, Kendrapara	100			
		Chhata Polytechnic, Derabish	70			
		M.N. High School, Pattamundai	150	Govt. Polytech Hostel (DCH)	160	10
		Marshaghai College, Marshaghai	100			
		Olaver College, Olaver, Rajkanika	100			
		Patkura High School, Patkura, Garadpur	100			
		Sri Sri Jagannath Mahavidyalaya, Rajnagar	100			
		Xavier International School, Aul	100			
Khordha						
385	25,087	IIS, SSEPD Dept. Kudiary, Jatani	100	Aditya Ashwini Hospital Bhubaneswar	99	51
				IMS & SUM Hospital, (DCH)	500	125
		Mahatma Gandhi Academy of Prisons and Correctional Services, Chatabar, Bhubaneswar	200	KIIMS Hospital, (DCH)	455	45
				Neelachal Hospital, Balakati	126	15
Puri						
720	27,002	Govt. Polytechnic College, Moto Bramhagiri	100	Ayurved College	58	0
		Govt. Womens College near Railway Station, Puri	200			
		Konark Ashram School, Konark NAC	80			
		Konark High School, Konark NAC	80			
		Maa Mangala College, Kakatpur	100			
		Nimapara College, Nimapara NAC	72			
		Ratanpur College, Astaranga	80	IDH Puri, (DCH)	40	15
		Shree Jagannath Medical College, Baliguali, Puri	100			

TMC		COVID Care Center		COVID Hospitals		
No.	Beds	Name	Capacity	Name	Capacity	ICU Beds
		Shree Jagannath Sanskrit University	100			
Ganjam						
3,020	1,46,457	Biju Patnaik Adarsha Vidyalaya	1,100	Amit Ashwini COVID Hospital, Berhampur (DCH)	76	74
		Kalam Engineering College	500	Boys & Girls Hostel, Saraswati Sishu Mandira, Berhampur (DCHC)	500	0
		PMEC - A	591	City Hospital, Berhampur (DCHC)	50	0
		PMEC - B	580	Girls Hostel, Biju Pattnaik Homoepat Hic College, Berhampur (DCHC)	50	0
		SDH, Bhajanagar	100	Leprosy Hospital Building, ASKA (DCHC)	150	0
		SDH, Chatrapur	80	MKCG (Paediatric Ward) (DCH)	126	24
		SDH, Hinjilicut	100	TATA Medica Hospital (DCH)	163	50

Source: Odisha Government Dashboard (https://statedashboard.odisha.gov.in/)

Annexure 2 Damage by cyclone Amphan in Odisha and selected districts

Table showing the overall extent of damage by Amphan in Odisha

S. No.	Item	Total
1.	Total number of districts in the state	30
2.	Number and names of the district affected	Balasore, Bhadrak, Kendrapara, Jagatsinghpur, Jaipur, Cuttack, Khordha, Puri, Mayurbhanj and Keonjhar
3.	Total number of blocks in the Districts	120
4.	Number of blocks affected	97
5.	Number of GPs affected	1593
6.	Number of villages affected	9838
7.	Number of ULBs affected	22
8.	Number of wards affected	272
9.	Population affected (in lakh)	45.26
10.	Total area of land affected (in lakh ha)	-
11.	Cropped area affected (in lakh ha)	
	(i) Total cropped area affected	10726.18 Ha
	(ii) Estimated loss to crops (Rs. In lakh)	3115.00
	(iii) Area where cropped damage was more than 33%	3393.58 Ha
12.	House damaged	
	(a)No. of houses damaged	
	(i)Fully damaged pucca houses	0
	(ii) Fully damaged kutcha houses	19
	(iii) Severely damaged pucca houses	1
	(iv) Severely damaged kutcha houses	38
	(v) Partly damaged houses (pucca+kutcha)	4497
	(vi) No. of huts damaged	334
	(b) Estimated value of damage to houses (Rs. in lakh)	214.76
13.	No. of human lives lost	0
	No. of persons with grievous injuries	1
	No. of persons with minor injuries	1
14.	Animals lost	1913
	(a)No. of big animals lost	17
	(b) No. of small animals lost	21
	(c) No. of poultry (birds) lost	4685
15.	Estimated value of the damage to public properties (Rs. in lakh)	22096.13
16.	Estimated total damage to houses, crops and public properties (Rs.in lakh)	25425.89
17.	No. of artisans affected (loss of livelihood)	5040

Source: Final Memorandum on Super Cyclone Storm "Amphan", GoO, 2020

Table showing damage to public properties by Amphan in Odisha

S.No.	Departments	Quantity	Loss (Rs. in Lakh)
1.	**Energy Department**		
	Feeder transformer damaged	4 Nos.	273.44
	33KV pole damaged	2016 Nos.	80.64
	33KV conductor damaged	388.02 kms	194.01
	33KV VCB damaged	26 Nos.	153.4
	11KV poles damaged	13800 Nos.	552.00

S.No.	Departments	Quantity	Loss (Rs. in Lakh)
	11KV conductor damaged	3624.443 kms.	1812.22
	11KV VCB damaged	68 Nos.	224.40
	LT line pole damaged	17694 Nos.	707.76
	Minor material damaged		172.00
	LT line conductor damaged	2821 kms.	1410.50
	Distribution Transformer damaged	1119 Nos.	1119.00
	Civil works		273.92
	Total		**7514.30**
2.	**Fisheries & Animal Resources Department**		
	Damage to infrastructure of ARD Sector	35 Nos.	138.00
	Damage to infrastructure of fisheries sector	6 Nos.	22.40
	Total		**160.40**
3.	**Forest & Environment Dept.**		
	Avenue plantation damaged	55 RKM	20.00
	Nursery seeding/infrastructure damaged		40.00
	Tree uprooted	4000 Nos.	25.00
	Infrastructure damaged		35.00
	Other plantation & infrastructure damaged in WL division		37.87
	Total		**157.87**
4.	**Housing & Urban Development Department**		
	Road damaged	16.78 kms	157.74
	Culverts damaged	11 Nos.	31.00
	Drain damaged	2.78 kms	74.00
	Debris cleared from roads/drain	122.80 kms.	24.08
	Street lights etc. damaged	484 Nos.	25.80
	Other Infrastructure damaged		**116.50**
	Total		**429.12**
5.	**Health & Family Welfare Dept.**		
	Damage to CHC/PHC/Sub centre	**128 Nos.**	**256.30**
6.	**Panchayati Raj & DW Department**		
	Anganwadi center damaged	646 Nos.	1297.00
	Primary school building damaged	1552 Nos.	3008.90
	GP/PS building & community hall damaged	298 Nos.	609.00
	GP/PS road damaged	2171 Nos.	4996.00
	Rural drinking water supply system damaged	3832 Nos.	1066.90
	Total		**10977.80**
7.	**Rural Development Department**		
	Damage to rural road including breaches	151.17 kms.	493.16
	Damage to CD/Bridges	42 Nos.	232.5
	Secondary school building damaged	77 Nos.	226.01
	Other hospital building damaged	12 Nos.	25.00
	RD Dept. building damaged	18 Nos.	63.30
	Revenue Dept. building damaged	23 Nos.	47.70
	ARD Dept. building damaged	5 Nos.	10.50
	Home Dept. building damaged	6 Nos.	14.15

S.No.	Departments	Quantity	Loss (Rs. in Lakh)
	Total		**1165.24**
8.	**Water Resources Development**		
	Damage to rivers & saline embankment	73.21 kms.	131.77
9.	**Works Department**		
	Damage to PWD roads	209.36	388.50
	Damage to CD/Bridges	3 Nos.	5.50
	Damage to breaches of PWD	2 Nos.	91.00
	Debris cleared on roads/public area	153.30	27.95
	Damage to secondary school buildings	5 Nos.	8.45
	Damage to hospital buildings other than PHC & CHC	2 Nos.	3.30
	Damage to Govt. offices	34 Nos.	73.10
	Damage to Govt. Qtrs./IBs/Guest House/Pantha Nivas	33 Nos.	62.20
	Damage to NHs maintained by state	1 No.	10.00
	Total		**690.00**
10.	**Cooperation Department**		
	Damage to Buildings and Godowns	146 Nos.	**420.30**
	Total (public properties)		**22096.13**

Source: Final Memorandum on Super Cyclone Storm "Amphan", GoO, 2020

Table showing extent of damage by Amphan in selected districts

S. No.	District	Blocks affected	GPs affected	Villages affected	ULBs affected	Wards affected	Population affected
1	Balasore	12	231	2898	4	44	130000
2	Bhadrak	7	218	1373	4	80	750000
3	Kendrapada	9	249	1592	2	41	1522901
4	Khordha	5	36	62	2	8	3172
5	Puri	11	166	464	4	21	40857

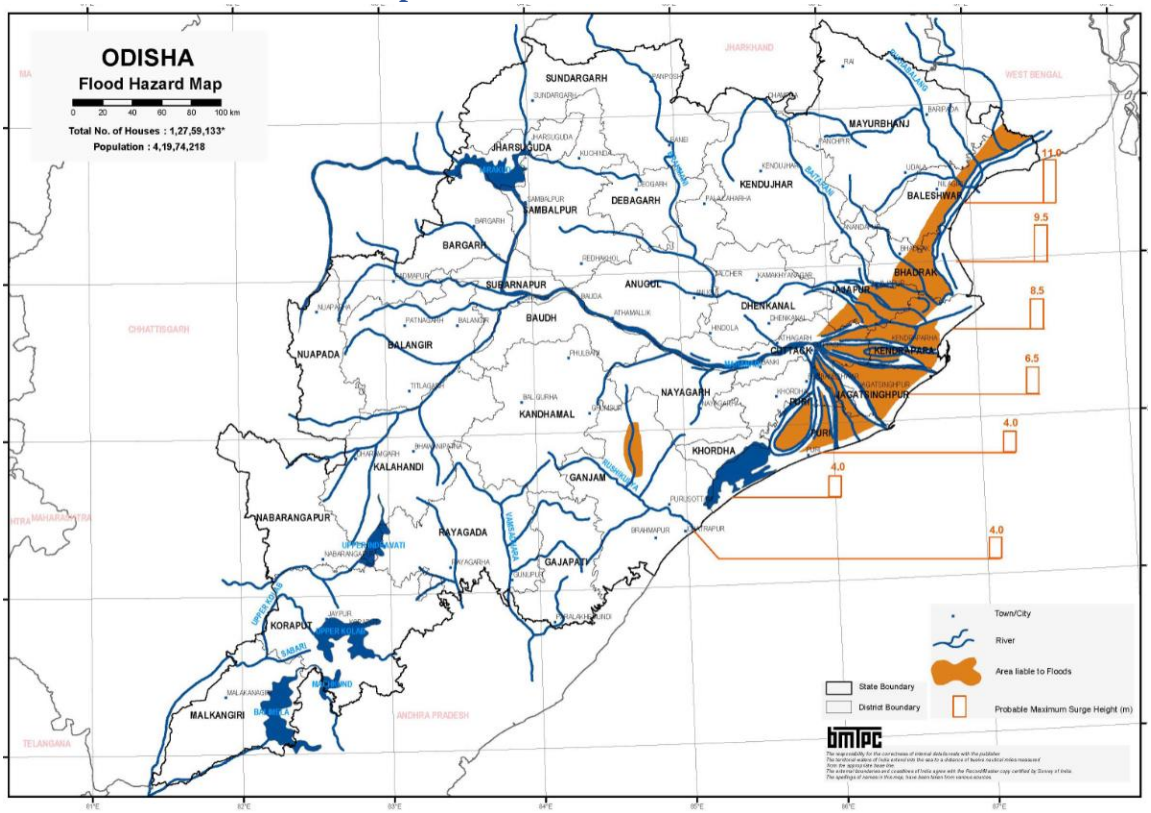
Source: Final Memorandum on Super Cyclone Storm "Amphan", GoO, 2020

Table showing loss of livelihood due to Amphan in selected districts

S. No.	District	No. of artisans affected
1	Balasore	1525
2	Bhadrak	215
3	Kendrapara	2350

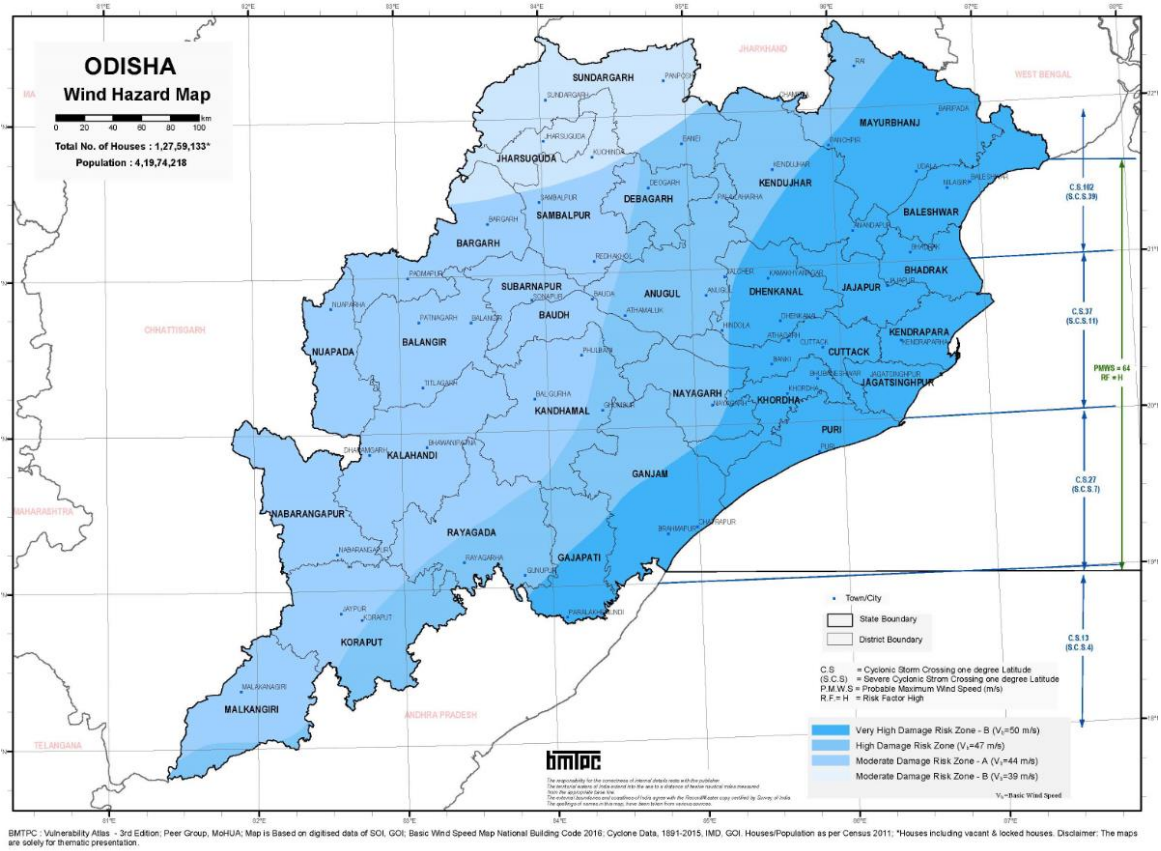
Source: Final Memorandum on Super Cyclone Storm "Amphan", GoO, 2020

Annexure 3 Flood hazard map of Odisha



Source: BMTPC, 2019

Annexure 4 Wind hazard map of Odisha



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016; Cyclone Data, 1891-2015, IMD, GOI. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Source: BMTPC, 2019

Annexure 5 Guide for review of disaster risk management plans and SOPs

1. Do the plans/SOPs recognize pandemic and other biological hazards/ public health emergencies *(referred to as topic in subsequent questions)* as a potential hazard?
2. Discuss in which all chapters/sections the topic has been discussed. Have its considerations been included in all phases of DRM? Highlight the key gaps and suggestions for overcoming them.
   - 2.1. Do the plans/SOPs talk about the topic and multi-hazard risks in the HRVC analysis? In what depth?
   - 2.2. Do the plans/SOPs prescribe specific legislation/policies for the management of the topic?
   - 2.3. Do the plans/SOPs talk about the topic lays down specific mechanisms for early identification/ surveillance/early warning of the biological hazards and public health emergencies? Is the laid down mechanism adequate? Highlight the key gaps and suggestions for overcoming them.
   - 2.4. Do the plans/SOPs discuss the establishment and functioning of the emergency communication systems (especially the mechanism used during management of the complex and cascading risks)?
   - 2.5. Do the plans/SOPs lay down prevention, mitigation, preparedness & capacity development measures specific for the biological hazards and public health emergencies? Do they include measures to enhance the preparedness of critical infrastructure and to reduce loss/damage to them?
   - 2.6. Do the above measures seem to be adequate? Highlight the key gaps and suggestions for overcoming them.
   - 2.7. Do the plans/SOPs lay down specific measures to be undertaken during the evacuation, shelter management, relief management, etc. during the pandemic and other public health emergencies? Has there been an emphasis and considerations for the special needs of the vulnerable communities including Persons With Disability (PWD), elderly populations, Person Living with HIV (PLHIV), pregnant and lactating mothers, children, etc?
   - 2.8. As per the plans/SOPs, what are the key Emergency Support Functions (ESFs) which pertain to the management of cascading and complex risk and that of biological hazards? Do these ESFs adequately deal with the topic? What are the key gaps?
   - 2.9. How do the plans/SOPs include the aspects of cascading & complex risk and that of biological hazards in recovery planning (all dimensions such as social, economic, physical, etc.)? Is the coverage adequate? What are the key gaps?
   - 2.10. Do the plans/SOPs include/lay down a mechanism for dissemination of education and awareness material for enhancing preparedness and supporting coordinated response? Does such mechanism consider the aspects of cascading and complex risks and those of biological hazards?
   - 2.11. How do the plans/SOPs prescribe measures for integrating biological hazards into DRM planning, enhancing institutional capacity building at state/district and community levels (pertaining to aspects of risk assessment, vulnerability assessment, early warning, resource mobilization, information dissemination and awareness generation, mapping out prone areas, safe management and disposal of health-care waste, continuity of emergency supply chains, stockpiling of emergency material, etc.)?
3. Do the plans/SOPS identify the key stakeholders and their roles & responsibilities for management of biological hazards and public health emergencies? Has any crucial stakeholder or key role been missed out?
4. Do the plans/SOPs recognise and lay down adequate use of technologies (such as GIS, Early Warning Systems, etc.) for effective management of risk?
5. From the perspective of the management of cascading and complex risk which require active coordination and liaison among varied departments, agencies and stakeholders, have the plans/SOPs lay down mechanism for coordination and communication among the stakeholders? Highlight the key gaps and suggestions for overcoming them.
6. Do the plans/SOPs recognize the role of private sectors, NGOs, and CBOs in risk management in general and in management of cascading and complex risk in particular? Highlight the key gaps and suggestions for overcoming them.

7. Has the topic been covered adequately in the plans/SOPs? What all pertinent areas are not dealt adequately or missing? Highlight the key gaps and suggestions for overcoming them.
8. Is the discussion on the topic actionable? Or is it more of explanation of theoretical concepts and definitions?
9. Have the aspects of management of new & emerging risks, systemic risks, multi-hazard risk and complex risk including that of NATECH[8]) been considered in the plans/SOPs? In what all areas? In what depth?
10. Do the plans/SOPs lay down/prescribe specific guidelines to address the concerns of the most vulnerable/marginalized communities including pregnant and lactating women, children, PWD, elderly population, PLHIV, etc.? Do these guidelines consider the aspects of cascading and complex risk such as Cyclone Amphan during the COVID-19 pandemic?
11. Are the plans/SOPs integrated[9] with the related aspects of Sendai Framework and the Bangkok Principles?
12. Do the plans/SOPs lay down measures/ recommendations for integration of critical sectors like health, public health into DRM planning?
13. What all background supporting documents and assessments (HRVA, capacity assessment, institutional assessments, etc.) are undertaken for the development of the plans/SOPs?
14. Do the plans/SOPs lay down a mechanism for undertaking these assessments and their incorporation into the plans/SOPs? What is the periodicity of undertaking such assessments? What all factors are considered for undertaking such assessments?
15. How often are plans/SOPs updated? How is the updation done?
16. Do the plans/SOPs lays down/prescribe mechanism for active public participation during development, implementation and updation of plans/SOPs? Is there a provision of community surveillance of hazard prone areas and other ongoing interventions? Do the plans/SOPs include indigenous knowledge/techniques of risk management prevalent in the local communities?
17. Are the plans/SOPs also tested through periodic mock drills and simulation exercises? What is the mechanism used for undertaking theses drills and exercises? Are cascading and complex risks considered as possible scenario for the mock drills?
18. Do the plans/SOPs lay down a financial mechanism for supporting its implementation and undertaking other DRM measures?
19. Are the plans/SOPs well aligned vertically (with policy, plans, guidelines at national, state and district levels) and horizontally (with respect to inter-departmental functioning and inter-linkages)?
20. Discuss the overall gaps in plans/SOPs
21. What is the mechanism for sharing and dissemination of the plans/SOPs with the key stakeholders? Is there a mechanism to consider and include their feedback during the plan testing and updation?
22. Enlist suggestions for overcoming the gaps. Lay down recommendations for integrating the risk reduction and management measures for biological hazards, such as COVID-19, into existing plans and SOPs in general and for evacuation, shelter management, etc. in specific.

Annexure 6 IDI Guide for evaluating and improving DM plans, SOPs

1. Are there DM plans and SOPs at district and sub-district levels? If yes, who prepares them, how are they updated, etc.? Please share copies.
   1.1. If yes, do they cover aspects of pandemic and other biological hazards/ public health emergencies. Briefly describe the coverage. How can they be improved?

[8] Natural Hazards Triggering Technological Disasters (especially for districts with industrial pockets or those having critical infrastructure like dam, thermal & nuclear power plants, radiological laboratories, etc. which can on occurrence of cyclones, floods, etc. can get impacted and lead to hazardous leakage, blast, triggering technological disaster)

[9] Integrated in the sense that they recognize the targets and actions laid down under the Sendai Framework particularly pertaining to multi-hazard risk, cascading risks, biological hazards and lays down measures to achieve those. Similarly does the plan recognizes the Bangkok Principles and lays down steps to implement them?

1.2. If yes, what are the key aspects missing in the plans and SOPs which needs to be added for management of cyclones, floods during pandemic?

2. If no, what plans and SOPs, guidelines do you follow for management of cyclones, floods and COVID-19? Please share copies, if any.
3. What is the mechanism for dissemination of warning and alerts for biological hazards such as pandemics to the last mile? How effective were they during Amphan and COVID-19? How can they be improved?
4. What new challenges you faced in planning and management of cyclones Amphan, floods during COVID-19? Could you share the key measures and planning you undertook for the same? Were they effective? How can they be improved?
5. Who are the key stakeholders you involved during this? How do you disseminate them to other officers and field staff? Do you train them for performing these roles? How is the coordination ensured among these stakeholders? What can be done to enhance their capacities and strengthening the coordination for managing similar future risks?
6. How do you/plans/SOPs address the concerns of the most vulnerable/marginalized communities including pregnant and lactating women, children, PWD, elderly population, PLHIV, etc.? What can be improved in this regard?
7. How did you/plans/SOPs involve private sectors, MSMEs, NGOs, and CBOs during management of Amphan and COVID-19? How can this be enhanced?
8. What are the key IEC materials used for management of cyclones, floods and pandemics? How can they be improved? For simultaneous management of cyclones/floods during pandemics, on what all aspects, do you want more public awareness material?
9. Do you test plans/SOPs through periodic mock drills and simulation exercises? How are these done? How do you intend to integrate pandemic in such drills in future?
10. What is the financial mechanism and funds available to support implementation of these plans/SOPs and guidelines? How did you mobilize funds for the additional resources required for management of cyclone and floods during COVID-19? What can be done to improve the existing financial mechanism?
11. Enlist suggestions for overcoming the gaps. Lay down recommendations for integrating the risk reduction and management measures for biological hazards, such as COVID-19, into existing plans and SOPs in general and for evacuation, shelter management, etc. in specific.

Annexure 7 Guide for review of public health/ COVID-19 measures and capacity of the healthcare system in the state for managing natural and biological hazard risks

Name of Health Facility:
Type of the Health Facility:
Address details:
Latitude/ longitude of the facility:

A Structural and non-structural safety

1 Building physical location, disaster history and accessibility

1.1 Is the building located near any hazard-prone site (such as low-lying area, near river or sea, close to any hazardous factory/ industry?
1.2 Specify the key hazards the building is prone to.
1.3 Any damage happened to the building during any past disasters? Please specify
1.4 How many main entry and exit points are there in the building?
1.5 How many blocks and floors does the building have?
1.6 Is the building accessible and connected through an all-weather road?
1.7 Is the access of the building and its units are disabled and elder friendly?

2 Building construction and current state of structural safety

2.1 Is the construction old or new? Mention year of construction.
2.2 Have any major repairs and/or renovation done after initial construction?
2.3 Is safety certification available for the building? Who has provided this certification? Specify the available details.
2.4 Are structural or non-structural safety audit conducted for assessing building safety? Y/N, If yes:
    a. Who does it?
    b. When it has been done last?
    c. How often does it happen?
    d. Any record available
    e. What actions were undertaken after the audit? Is the action taken report available?
2.5 Has the retrofitting of the building carried out to enhance the safety of the building? Y/N, If yes:
    a. When was it done?
    b. What changes made for safety enhancement?
    c. Any retrofitting done on utility or architectural aspects, if yes, give information
    d. Any record available
    e. Is the action taken report available?
2.6 Is any part of the building including roof /building currently unsafe to use? Specify the details.
2.7 Are there any visible cracks?
2.8 Is the building facing the issue of leaking rooks or seepage?

3 Fire safety of the building

3.1 Is the fire alarm system put in place and functional?
3.2 Are fire extinguishers/firefighting equipment in place and functional?
3.3 Is the fire hydrant system in place and functional??
3.4 Please observe, if the equipment is easily accessible during emergency by different units, floors, etc. Are they kept together in a store room and/or locked?
3.5 Please observe if the equipment is well-anchored to wall or floor from the perspective of non-structural safety. Take pictures to support this observation.
3.6 Is the fire safety certification available? Please verify and specify available details.
3.7 When was the last verification and testing of firefighting equipment done?
3.8 What is frequency of fire safety audit? Who conducts is? What are the key actions that follow the audit? Any action taken report available?

3.9 Please observe if there is any video playing or IEC material displayed for awareness on fire safety for staff and visitors.

3.10 Has the emergency assembly area been designated and marked? Is it adequate for the current occupancy?

3.11 Have the emergency exit routes designated and marked? Are they adequate for current occupancy?

3.12 Are the signages for assembly area, emergency exit and emergency routes well-displayed? Are the signages disabled-friendly?

4 Electrical system and safety

4.1 Whether all electrical installation done as per the standard protocols?

4.2 Whether inspection conducted to ensure electrical wires and cable are not damaged?

4.3 Is the electrical ducts sealed with non-combustible materials?

4.4 Is the electrical safety certification of the building available? Y/N, If Yes:

a. Who does it?
b. When it has been done last?
c. How often does it happen?
d. Any record available
e. What actions were undertaken after the audit? Is the action taken report available?

4.5 Does the hospital have power backup arrangement? For how long can this support critical functions during disruption in power supply?

4.6 Does the hospital have generator to meet 100% demand of the hospital? For how long can this support critical functions during disruption in power supply?

4.7 Whether regular test of generator performance is carried out? How often?

4.8 Does the hospital have fuel storage tanks/cylinders? For how long can the available stock support critical functioning in the building?

4.9 How often are they refilled or restocked?

4.10 Please observe if heavy equipment such as generators, fuel tanks, cylinders, etc. are well anchored from the perspective of non-structural safety. Take pictures to support this observation.

5 Telecommunication system

5.1 Which are the main telecommunication equipment available in the building? Are they and telecommunication cable are in good condition and functional?

5.2 Whether the internal communication system such as public address system, loud speakers, alarms, etc. available and fully functional? Are they located at strategies places which is easily accessible during emergencies any are safe and good conditions?

5.3 Is there any alternate communication system for emergencies such as satellite phones? If yes, are they functional and in good condition?

5.4 Are there trained personnel for using the telecommunication effectively?

6 Water supply system

6.1 Does the hospital have piped water supply including the provision of drinking water? Is the available water adequate for sustaining functions

6.2 Is there any alternate source for provision of water and drinking water in case of disruption/damage to public water supply system? Briefly discuss. How long can they sustain the critical functions during emergencies?

6.3 Is the water distribution system currently facing any issues of damage, leaking, etc?

6.4 How often is quality check of water carried out?

6.5 Does regular cleaning of the water facilities take place for preventing spread of infections and diseases?

6.6 Are water storage tanks are protected and in secure position?

6.7 Is there any mechanism for water recycling and treatment in the building?

6.8 Are there adequate number of fixed and/or portable washing stations in the building, considering the requirement of frequent hand washing during COVID-19? Are soaps available at the washing stations?

7 Medical Gas (oxygen, nitrogen etc.)

7.1 Does the hospital have sufficient gas storage for minimum of 15 days?
7.2 Whether medical gases are stored in safe and appropriate place
7.3 Safety of medical gas distribution system (pipe, valves and connections) maintained
7.4 What are the backup arrangement for making availability of alternative sources of medical gases especially in case of emergencies including natural/biological hazards?

8 Heating, ventilation and air-conditioning (HVAC) system in critical areas (wherever applicable)

8.1 Whether the HVAC equipment are in operating conditions and safe ?
8.2 Whether regular inspections of HVAC equipment done ? Y/N. If Yes:

a. Frequency at which it takes place
b. Action taken report

9 Medical, laboratory equipment and supplies used for diagnosis and treatment

9.1 What is the condition and safety of radiology and imaging equipment?
9.2 What is the condition and safety of laboratory equipment?
9.3 What is the condition and safety of sterilization equipment?
9.4 Does the regular inspections of the equipment take place ? Y/N, If Yes:

a. Frequency of inspection
b. Is any action taken reports available?

B Functional Safety

1 Coordination & Management

1.1 Does the facility have a Hospital Disaster Management Committee (HDMC) Y/N, If Yes: who are the members?
1.2 Whether each member of the committee is aware of his/her specific responsibilities Y/N
1.3 How frequently does this committee meet?
1.4 Does regular documentation of the meetings take place with follow up and action taken report
1.5 Dose the health facility has a Hospital Incident Response System (HIRS) to oversee operation, planning, logistics, finance/administration required for disaster preparedness and response. Y/N,
1.6 If Yes, whether role and responsibilities of each member of the HIRS and other critical staff are defined
1.7 Whether SoP/strategy to implement the HIRS is available Y/N

2 Triaging including rapid identification and diagnosis of Covid19 cases

2.1 Dose the hospital have a triage protocols based on the severity of illness/injury, survivability and hospital capacity?
2.2 Does hospital have a contingency site for receipt and triage of mass-casualty victims and also waiting areas with all required facilities?
2.3 Does the hospital have a protocol on hospital admission, discharge, referral during disaster?
2.4 Does the hospital have a triage protocol for ensuring that cases of respiratory infection are rapidly recognized and reported?
2.5 Does the health facility have the dedicated screening area and isolation room for Covi-19 cases or suspected cases with toilet facilities?

2.6 Does hospital offer testing of Covid-19 (Rapid Antigen Test Kits/ RT-PCR test for COVID-19 or both)

2.7 Does the health facility screen patients for respiratory symptoms before allowing them to OPD. Y/N How it is being done –

2.8 Does the hospital have triage space with optimal conditions for the prevention and control of infections to triage patients with acute respiratory symptoms?

2.9 Is there a triage area for the patients arriving at the hospital?

a. Triage area: sitting area for patients; designated person in charge; separated by glass shield or sitting at a distance of at least 1 meter, along with other necessary facilities like toilets/water facilities etc.

2.10 Are the protocols ensured for triaging?

a. All the designated persons wearing PPE (Triple layer mask and Gloves)
b. Are the designated persons separated by at least 1 meter /glass shield
c. The designated person doing the routine screening

- Fever (infrared thermometer),
- Upper Respiratory Tract Infection,
- Pneumonia (RR, SpO2)

2.11 Do the hospital personnel have the knowledge of what to do after Triaging once a suspected case is identified?

a. Suspect patient given a medical mask and directed to a separate area / isolation room
b. Minimum distance of 1 metre being maintained between the suspected patient and other patients
c. Instructions been given to all patients to maintain respiratory hygiene (cover nose and mouth during coughing or sneezing with a tissue or flexed elbow for others)
d. Counselling on Respiratory and hand hygiene etiquette

3 Infection Prevention and Control

3.1 Does the health facility have the Hospital Infection control committee functional (Earlier Infection control committee under the quality assurance) with members updated?

3.2 Does the infection control audit is done regularly at the facility Y/N, if Yes:

a. Does collection of Samples for surfaces form critical and high-risk areas (LR and OTs) for microbiological surveillance is done
b. Does Record keeping for HAI (Hospital Acquired infection) and analysis of HAI rates is done.
c. Audit committee meeting regularly with presentation of audit report
d. Any follow up /action taken report

3.3 Is there any separate designated screening area / space for everyone (all staff, patients and attendants) entering the hospital (preferably at the entrance) being used?

3.4 Are the protocols ensured for screening?

a. The screening staff are trained
b. The screening staff are adequately protected (Triple layer mask, gloves, sanitiser, 1metre spacing between patients, patients wear masks)
c. The protocols are displayed
d. The screening person able to guide the suspected COVID patient for testing facility and counsel on the prevention of spread
e. Screening checklist being used by staff

3.5 Is there a separate fever clinic (away from the main working area of the Hospital) being functional for the purpose of screening SARI / ILI / suspected Covid-19 cases ?

3.6 Is the reporting register kept at the Screening area , Fever clinic and Triage area to report SARI/ILI to IDSP surveillance.

3.7 Have all healthcare workers undergone training on Infection Prevention and Control?
3.8 Are the workers aware of common signs and symptoms, need for self-monitoring and prompt reporting of such symptoms?
3.9 Do all staff members (doctors and paramedics) know how to properly don and doff PPEs?
3.10 Do the Cleaning staff trained on the Cleaning procedures and Biomedical waste (BMW)
3.11 Is there a space / ward or room with separate toilet earmarked for suspected Covid-19 patients (awaiting test results) being identified/used?
3.12 Is the use of masks, sanitisers, hand washing, and social distancing ensured within the hospital being functional?
3.13 Is there adequate stock of all PPE and sanitizers available?
3.14 Is 24X7 Water availability both for drinking and other purposes at the facility
3.15 Are separate colour coded bins/bags/containers available in rooms, wards, corridors etc. to segregate waste as per BMWM rules being used?
3.16 Are separate colour coded bins/bags/containers available in rooms, wards, corridors etc to segregate waste as per Biomedical Waste Management (BMWM) rules being used?
3.17 Is waste from all over the hospital carried in trolleys to a central demarcated area for segregation and disinfection?
3.18 Are the waste disposing staff trained Y/N . If Yes, how often and last time when they trained
3.19 Do the janitorial staff transporting, segregating and disinfecting waste use appropriate PPE?
3.20 Does janitorial staff are trained to adhere to all the protocols related to transporting, segregating and disinfecting waste?
3.21 Is the disinfected waste taken out for disposal by the identified agency on a daily basis and disposed off properly?
3.22 IEC Protocols displayed in all the concerned areas
3.23 Is laundry / linen handling precautions and hygiene being maintained
3.24 Are dead body management protocols for suspected / confirmed Covid-19 patients in place and staff trained?

4 Planning, training and drill

4.1 Whether the health facility have a Hospital Disaster Management plan (HDMP) [describing comprehensible actionable plan for disaster preparedness, Response and Recovery corresponding to the pre-disaster phase, disaster phase, and post disaster phase respectively]?. Y/N, If Yes:

a. When was it developed
b. Who had developed it

4.2 Whether staff of the hospitals oriented/trained on disaster management plan of the hospital? Y/N, If Yes:

a. Who conducted the training and when
b. Does refresher training take place for the old staff and new trainings for the newly appointed staff

4.3 Whether hazard vulnerability assessment of the health facility done Y/N, If Yes:

a. When it was conducted last time?
b. Who conducted the same?
c. How frequently it is done?
d. Whether there is a follow up of the same?

4.4 Whether hospital capacity and capability analysis done any time. Y/N. If, Y, any action has been initiated to improve the situation if any. Any documentation available for the same including follow up action

4.5 Whether health facility conducts periodic drill and rehearsals to test the response capabilities to emergencies in real time. Y/N, if Y, when and for which kind of disaster it was conducted.

4.6 Whether hospital-community coordination mechanism put in place. Y/N, If, Y, then describe

a. Any specific staff appointed for the same .
b. What activities are conducted under this mechanism

4.7 Whether guideline and SoP etc. developed for execution of Hospital Disaster management plan Y/N

4.8 Whether any resource allocation has been made for smooth implementation of HDMP ? Y/N, If Yes: what % of allocation is made to meet the spendings under this component

5 Information and Communication management

5.1 Whether hospital has established procedures and assign personnel to collect, confirm and validate data and information related to the emergency.

5.2 Does the hospital have an established internal and external communication mechanisms?

5.3 Does the health facility have a dedicated public information spoke person to coordinate hospital communication with public, media and health authority? Y/N, If yes, who.

5.4 Whether the hospital has a robust communication protocol for information exchange between hospital administration and staff during emergency

5.5 Whether staffs are briefed their roles and responsibilities during crisis situation

5.6 Does hospital maintain a database containing the contact information of all the hospital staff and other relevant stakeholders and update regularly

5.7 Is there a public display of all emergency contact nos. in a prominent place Y/N ?

a. Is it also displayed in a prominent place
b. is it also displayed in local language and is also disabled friendly / accessible to all

5.8 What is the common methods of communication during emergency time.

5.9 Whether the hospital has reliable and suitable primary and back-up communication system which can be used during emergency. Y/N, please document in detail.

5.10 Whether hospital has a mechanism for timely information management and reporting to supervisory and other stakeholders (neighbouring hospital and pre-hospital network) for prompt action at the time of emergencies

6 Safety and security

6.1 Does the hospital have a security team responsible for hospital safety and security activities? Y/N

6.2 Are they also trained to tackle situations arising out of a disaster – natural and biological

6.3 Does hospital prioritize security needs of the hospital and identify area where increased vulnerability is anticipated during emergency

6.4 Does the hospital have a mechanism put in place for ensuring early control of facility access point, triage and other areas of patient flow in emergency?

6.5 Does the facility have appropriate flow and visitor restrictions in place especially during a natural/biological disaster?

6.6 Does the hospital have a reliable mode of identifying authorized hospital personnel, patients and patient's attendant and visitors? Y/N. If Yes, briefly describe how and what is done.

6.7 Whether mechanism put in place to provide security to medical personnel working during disaster/emergency?

C Human resources

1. How many staff (different category - doctors, nurses, paramedics – pharmacist, lab. technicians, radiographers; managers, Group D - housekeeping, attendants, sweepers security etc.) are available at the facility?

    a. Is there an equal distribution of all the staffs categorized in all shifts. Or there is a variation in the number of staffs according to the shifts?

2. Are they sufficient to provide emergency healthcare to victims of natural and biological disasters? Y/N (If No, what is requirement in each category)
3. Have they been trained to deal with situations arising out of an emergency/ disaster/ hazard
4. Does the hospital has provision to recruit or train additional staff according to anticipated need during emergencies? Y/N, If Yes:

    a. Is there a budget component/resource allocation done to meet the exigencies arising out of this.

5. Have the health workers at the healthcare facility been sensitised to identifying potential health risks from natural and biological hazards? Y/N (If Yes, Year and place of training, title of the training, who conducted the training, no. of people trained)
6. Are there refresher trainings held for the already trained staff along with trainings for newly recruited staff?
7. Are all professionals involved in the day-to-day operation of the health facility are well prepared to respond to disasters – natural and biological? Y/N (If Yes, which category of staff and their number). If no, which kind of training required?
8. Have the health workers at the health facility been trained in Medical Preparedness & Mass Casualty Management. Y/N (If Yes, Year and place of training, who conducted the training, no. of people trained)
9. Does the staff have adequate capacity and competency to providing high demand clinical response services during emergencies? Y/N. Or need for training?
10. Whether staff are trained on clinical management Covid-19 cases? Y/N
11. Does the hospital have a human resource policy for disaster situation?
12. Has the hospital identified minimum needs in terms of health-care workers and other hospital staff to ensure the operational sufficiency of the hospitals/department in emergencies
13. Does the hospital practise prioritizing staff requirements and distribute personnel accordingly during emergencies?
14. Does the hospital have proper HR planning to ensure adequate staff rotation and self-care for clinical staff during emergencies to support morale and reduce medical error? Y/N
15. Does the hospital have mechanism to establish contingency plan for provision of food, water and living space of the hospital personnel during disaster? Y/N
16. Whether the hospital facilitates measures to deal with psychosocial and mental health issues of hospital staff and their family during emergencies.
17. Does hospital personnel dealing with contagious disease like Cpovid-19 are provided with Personal Protective Equipment (PPE) and vaccinated against Covid-19 along with other necessities required to deal with the pandemic?
18. Has the hospital establish a clear policy to monitor and manage staff suspected or confirmed of having COVID-19 or who have been exposed to a confirmed, probable or suspected COVID-19 patient.
19. Has the staff been trained and educated on use of personal protective equipment and the handling and disposal of contaminated waste.
20. Is there a provision put in place to mobilize staff if a substantial number of existing staff gets affected especially during the covid-19 pandemic

21. Does the resting facilities available for staff maintaining social distancing protocols to deal with the spread of covid-19

D Logistics, supply and financial management

1. Whether health facility develop and maintain an updated inventory of all equipment, supplies and pharmaceuticals and establishment of a short-alert mechanism. Y/N
2. Does health facility estimate consumption of essential supplies and pharmaceuticals using most likely disaster scenarios Y/N
3. Does the health facility have adequate resource allocation / budget to meet the expenses arising out of it?
4. Does Health care facility consult with relevant authorities to ensure the continuous provision of essential medicines and supplies both during disaster as well as during normal circumstances.
5. Whether health facility established ant contingency agreements with vendors to ensure the procurement and prompt delivery of equipment and supplies in a disaster situation
6. Does the hospital have mechanism for storage and stockpiling of additional supplies including pharmaceuticals and ensure an uninterrupted cold chain?
7. Does the health facility have established mechanism for quick assessment of functional status of different equipment and prompt maintenance and repair of those equipment required for essential services?
8. Does the hospital Ensure the availability of appropriate back-up arrangements for essential life-lines, including water, power and oxygen.
9. Define the hospital pharmacy's role in providing pharmaceuticals to patients being treated at home or at alternative treatment sites.
10. Does the health facility establish coordination for a contingency transport strategy for patient transfer between hospitals
11. Does the health facility have a procedure to protect ambulance crew and disinfect ambulance vehicles and equipment after each use?
12. Establish a simple disaster budget protocol for quick mobilization of funds for disaster response
13. Ensure availability of petty cash/dedicated contingency fund which could be used for disaster response
14. Introduce special accounting policies and procedures for efficient financial management during emergencies

E Continuity of essential services

1. Does the health facility list and identify all hospital services and rank in order of priority? Also identify nonessential services that could be suspended if necessary in order to surge capacities
2. Identify the resources (human resources and logistics) needed to ensure continuity of those hospital services identified as essential.
3. Does the health facility have a utility management plan and protocols for the hospital with actionable mechanisms to ensure proper maintenance, 24x7 availability normal and emergency domestic and treated water systems, power system, medical gas, heating, air conditioning system, life safety systems etc. during emergencies?
4. Whether health facility Determine strategies and identify resource needed to ensure the continuity of essential hospital services, in particular those for critical ill and other vulnerable groups (eg. Paediatrics, elderly, disabled, pregnant patients, etc.)
5. Any arrangement put in place for Pregnant mothers who are covid positive and their babies
6. Is SNCU functioning well
7. Is there any provision for offering treatment to covid-positive sick new born
8. Adapt admission and discharge criteria and prioritize patients and clinical interventions according to available treatment capacity and demand.

9. Ensure the existence of a systematic and deployable evacuation plan that seeks to safeguard the continuity of critical care
10. Coordinate with local health authorities, neighbour hospitals, private medical practitioners to ensure continuous provision of essential medical services to the community

    a. Ensure availability of appropriate backup arrangement for essential life lines including water, power, food supplies, medical gases etc.
    b. Ensure the availability of adequate hospital supplies
    c. Ensure contingency mechanism for hospital waste management

1. Surge Capacity for Medical Response

1.1 Does the health facility estimate the expected increase in demand for hospital services and calculate the maximum capacity required for the same?
1.2 Has the hospital identified the methods of expanding hospital inpatient/outpatient capacity in case of emergencies?
1.3 Can the health facility Identify areas that can be used to increase patient care capacity (surge capacity) bearing in mind the necessary physical space, staff, supplies and processes
1.4 Indicate the criteria for reassigning normal rooms as isolation rooms once the number of patients reaches the threshold, and plan to reallocate non-isolated patients to other rooms.
1.5 Does the hospital have mechanism for outsource care or shift non-critical patients to appropriate alternative sites to increase the hospital's capacity?
1.6 Whether hospital has designated care area for patient overflow
1.7 Verification of availability of vehicles and resources for patient transfer
1.8 Whether health facility has any established mechanism for inter-facility patient transfer
1.9 Have you identified any potential gaps in the provision of critical medical care and address the same while coordinating with neighbouring and network hospital
1.10 Does you identified sites that may be converted into additional patient care units
1.11 Has the health facility Prioritise/ cancel non-essential services when necessary
1.12 Can you Adapt hospital admission and dischare criteraia in emergency
1.13 Does the hospital has Desginate specific area that may be used as a temporary morgue and formulate contingency plan for ensuring required post-mortem procedures?
1.14 Establish protocols for maintenance of a special disaster store/stockpiles
1.15 Does the facility have the necessary day-to-day and backup arrangements in place to respond to COVID-19 if need arise? Y/N (Space for isolation and Covid care ward with separate entry and exit away from main wards of the hospitals, availability of essential medicines an supplies as per guidelines ,Infection prevention and control, dedicated staff trained for Covid mgt.)
1.16 Can the health facility prove the COVID-19 primary care services - Detection, Diagnosis, Treatment, Referral, Rehabilitation, contact tracing etc.

2. Surveillance

2.1 Whether staff have been informed about and trained in COVID-19 case definitions, the definition of close contacts and the quarantine system. ? Y/N
2.2 Are they trained regarding adherence to specific COVID-19 guidelines and protocols ? Y/N
2.3 Does the health facility have a standard operating procedures for collection, confirmation and validation of COVID-19 data. Has it been developed and available to the designated staff ?
2.4 What are the mechanism put in place to report COVID-19 case information to disease surveillance unit of dist./state?
2.5 Are standardized forms available to report COVID-19 case information to surveillance unit (dist./state) within 24 hours of case identification?

2.6 Which type of surveillance system (passive/active/no surveillance) used to identify COVID-19 cases among inpatients and their attendants

2.7 What is the surveillance system used to identify COVID-19 cases among healthcare workers (passive/active/no surveillance)?

2.8 What are the mechanism put in place for rapid identification, early warning and reporting of suspected cases from community to the health facility?

2.9 What are the mechanism put in place for monitoring and reporting of suspected health events at the community by health facility?

2.10 Does the health facility has designated staff to collect, analyse and report data related to COVID-19 cases to appropriate reporting unit/surveillance unit following appropriate procedures?

3. Area level networking of hospitals

3.1 Has the health facility established network with other health centres in the area to enable resource sharing during emergencies?

3.2 Whether the health facility has established network with nearest equipped hospitals in the area for patient transfer for treatment, when health facility overwhelmed amid surge of patients during emergencies?

3.3 Is there any defined arrangement/memorandum of understanding between the health facilities and networked hospitals?

3.4 If network is not established, has a list of possible health facilities been identified that can be networked?

3.5 Is the list of the persons to be contacted in those hospital available?

4. Volunteer involvement

4.1 Whether local volunteers close proximity to health care facility involved any time for hospital disaster preparedness and response?

4.2 Whether local volunteers participated any time in drill and preparedness exercise and training on disaster preparedness and response?

4.3 Have the community healthcare workers (ASHAs, AWW and ANMs) trained on Disaster preparedness and Response and attended any mock drill

4.4 Has the health facility identified volunteer who could be involved in hospital disaster preparedness and response activities

4.5 Are community volunteer volunteers kept in contact and communicated regularly even if there is no disaster / emergency situations.

4.6 Whether local volunteers trained on the following:

a. Basic Emergency Preparedness and response
b. Search and Rescue
c. First Aid
d. Basic life support
e. Community triage
f. Health communication/psychosocial care
g. Interpersonal communication and leadership

F Experience of handling cyclone Amphan and Yaas amidst the COVID-19 pandemic

1. What measures were taken by your health facility to prepare for and respond to the cyclone Amphan and Yaas amidst the COVID-19 pandemic?
2. What steps were taken to ensure that delivery of essential health services both at facility (exp. ANC etc.) and community level (VHND, vaccination etc.) do not get disrupted due to the cyclone Amphan and Yaas amidst the COVID-19 pandemic?

3. What public health services measures were taken by your health facility to prepare for and respond to the cyclone Amphan and Yaas amidst the COVID-19 pandemic?
4. What are the challenges your health facility might have faced in delivering healthcare services to the people (disaster victim and normal community) during cyclone Amphan and Yaas amidst the COVID-19 pandemic?
5. Any best practices you might have adapted while delivering healthcare services at facility and community level, during Cyclone Amphan and Yaas amidst the COVID-19 pandemic that can be documented and replicated?
6. From your experience from Cyclone Amphan and Yaas as well as Covid-19 which are components/ domains that needs to be improved/ further strengthened at your health facility for better preparedness and response to natural hazards amidst the biological disaster like COVID-19?
7. Is your health facility ready to provide desired services to normal community and disaster victim during natural hazards amidst the biological disaster like COVID-19?

G Collaboration/Coordination with wider Disaster preparedness initiatives (to Head of Health facility)

1. Are you aware about Disaster Risk Management(DRM) programme/ Disaster Risk Reduction(DRR) activities are being implemented by your district?
2. Are you involved any DRM/DRR activity in your area?
3. Have you attended any DRM/DRR meeting conducted local/block/district level?
4. Whether any joint activities undertaken by your health facility with DRM/DRR initiatives
5. Whether your health facility is involved in preparation of District Disaster Management plans

Annexure 8 Guide for Focused Group Discussions (FGDs) and consultations

(ASHA / AWC / VDMC members and teams, Shelter Management Committee representative, School Management Committee representative / School headmaster/teachers, youth volunteers, block and cluster resource centre representative, PHC/CHC members, etc.)

Objective: To understand the challenges faced by community mobilisers, volunteers and response teams in supporting awareness generation, last mile dissemination, evacuation and shelter management during cyclone Amphan and floods amidst COVID-19 pandemic. To capture lessons learnt and good practices from actual evacuation during pandemic and recommendations for improvement.

Investigator's name:
District: Village/block:
Date: Venue of FGD/IDI:

List of participants involved in the FGD/ IDI:

Guidance questions	Key points of discussion
1. What all key roles (with focus on evacuation, shelter management) did you perform for management of cyclone Amphan and floods during COVID-19 pandemic? How were these roles different from those in management of earlier cyclones and floods? *Note the key roles agency/designation wise.*	
2. How were you trained and sensitized for performing these new roles? Who trained you? Was there any mock drill/table top exercise undertaken for planning and understanding new roles? Were such measures adequate and useful for you in preforming the new roles?	
3. What other support did you receive from the Government or any other agencies to manage Amphan and COVID-19?	
4. Were you provided additional IEC material? What were they? Were they useful? What more information you needed which was not covered in the IEC material?	
5. What challenges you faced in performing your roles? Was it difficult to disseminate the new learning and directions to the community? How did you overcome them?	
6. What specific measures you had to undertake to maintain protocols of the COVID-19 pandemic during the evacuation/rescue/rehabilitation processes.	
7. Who according to you were the key vulnerable groups to Amphan and COVID-19? What key measures you undertook to meet their special needs (esp. old aged, pregnant ladies, sick persons who were more exposed to COVID-19)? Were the services/facilities made for them adequate or would you suggest changes/improvements for better management?	
8. Did you put any of the indigenous/local practices and knowledge to use to tackle the situation? If yes, please mention it briefly.	
9. Briefly describe the good practices undertaken by you for planning, preparing and managing cyclones and floods during COVID-19.	
10. Please suggest measures by which you or your community can be made better aware, prepared for managing similar risks in future.	

Annexure 9 PRA Guide

Objectives:

1. To identify vulnerable areas, infrastructures, and facilities in the target communities
2. To assess capacity and resilience and risk to biological hazards including COVID-19 and natural hazards such as cyclone and floods in the target communities with scientific approach

Suggestive tools:

1. GPS Map Camera app for mapping the vulnerable areas, infrastructure and key facilities
2. Use normal camera to capture clear pictures of vulnerable areas, infrastructure and key facilities
3. Undertake transect walk with community members and volunteers
4. Guide community in developing PRA charts, showing community boundary, vulnerable areas, infrastructure and key facilities, etc. Different colors and legends may be used to depict these on the PRA chart

Guiding points:

A. Community layout

1. Mark community boundary, broad land-use pattern, natural resources, settlements, agricultural lands, forest, etc.

B. Hazards and hazardous areas

1. What are the key hazards the community (village/ward) is prone to? List all.
2. How often is the community get affected by cyclones and floods?
3. List and depict major sites/locations prone to/associated with hazards (especially cyclone, floods, pandemic). These may include nearby river and water bodies prone to flooding; coastal areas, waste-dumbing sites/landfills, areas prone to water-logging, hazardous factories, crowded places, etc. (Legend H may be used to mark such areas along with brief description for identification)

C. Vulnerable areas

1. Mark the areas regularly impacted by cyclones, floods and/or pandemic or public health hazards. Here you may mark areas prone to inundation during monsoons, floods and cyclones, level of flooding, key sites of water logging, areas impacted by Amphan, COVID hotspots, etc. (Legend V may be used to mark such areas along with brief description for identification).

D. Infrastructure and key facilities

1. Mark the critical and life-saving infrastructure and key facilities available in the community and nearby. These may include emergency shelters, high ground, high-rise and pucca building (potential shelter buildings), community assembly areas, evacuation routes, hospitals, blood banks, pharmacy, PHC, CHC, quarantine centres, fire stations, emergency control rooms, road and railway network, schools, anganwadi centres, colleges, police stations, panchayat bhavan, government buildings and offices, post office, community halls, food godowns, telecommunication towers, power infrastructure, water sources, religious and cultural places, etc. (Legend C may be used to mark such areas along with brief description for identification).
2. Mark location of key emergency resources such as early warning equipment, sirens, firefighting equipment, rescue equipment, etc.

Annexure 10 Template for the baseline survey for the community

Questionnaire No-……..
Date-…….

Investigator Name:	
District:	Block/ Municipality:
Village/Ward:	HH Code:

Section A: Household demographic details							
A.1	Name of respondent:			Gender:		Age:	
A.2	Total members in HH:						
A.3	Gender	Male (1)-		Female (2)-		Others (3)-	
A.4	Age	0-5 yrs (1)-	5-18 yrs (2)-	18-60 yrs (3)		>60 yrs (4)-	
A.5	Social group	SC- 1	ST- 2	OBC- 3		General- 4	
A.6	Religious Group	Hindu- 1	Muslim- 2	Christian - 3		Sikh - 4	
		Buddhist- 5	Jain- 6	Others (specify)- 7			
A.7	Education[10]	Illiterate (1)-	Primary (2)-	Secondary (3)-		Higher secondary (4)-	
		University or higher (5)-		Others, specify (6) –			
A.8	Health status	Pregnant/ lactating (1)-	Differently abled (2)-	Bedridden/special care (3)-		Others, specify (4)-	
A.9	Employment status	Salaried (1)-	Daily wager (2)-	Self-employed (3)-		Pension (4)-	
		Unemployed (5)-	Students (6)-	Others, specify (7)-			
A.10	HH income/ month						
A.11	Are you covered under any health/ social protection scheme?			Yes,		1	
				If yes, please specify the scheme			
				No		2	
A.12	1. Have you ever taken any loans?			Yes		1	
				No		2	
	2. If yes, then from whom?			Moneylender		1	
				Friends		2	
				Family/ relatives		3	
				Bank		4	
				Others		5	
	3. Were you able to repay it timely?			Yes		1	
				No		2	
Section B: Housing, facilities, and assets							
B.1	Do you live in your own house with title or in rented accommodation			Own house (with title)		1	
				Rented accommodation		2	
				Friends/relatives		3	
				Others, please specify		4	
B.2	Which of the following statements best describes your house?			Kuccha house		1	
				Pucca house		2	

[10] Primary (1-7 grade); Secondary (8-10 grade); Higher secondary (10-12 grade)

B.3	Is the house used for any other purpose than residential?	Only residential	1
		Residential plus commercial (hosting shop/ business) If yes, specify	2
B.4	How many floors are there in the house?	Ground floor only	1
		Ground plus 1	2
		Ground plus 2	3
		More than ground plus 2	4
B.5	Does the house have an accessible terrace?	Yes	1
		No	2
B.6	Does the house have an electricity connection?	Yes	1
		No	2
B.7	1. Does the house have a water connection?	Yes	1
		No	2
	2. If yes, what is the duration of the daily availability of water?		
	3. If no, what is the source of water (domestic and drinking purpose) for the house?		
B.8	1. Does the house have a toilet and washroom?	Only washroom	1
		Both washroom and toilet	2
		None	3
	2. If no, what does the HH use for the toilet and washroom	Open defecation	1
		Community toilet and washroom	2
		Friend/neighbor's toilet and washroom	3
		Others, please specify	4
B.9	1. Who is the service provider for solid waste disposal and collection system?	Government	1
		Private agency	2
		Community-driven	3
		Others	4
	2. In absence of such a service, how is the solid waste disposed of?	Open dumping sites	1
		Municipal dustbins	2
		Burnt	3
		Others, please specify	4
B.10	List the assets that you have. Select that applies.	Agricultural land	1
		Livestock	2
		Pets	3
		Boats	4
		Fishing nets	5
		Tractor/ machines	6
		Others (please specify)	7
Section C: Physical factors			
C.1	Is the house well connected to main roads/ railways through all-weather roads?	Yes	1
		No	2
C.2		Distance[11] (meters)	
		Near the riverbank (1)	

[11] <300 m- 1; 300-500 m-2; 500-1000 m-3; >1000 m- 4

	Is your house located next to the following places? (Select all that applies)	Near the sea coast (2)	
		Near hazardous location/industry (3)	
		Near open area of waste disposal (4)	
		Low lying areas (5)	
		Others, please specify (6)	
C.3	How far are you from higher ground and safe shelters (in meters)?	<300	1
		300-500	2
		500-1000	3
		>1000	4
C.4	Do the key sources of water get polluted/ flooded during rainfall, floods, and cyclones?	Yes	1
		No	2
C.5	Are your agricultural fields/soil prone to salination and other issues post floods and cyclones?	Yes, please specify the key issues	1
		No	2
C.6	How do you protect your houses/assets from being flooded/cyclone?		
Section D: Social factors and preparedness			
D.1	Since how long you have been living in the present village/ward?		
D.2	1. Do you have regular community meetings to discuss local issues, challenges, etc.?	Yes, Please specify how often	1
		No	2
		Not aware	3
	2. Are hazards, preparedness, hazard warnings discussed in such meeting?	Yes	1
		No	2
		Don't know	3
	3. Frequency of participation in the meeting?	Never	1
		Sometimes	2
		Frequently	3
		Always	4
		Not applicable	5
D.3	What is the strength of community cooperation during normal days?	Very poor	1
		Poor	2
		Moderate	3
		Good	4
		Very good	5
D.4	What is the strength of community cooperation during disasters/events?	Very poor	1
		Poor	2
		Moderate	3
		Good	4
		Very good	5
D.5	1. Have you or your family attended any meeting/ training/ discussion on disaster risk management?	Yes	1
		No	2
	2. If yes, what were the key aspects discussed?	Response during any emergency/disaster	1

		First aid training	2
		Evacuation drill	3
		Resource mapping	4
		Disaster plan related	5
		Others, please specify	6
	3. Was there any new knowledge gained/skill learned?	Yes, please specify	1
		No	2
	4. If you have not attended a training/preparedness program, what prevents you from attending it?	Unaware	1
		Not interested	2
		Location too far	3
		Loss of wage/ work	4
		No time	5
		Others, please specify	6
D.6	1. Does your family discuss preparedness measures and plan of action for disasters?	Yes	1
		No	2
	2. If yes, what are the main points of discussion	Safe shelters	1
		How to strengthen the house to avoid the impact of disaster	2
		Emergency stocks and kits	3
		Evacuation plan	4
		Others, please specify	5
Section E: Past experience (Amphan and COVID-19 or earlier floods/cyclone)			
E.1	Was your family/ household affected during Amphan, COVID-19, or any recent floods/cyclones? (Tick all that applies)	Amphan	1
		COVID-19	2
		Past floods and cyclones (please specify)	3
E.2	1. How was your family/ household affected by COVID-19? (Tick all that applies)	Death	1
		Serious illness and comorbidity	2
		Limited/ disrupted access to basic goods and supplies, please specify	3
		Social stigma	4
		Loss of education	5
		Disruption or loss of livelihood	6
		Additional financial burden/no remittances	7
		Others, please specify	8
	2. If yes, how did you cope/ manage the above-mentioned effects of COVID-19? (Select all that applies)	Sold assets	1
		Engaged in alternate livelihood, Please specify	2
		Children supported by working	3
		Took loan	4
		Relied on support by Government/ NGOs/ community	5

		Ignored the symptoms, didn't get tested and continued normal functioning	6
		Didn't tell anyone about COVID positive patients at home	7
		Others, please specify	8
	3. Did you receive any alerts/ regular updates on COVID-19?	Yes Specify by whom and what kind of information.	1
		No	2
	4. What action did you take after receiving these alerts/ updates?	Nothing	1
		Took precautions Specify?	2
		Shared with family members/neighbors	3
		Others	4
	5. Were you or any of your family members shifted to COVID- 19 quarantine/ isolation centres/ Temporary Medical Centres (TMC)?	Yes	1
		No	2
	6. If yes, what were the challenges faced at such centres?		
	7. What key COVID-19 related precautions/ measures did your family practice? What were the key challenges faced by you in practicing these measures?		
E.3	1. How was your family/ household affected by Amphan or past cyclones (Mention name of past cyclone if not affected by Amphan - _____) (Tick all that applies)	Evacuation	1
		Property damage	2
		Damage to agricultural land	3
		Loss of assets	4
		Disruption or loss of income	5
		Serious injury	6
		Mental trauma	7
		Death	8
		Loss of livestock	9
		Others, please specify	10
	2. What all key disruptions in critical services were faced during Amphan or past cyclones? (Tick all that applies)	Food supply and PDS	1
		Water services	2
		Medical services	3
		Sanitation and waste disposal	4
		Connectivity links	5
		Electricity/power supply	6
		Road connectivity and transportation	7
		Lack of access to markets	
		Others, please specify	8

E.4	1. Was the early warning mechanism activated in your village/ ward before the cyclone struck?	Yes	1
		No	2
	2. If yes, how many days before the cyclone landfall, you received the warning?		
	3. What was the frequency of subsequent warnings?		
	a. From whom do you receive the warnings and alerts?	District authorities, please specify	1
		Local authority, please specify	2
		NGO	3
		Religious institutions	4
		Community-level sirens/ early warning systems	5
		Radio	6
		TV	7
		Newspaper	8
		Others, please specify	9
	b. To whom do you further share the warnings and alerts? (Tick all that applies)	Don't share	1
		Family/relatives	2
		Neighbours	3
		Community members/ representatives	4
		Village/ward Disaster Management Committees	5
		Community volunteers	6
		Others, please specify	7
E.5	Did your village/ward had pre-identified evacuation routes to safe shelters/locations during floods and cyclones?	Yes	1
		No	2
		Don't know	3
E.6	Did your village/ward had a pre-identified shelter where people can go during floods and cyclones?	Yes	1
		No	2
		Don't know	3
E.7	1. What instructions were given to you about the cyclone? Mention briefly and by whom?		
	2. Were special instructions considering COVID-19 also given?	Yes, briefly mention	1
		No	2
E.8	1. Did you use any technique/ methods to protect your houses/ assets/ livestock/ crops against potential damage by flood and cyclone?	Yes	1
		No	2
	2. If Yes, which technique	Sandbags	1
		Temporary barriers (mud)	2

		Moving livestock to higher/ safe locations	3
		Storing harvested crop at higher/ safe location?	4
		Others, please specify	5
E.9	Did you evacuate to the safe shelter/ location on receiving cyclone warning?	Yes	1
		No	2
E.10	If yes:		
	1. What was the distance of your house from the safe shelter/ location?	metres	
	2. What type of shelter were you shifted to?	School	1
		Multi-purpose cyclone and flood shelter	2
		College	3
		Panchayat/ Municipal buildings	4
		Higher ground	5
		Others, please specify	6
	3. Were you scared to shift to a shelter?	Yes	1
		No	2
	4. If yes, what were the reasons?	Fear of losing belongings	1
		Unsure of where to go	2
		Poor hygiene conditions	3
		Fear of eve teasing	4
		Fear of losing rented place	5
		Fear of getting COVID-19 from shelter	6
		Others, please specify	7
	5. What made you move to shelter despite these fears and concerns?	Fear of damages by cyclone	1
		Police enforcement	2
		Community pressure	3
		Others, please specify	4
	6. What all do you carry along to the shelter?		
	7. Were COVID-19 safety protocols followed while shifting and in the shelters?	Yes	1
		No	2
		Don't know	3
	8. If yes, what protocols were followed?	Social distancing while shifting	1
		Mask and PPE usage by all	2
		Availability of sanitization facilities	3
		Physical distancing in shelters	4
		Medical facilities available in shelters	5
		Essential services provided in the shelter while adhering to COVID-19 safety protocols	6

		Proper sanitation/hygiene and waste collection and disposal facilities available		7
		Separate facilities for the most vulnerable (pregnant women, old persons, sick persons, young children, etc.)		8
		Others, please specify		9
	9. Was the shelter accessible to all (elderly, differently-abled, pregnant mothers, children, different castes, etc.)?	Yes		1
		No		2
	10. What are the key challenges faced by you at the shelter?	Was there a piped source of water in the toilet and bathrooms?	Yes -1	No - 2
		Was the water available 24*7?	Yes -1	No - 2
		Was there a dedicated staff for cleaning toilets, bathrooms, and drainage?	Yes -1	No - 2
		Was there a provision of dustbins in the shelter?	Yes -1	No - 2
		Was there provision for segregation of waste (kitchen waste, sanitary waste, PPE, etc.)?	Yes -1	No - 2
		Was the food and drinking water provided well in quality?	Yes -1	No - 2
		Was the quantity adequate?	Yes -1	No - 2
		Was there adequate space for sleeping and resting?	Yes -1	No - 2
		Were there any safety issues felt at the shelter?	Yes -1	No - 2
		Others, please specify		
	11. How were they resolved? Was there any mechanism to raise grievance and share feedback?			
	12. How many days did you spend in the temporary shelter?	<5		1
		5-10		2
		10-15		3
		15-30		4
		>30		5
	13. How did you spend time at the shelter?			
	14. How moving to the shelter helped you?			
	15. What were the challenges/ losses you faced after returning to your houses?			

E.11	1. If you were not required to evacuate, what are the emergency supplies that you stocked at home?	Didn't have emergency stock at home				1
		Water				2
		Dry/ packaged food				3
		Medical emergency kit/ first aid kit/medicines				4
		Sanitary needs				5
		Emergency light				6
		Cash				7
		Important documents				8
		Others, please specify				
	2. How long the emergency stock lasted?		1-2 days	3 -7 days	8-14 days	>14 days
		Food				
		Water				
		Medicines				
		Others, please specify				
	3. What were the difficulties you faced in your area during this time? Mention briefly					
Section F: Suggestions and feedback						

Annexure 11 FGD and RVS guide for assessing preparedness of emergency shelters and their management during floods/cyclones amidst COVID-19

1. Focussed Group Discussions (FGDs) with emergency shelter management committee representatives/volunteers

GENERAL

1. Please list down the resources/facilities available in the emergency shelter.
2. Is the shelter used for any other purpose during normal times? Please list the different uses (school, community hall, etc.)
3. Do you know about other such shelter in the vicinity?
4. List down the presence/absence of factors in the below-mentioned domain:
   - Physical factors: Building structure, location, no. of people who can be accommodated in the shelter (following physical distancing norms during COVID-19)
   - Social factors: Allocation of rooms in the shelter based on gender, etc., access to resources available in the shelter (basic medical care, face masks/shields, hand sanitizers, etc.)
   - Institutional/human factors: Training in preparedness during floods/cyclones amidst COVID-19, collaboration with different organizations, budgetary allocations for maintenance, etc.
   - Secondary factors: Exposure to secondary hazards (landslides, fire due to short circuits, etc.)

IMPACTS OF DISASTERS

5. Has your village/ward been affected by Cyclone Amphan/Yaas? What is the impact of the cyclone in your community?
6. Was your village/ward a hotspot during the COVID-19 pandemic? What is the impact of the pandemic in your community?

RESPONSIBILITIES AND STAFF MANAGEMENT

7. Please briefly describe your role during floods/cyclones amidst COVID-19 pandemic. How is it different from the role assigned to you in other circumstances?
8. What were the various difficulties faced in the shelter during cyclone Amphan/Yaas under COVID-19 pandemic? How difficult was it to carry out your responsibility?
9. How many representatives/volunteers manage it? Are they family members, friends, neighbors, etc.? Are they sufficient to provide services during a disaster? Is the salary of the representatives/ volunteers paid on time? Do they receive overtime pay?
10. What actions have you taken to ensure the well-being of yourself and other representatives/ volunteers during the crisis?

OPERATIONS DURING DISASTERS

11. Did the cyclone lead to evacuation in your community? If yes, who were the different stakeholders involved and specify how did they help. If evacuation was done, how did the residents come to the emergency shelter? Did any other organization help in the process?
12. Did the residents come together to help each other while shifting to the shelter? Did the residents help in managing the shelter by being co-operative and following the basic set of rules?
13. What specific measures you had to undertake to maintain physical distancing and other protocols of the COVID-19 pandemic while shifting process to the shelter? How would you describe the willingness to shift of the affected residents?

FACILITY MANAGEMENT

14. What actions have you taken for COVID-19 pandemic safety inside the shelter?
    - Shelter sanitization, increased cleaning of surfaces, installation of hand sanitizing units, etc.
    - Promotion of good hygiene (wearing masks, washing hands)
    - Regular temperature checks
    - Maintaining physical distancing (e.g., marking the floor to indicate the distance)
    - Staggering work shifts to minimize volunteer density in the shelter

15. Please mention the situation of the shelter in terms of:
    - Safe refuge: Location of the shelter away from hazard prone zones, accessibility routes to the shelter, disaster-resilient design and infrastructure, adequate capacity, space management (following physical distancing norms during COVID-19), special facilities for the vulnerable, isolation rooms for COVID-19 patients
    - Food and drinking water provisioning: Safe drinking water, food packets and ration, cooking kits and material, pest and rodent management
    - Hygiene and sanitation: Toilet and bath facilities, adequate water supply, provision of supply for hygiene maintenance, safe disposal of waste, touchless bathroom fixtures
    - Health and psycho-social care: Provision of first aid kits and basic medicines for fever, cough/cold, headache, volunteers trained in psycho-social care
    - Safety and security: Proper light and provision of power, security of the people seeking shelter and their belongings, provision of emergency and response supplies, record management of shelter inhabitants
16. Please comment on the following aspects related to essential supplies:
    - Developing and maintaining an updated inventory of all supplies and establishing a shortage-alert mechanism
    - Estimating consumption of essential supplies (especially in disaster scenarios)
    - Consultation with relevant organizations to ensure the continuous provision of essential supplies
    - Assessing the quality of the items before purchase
    - Establishing agreements with vendors to ensure prompt delivery of supplies in a disaster situation
17. Do you have existing financial liabilities/burden associated with the management of the shelter?

PREPAREDNESS

18. How did you make the community aware about the existence of the shelter and facilities thereof, to positively influence their willingness to shift as and when a disaster struck? Did you use the traditional/manual methods for outreach or digital platforms?
19. Does the shelter receive early warning in adequate time? Mention briefly and comment on your experience in this matter during Cyclone Amphan/Yaas.
20. Has a contact list of stakeholders been prepared by the shelter?
21. Does the shelter maintain an inventory of all people who has taken shelter till date?
22. Do you have emergency communication system in the shelter? If yes, mention briefly about it.
23. Does the shelter have provisions for the special needs of vulnerable communities such as Persons with Disability (PWD), elderly populations, Person Living with HIV (PLHIV), pregnant and lactating mothers, children, etc.?
24. Did any pre-disaster reconnaissance survey take place in the Zone of Influence (ZOI) of the shelter to take a note of the status of the residents?
25. Has the shelter been assessed to judge its resilience towards floods/cyclones by trained experts?
26. Was a vulnerability assessment conducted for building safety?
27. Was retrofitting carried out to enhance the safety of the building?
28. Is a structural safety certificate available?
29. Have any funds been allocated for strengthening the structural safety of the building? If yes, what percentage of the allocated budget?
30. Is a disaster management plan available for the shelter? If yes, what does it include?
31. Comment on the specific problems you faced during Cyclone Amphan/Yaas and COVID-19 pandemic, w.r.t. the following:
    - Absenteeism of shelter representatives/volunteers due to concern over the use of public transportation, mental and physical stress, reduced working hours, family members/child care
    - Disruption in basic utility services like electricity, gas, water, telecommunication (mobile, telephone, internet), banking and postal service
    - Supply chain issues: Access, availability, flow of goods and services, etc.

- Government regulations: Difficult to procure raw materials and other supplies, delay in approval and quality checking of new products, increase in cost of using public utilities (e.g., electricity, water, etc.)

32. Mention briefly the overall condition of the shelter (both positive and negative observations) towards preparedness during floods/cyclones amidst COVID-19.
33. How prepared do you perceive the shelter to be so as to resist the effects of floods/cyclones amidst COVID-19 on a scale of 1 to 5 (Very Low to Very High)?

Preparedness →				
□ 1:Very Low	□ 2:Low	□ 3:Medium	□ 4:High	□ 5:Very High

SUPPORT FROM OTHER ORGANIZATIONS/GOVERNMENT

34. Have you received any training, been part of mock drills, organized meetings on disaster management/evacuation/preparedness, etc. during floods/cyclones amidst COVID-19? Which agency provided the training? Do you think it was useful and were you able to implement it when multiple disasters struck? Was it theoretical training or hands-on training?
35. Did you receive any specific guidelines/points of action from the Government/organizations to deal with cyclone Amphan/Yaas during the COVID-19 pandemic? Mention briefly and describe the implementation process.
36. What support did you receive from other organizations/initiatives (such as Government schemes and programmes)? What suggestions/improvements would you like to suggest for better functioning and effectiveness of such schemes/programmes. Was there a separate budgetary allocation made to overcome the crisis?

PAST EXPERIENCES

37. Was your shelter effective/functioning during floods/cyclones in the last 5 years? What were the existing issues/challenges faced in the last 5 years? Did COVID-19 increase these issues/challenges? If yes, then how?
38. Was support from other organizations/Government available to you to overcome the situation in the last 5 years?

SUGGESTIONS

39. Can you briefly describe the best practices that you have adopted to deal with natural and biological hazards simultaneously? Was any indigenous/local practice used to tackle the situation?
40. Are the number of emergency shelters adequate for the community considering the demand based on the existing and projected population under threat?
41. Do you conduct campaigns for promoting importance of shelters through social media, meetings, mock drills, hoardings, etc.?
42. What other facilities should have been made available to tackle the situation better? To name a few:
    - Insurance (claims management, insurance coverage)
    - Banking sector support
    - Infrastructure (Existing infrastructure repairing and upgradation of infrastructure)
    - Government policies and guidelines
    - Human capital (livelihood restoration, compensation, etc.)
43. Any other suggestion/feedback. Briefly mention.

2. Data collection form for Rapid Visual Screening (RVS) of emergency shelters to check its degree of preparedness during floods/cyclones amidst COVID-19

Questionnaire No.:
Date:

Investigator Name:	
District:	Block/Municipality:
Village/Ward:	Shelter code:
Shelter Contact Name:	

Year of construction:			
Accessibility	□ Full	□ Partial	□ No Access
Type of shelter/Use	□ School	□ College	
	□ Community hall	□ Panchayat/Municipal building	
	□ Multi-purpose flood/cyclone shelter	□ Higher ground	
	□ Others (mention)		
Building plan shape	□ Square	□ Rectangle	
	□ Long rectangle	□ L-shape	
Shelter capacity (persons):			
Total area of shelter (in sq. meter):	Area per person (in person per sq. meter):		

Checklist of observables and associated scores (in increasing order of vulnerability)

Section A. Building elements		
Location of the shelter	□ Shielding by hillock	□ 1
	□ Shelter on stilts/artificially raised earth mounds	□ 2
	□ Shielding by strong trees	□ 3
	□ Shelter at ground level (risk of inundation)	□ 4
	□ No shielding	□ 5
Proximity to major water course (river, sea, etc.)	□ No	□ 1
	□ Yes	□ 2
Building type	□ RCC	□ 1
	□ Masonry	□ 2
	□ Timber (Kaccha)	□ 3
No. of storeys	□ Single ground floor	□ 1
	□ Double storied	□ 2
	□ More than 02 storeys (mention G+_____)	□ 3
Vertical irregularity	□ Absent	□ 1
	□ Present	□ 2
Plan irregularity (un-symmetric plan configuration w.r.t. staircase)	□ Absent	□ 1
	□ Present	□ 2
Heavy overhangs (moderate/substantial horizontal projections)	□ Absent	□ 1
	□ Present	□ 2
	□ At 0.5 meters from wall corners	□ 1

Openings on walls (door, window, etc.)	□ Just near the corner of walls	□ 2
Is the openings close to the roof level?	□ No	□ 1
	□ Yes	□ 2
Are the holdfasts, closing/locking arrangements in the door/window adequate/strong?	□ Yes	□ 1
	□ No	□ 2
Wall material	□ Concrete	□ 1
	□ Brick	□ 2
	□ Kaccha mud wall	□ 3
Building age	□ Less than 10 years	□ 1
	□ 11 to 25 years	□ 2
	□ 26 to 50 years	□ 3
	□ More than 50 years	□ 4
Basement	□ Absent	□ 1
	□ Present	□ 2
Open storey (Stilts)	□ Present	□ 1
	□ Absent	□ 2
Plinth height	□ Stilted building	□ 1
	□ Above road level	□ 2
	□ Same as road level	□ 3
	□ Below road level	□ 4
Soil type	□ Hard	□ 1
	□ Soft	□ 2
Floor material	□ Concrete	□ 1
	□ Masonry	□ 2
	□ Kachha mud floor	□ 3
Roof type	□ Pitched roof (hipped/gable)	□ 1
	□ Light-weight flat roof	□ 2
Roof material	□ Sheeted roof (made of corrugated galvanised iron, etc.)	□ 1
	□ Clay tile roofs	□ 2
	□ Thatch roof	□ 3
Exposure to secondary hazard (landslide, mechanical-electrical-plumbing system failure, loose sewage joints, loose water supply joints, loose power cables, etc.)	□ No	□ 1
	□ Yes (mention)	□ 2
Building condition (materials/construction)	□ Standard quality	□ 1
	□ Low maintenance	□ 2
Is there provision for a helipad in the terrace of the shelter, so that helicopters can be used to access the affected area?	□ Yes	□ 1
	□ No	□ 2
Overall score (Addition of above factor scores)		
Section B. Facility services		
Communications equipment	□ Present	□ 1
	□ Absent	□ 2
Vehicles for transportation	□ Present	□ 1
	□ Absent	□ 2
	□ Present	□ 1

Power supply/ Lighting (not reliant on grid)	□ Absent	□ 2
Water supply – Potable/ Non-potable (not reliant on regular water supply)	□ Present	□ 1
	□ Absent	□ 2
Sewage/ sanitation/ waste management	□ Present	□ 1
	□ Absent	□ 2
Overall score (Addition of above factor scores)		

Section C. Response to COVID-19		
Area per person in accordance to physical distancing norms (min. area required = 3.5 sq. meter under normal circumstances and 6 sq. meter under COVID-19 condition)?	□ Yes	□ 1
	□ No	□ 2
COVID-19 advisory materials available for multiple audiences	□ Yes	□ 1
	□ No	□ 2
Do the occupants (residents and staff) undergo COVID-19 screening procedures during entry to the shelter?	□ Yes	□ 1
	□ No	□ 2
Are masks available for those who do not have them upon entry?	□ Yes	□ 1
	□ No	□ 2
On-site COVID-19 medical facilities	□ Medical care professional, nurses, medicines, testing facilities	□ 1
	□ Trained volunteers, medicines, testing facilities	□ 2
	□ Trained volunteers and medicines	□ 3
	□ Only medicines	□ 4
Availability of PPE kits for medical volunteers	□ Yes	□ 1
	□ No	□ 2
Areas designated as restricted access for isolation	□ Yes	□ 1
	□ No	□ 2
Presence of hard barrier or partitions in isolation areas	□ Yes	□ 1
	□ No	□ 2
Designated bathrooms/shower facilities in the isolation areas	□ Yes	□ 1
	□ No	□ 2
Hand hygiene supplies are available in the isolation areas	□ Yes	□ 1
	□ No	□ 2
Overall score (Addition of above factor scores)		

Extent of review	□ Exterior	□ Partial	□ All sides	□ Aerial
	□ Interior	□ None	□ Visible	□ Entered
Building drawing	□ Reviewed	□ No		

Suggestions and observations

Annexure 12 In-depth Interview (IDI) guide for reviewing effectiveness of existing public awareness material on cyclones, floods and COVID-19

Investigator's name:
HH Code (Use same code as used during baseline survey):
Responder's name:
Date:

Please note: The discussion is here on public awareness material on **cyclones, floods and COVID-19.**

1. Accessible	
1.1 How do you access public awareness materials on cyclones, floods and COVID-19?	
1.2 Are they displayed only at public places (schools, hospitals, government offices, etc.) or available to you at household level too?	
1.3 Are the materials freely available to you or do you pay to access them?	
1.4 Can you enlist a few public awareness materials on cyclones, floods and COVID-19 you have received in last one year?	
1.5 Who all provides you such materials?	
1.6 Are they displayed only at public places (schools, hospitals, government offices, etc.) or available to you at household level too?	
1.7 In what all way (medium), such material is provided to you? a. If in physical form, how do you store, use and disseminate them? What are challenges faced in using them?	
b. If in digital form, how do use and disseminate them? What are the challenges faced in accessing and using them?	
1.8 What can be done to make the public awareness material more accessible to you?	
2. Understandable and actionable	
2.1 Is the public awareness material easy to read and understand? What key issues you face in reading and understanding them (e.g., language issues, problem in understanding graphics, technical wordings, etc.)?	
2.2 Do you find the existing public awareness material interesting and want to receive more of them?	
2.3 Do you find the existing public awareness material boring to read and use? What can be done to make them more interesting for you and your family?	
2.4 Which medium (video, audio, printed material, etc.) do you find most impactful and easy to understand? Why?	
2.5 Which medium are most suitable for different family members (e.g., children, old aged, differently-abled persons, etc.)? What are the challenges faced by them in understanding the existing information?	
2.6 What can be done to make the information easy to understand?	

2.7 Is the information shared easy to act on? Can you share details of actions you have taken based on existing public awareness materials?	
2.8 Discuss examples of how the information has been useful to you in the past.	
3. Credible and trusted	
3.1 Do you find the information provided to be credible?	
3.2 Are there cases where you found the information in the public awareness material to be wrong?	
3.3 Information provided by which source agencies/organisations (local government departments, NGOs, community representatives, etc.) do you trust the most? Why?	
4. Relevant	
4.1 Do you find the existing public awareness material relevant to the challenges you face before, during and after cyclones, floods and COVID-19?	
4.2 What are the key aspects of cyclones, floods and COVID-19 risk management you want to learn more about or are more relevant to you?	
4.3 What are the existing gaps in the existing public awareness material for children, old aged persons, women, differently-abled persons?	
5. Dissemination mechanism	
5.1 How often are the materials provided to you? Is that adequate?	
5.2 What according to you should be the frequency of dissemination of such materials so that it is most effective and better understood?	
5.3 During the dissemination, are the materials explained to you?	
5.4 Are you interested in understanding them while they are disseminated?	
5.5 Does the existing dissemination frequency and timing allow you adequate time to understand and act on the provided information? What can be done to improve this?	
5.6 When all should the materials be provided to you so that it is most effective to act on for managing cyclone, floods and COVID-19 risk? Mention preferred months/season, time of day, etc.	
5.7 How should the materials be disseminated to you?	a. At household level b. At community level programmes and trainings c. At workplace, schools, etc d. Displayed at public places e. Through TV, Radio, digital platform (like youtube) f. Others, please specify

Annexure 13 Quick Risk Estimation(QRE) Tool for Micro, Small and Medium-sized Enterprises (MSMEs)

Human Resource
How worried are you that the business operations would be impacted by employee unavailability or absenteeism? ● Not at all worried as most of the systems are automated or employees are available ● Not so worried as family members and/or friends can or are filling any employee shortages ● Worried as the business relies on employees and the business has no other support
Are the employees permanent/regular or temporary? (Permanent means no fixed end date of employment/have access to superannuation and eligible for company benefits such as pension fund, employer contribution; and Temporary means they are paid by a daily wage or short-term contract). ● All of the employees are permanent or come from amongst the family members ● Majority of the employees are permanent or come from amongst the family members (more than 50%) ● Approximately there are equal numbers of permanent and temporary employees ● Majority of the employees are temporary (more than 50%) ● All of the employees are temporary
How would you describe most of the employees in the business? *(Multiple answers can be selected)* ● Family members ● Friends and neighbours ● Seasonal / Migrant workers / Casual workers / Daily wagers ● Others
What are the actions the business has taken /or efforts made to ensure the well-being of the employees? *(Multiple answers can be selected)* ● Employees may work remotely/ office space transformed to minimise physical contact ● Management regularly engages with employee and effectively communicates with them on company's position to COVID-19 and its possible implications ● Management periodically conducts employee support programs to help them with mental and physical wellbeing ● Management encourages employees to acquire new skill sets and knowledge to fill in for other employees who are unable to come to work and/or to increase their personal skills ● Management guaranteeing income/salary of the employees even if the business has to temporarily close or downsize the operation. ● None of these
Does the business require close physical contact or distance with people? ● a. Close physical distance to customers and clients (shops, restaurants etc.) ● b. Close physical distance to other employees (manufacturing units, shops, etc.) ● c. Both a & b ● d. None of these
What kind of Human Resource issues is the business facing due to COVID-19 pandemic? *(Multiple answers can be selected)* ● Absenteeism among the employees due to concern over the use of public transportation irrespective of lockdown ● Migration leading to shortage of daily wage workers ● Absenteeism caused by mental and physical stress among employees coming to work

leading to reduced working hours or productivity
- Absenteeism among the employees due to lockdown
- Absenteeism due to family members/child care
- None of these

Technology and innovation

If the business is highly dependent on Information Technology (IT), has it prepared for / or reviewed existing strategies for possible cyber security threats to the business?
- Yes
- No
- There is no awareness on such threats
- Not applicable

Is the business using technology and /or innovative IT solutions (Digital transaction, virtual office, remote learning, virtual visits/tours, telemedicine, webinar, mobile application) to manage the disruptions or ensure business continuity?
- Yes, most of these
- Some of these
- No, there has not been any thought about these before
- Not applicable for the business

Operations

Is there any impact on the business operations due to disruption in basic utility services like electricity, gas, water, telecommunication (mobile, telephone, internet), banking and postal service in your area?
- Business is highly impacted
- Business is somewhat impacted
- Business had minimal impact
- No impact on the business

What kind of supply chain (flow of goods and services linking manufacturer, vendor/supplier, and customer) issues have affected the business? *(Multiple answers can be selected)*
- Goods and services have sold out or are unavailable
- Vendors/suppliers/raw materials/products have been inaccessible or unavailable
- Logistics/transport issues
- No current impact on supply chain

Which of these are being promoted in the business for COVID-19 pandemic safety? *(Multiple answers can be selected)*
- Workplace sanitisation (e.g. increased cleaning of surfaces, installation of hand sanitising units, etc)
- Promoting of good hygiene among staff (wearing mask, washing hands)
- Regular temperature checks of employees and customers
- Maintaining physical distancing at work place (e.g. marking the floor to indicate distance between customers and staff, retrofitting of front desks to increase distance between people, etc)
- Provision of office transportation facilities to work for employees
- Staggering work shifts or introducing work from home policies to minimize employee density in the business/ office
- None of these

How do you describe the equipment and machinery status which are indispensable to the business?
- There is no access to the office(s)/manufacturing unit(s)/warehouse(s)/store(s)/other

establishment(s)
- There is no Annual Maintenance Contract (AMC) and many of the machinery/ equipment need regular maintenance
- There is an Annual Maintenance Contract (AMC) in place for most of the machinery/ equipment
- The business is not dependent on any such machinery/ equipment which may be rendered unserviceable due to lack of maintenance
- The business is not dependent on any such machinery/ equipment

Finance

What kind of existing financial liabilities did the business have before COVID-19 pandemic? *(Multiple answers can be selected)*
- High operational cost
- Pending taxes, interest due to change in government's financial policies (custom duty, tax, import/export regulations, etc.)
- Existing debt/ loans/ or any other financial burden
- None of these

How long can the business continue to operate with its present financial position (asset, shares, cash, government support)?
- It cannot continue any further
- It can sustain for 1-2 month
- It can sustain for 3-6 months
- It can sustain for 6 -12 months

Is the business insured?
- The business is insured with disaster insurance cover that includes pandemics
- The business is insured with disaster insurance but it does not cover pandemics
- Only a part of the business is insured for disasters and pandemics
- The business currently does not have or has never purchased any insurance
- The business does not have access to any insurance

What does the business insurance cover?
- Earthquakes
- Floods
- Fires
- Cyclones/ typhoons/ tornadoes
- Pandemics/ outbreaks/ epidemics/ endemics
- Terrorist attacks
- Volcanoes
- Droughts
- Crop damages
- Others
- None of these

Government Policy

How effective has been the government's COVID-19 stimulus package for the business?
- Very effective
- Somewhat effective
- Not effective
- No such package by the government provided or accessed yet
- The business is not eligible for such package(s)
- There is no awareness of such packages

What is the impact of any lockdown on the business?

- The business has completely shut down
- Business is operating at minimum capacity after an initial shutdown
- Business is operating at reduced capacity without any shutdown
- Business is operating at full capacity after an initial shutdown
- No impact on business operations / There was no lockdown

What has been the impact of the government's regulations on the business? *(Multiple answers can be selected)*

- Difficult to procure raw materials and other supplies
- Difficult to sell products in the market / accessing customers
- Delay in approval and quality checking of new products
- Increase in cost of using public utilities (e.g. electricity, water, etc)
- Shortage/Unavailability/ rise in cost of human resource
- None whatsoever

Market

Under the COVID-19 scenario which of these market conditions are true for the business? (Multiple answers can be selected)

- There is a drop in consumer demand
- Reliance on traditional/manual methods for customer outreach instead of digital platforms/ e-commerce
- No scope for diversifying products and services to take advantage of the change in market demand
- The physical market is now in a high-risk zone and it has become unserviceable
- The market has become more competitive
- Inability to communicate with clients and suppliers
- None of these

Exposure to Other Hazards

Which of these hazards have a high likelihood of impacting the business in near future? *(Multiple answers can be selected)*

- Earthquakes
- Cyclones/typhoons/storms and wind damages
- Floods
- Landslides
- Industrial fires/forest fires
- Droughts
- Heat waves/cold waves
- Chemical leaks
- Conflicts and social unrests
- None of these

Annexure 14 IDI guide for MSME Units

Investigator Name:	
District:	Village/Ward:
MSME Code: MSME-	Date:

A. Basic details
   - A.1 Name of MSME unit:
   - A.2 Responder's name:
   - A.3 Responder's designation:
   - A.4 Type of unit (SHG, Household, Cooperative, Registered MSME units, others (specify)):
   - A.5 Buying raw material from which MSME/ vendor/ etc.:
   - A.6 Selling products to which MSME unit/vendor/ etc.:
   - A.7 Details of work undertaken by the MSME Unit:

B. How was your unit affected during cyclone Amphan/Yass and floods?

Raw material related issues
Sale issues
Marketing issues
Human resource issues
Physical infrastructural, machinery damages
Damage to finished products
Finance related issues
Any other issues

C. How did COVID-19 further increase the challenges faced during cyclones and floods situation?
D. What were the critical needs of your unit during this time (cyclone/flood + COVID-19 pandemic) for ensuring continuity of your business?
E. What actions did you take to overcome these challenges and address the needs to ensure continuity of your business?
F. What actions did you take to support livelihood of local community during cyclones/ floods and COVID-19 pandemic?
G. Has your business recovered from the losses and damages incurred due to COVID-19 and cyclone Amphan/ Yass and floods? What external assistance have you received for this and from whom?
H. What support do you need from local and state government for recovering from the losses and damages incurred due to COVID-19 and cyclone Amphan/Yass and floods?
I. What support do you need from local and state government for sustaining your business during similar future disasters?
J. What measures have you now taken to re-organize the business functions before-hand to reduce impact of similar future disasters (Cyclone, floods and pandemic together)?
K. What are the key aspects on which you and your staff need awareness (IEC material) for being better prepared and ensuring business continuity during disasters?

Annexure 15 Key secondary data referred

S. No.	Secondary data	Available links
1.	Sendai Framework for Disaster Risk Reduction	https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030
2.	Words into Action Guidelines, Bangkok Principles for implementation of health aspects of SFDRR	https://www.preventionweb.net/english/professional/policies/v.php?id=48396
3.	National Disaster Management Act	https://www.ndmindia.nic.in/images/The%20Disaster%20Management%20Act,%202005.pdf
4.	National Disaster Management Policy	https://www.mha.gov.in/sites/default/files/NPDM-101209.pdf
5.	National Disaster Management Plan	https://ndma.gov.in/sites/default/files/PDF/ndmp-2019.pdf
6.	NDMA guidelines	https://www.mha.gov.in/sites/default/files/NPDM-101209.pdf
7.	Odisha State Disaster Management Plan	https://www.osdma.org/plan-and-policy/village-disaster-management-plan/#gsc.tab=0
8.	Odisha State Disaster Management Policy	https://www.osdma.org/plan-and-policy/state-disaster-management-plan/#gsc.tab=0
9.	Odisha State Disaster Management Rules	https://www.osdma.org/plan-and-policy/state-dm-policy/#gsc.tab=0
10.	District Disaster Management Plans	https://www.osdma.org/plan-and-policy/district-disaster-management-plan/#gsc.tab=0
11.	Handbook on Management and Maintenance of Shelters, Government of Odisha	https://www.osdma.org/publication/hand-book-on-management-maintenance-of-shelters/#gsc.tab=0
12.	Memorandum on Cyclone Amphan	https://www.osdma.org/publication/amphan/#gsc.tab=0
13.	Memorandums/DLNA on past disasters	https://www.osdma.org/publication-category/%e0%ac%b8%e0%ad%8d%e0%ac%ae%e0%ac%be%e0%ac%b0%e0%ac%95%e0%ac%aa%e0%ac%a4%e0%ad%8d%e0%ac%b0/#gsc.tab=0
14.	Odisha specific studies/reports on the management of COVID-19 (preparedness and response)	https://www.osdma.org/corona-virus-update/#gsc.tab=0
15.	Census handbook of selected districts	Khordha: https://censusindia.gov.in/2011census/dchb/2117_PART_B_DCHB_KHORDHA.pdf Ganjam: https://censusindia.gov.in/2011census/dchb/2119_PART_B_DCHB_GANJAM.pdf Kendrapada: https://censusindia.gov.in/2011census/dchb/2110_PART_B_DCHB_KENDRAPARA.pdf Puri: https://censusindia.gov.in/2011census/dchb/2118_PART_B_DCHB_PURI.pdf Bhadrak: https://censusindia.gov.in/2011census/dchb/2109_PART_B_DCHB_BHADRAK.pdf Balasore: https://censusindia.gov.in/2011census/dchb/2108_PART_B_DCHB_BALESHWAR.pdf

Annexure 16 List of stakeholders consulted

Bhadrak

1. Ms. Manorama Jali, District Emergency Officer, Bhadrak
2. Mr. Biswanath Nayak, District Project Officer, Disaster Management, Bhadrak
3. Mr. Arvind, Executive (Looking after COVID 19 surveillance and data updating)
4. Dr. Santosh Kumar Patra, Chief District Medical and Public Health Officer (CDM&PHO), Bhadrak
5. Dr. Bharati Raut, District Public Health Officer, Bhadrak
6. Ms. Satarupa Mishra, Hospital Manager, District Headquarter Hospital (DHH), Bhadrak
7. Mr Niranjan Malik, Pharmacist, District Headquarter Hospital, Bhadrak
8. Mr Rajat Kumar Sahoo, Pharmacist, District Headquarter Hospital, Bhadrak
9. Mr. Ramesh Chandra Behra, Fire Station Officer, Bhadrak
10. Mr. Saroj Kumar Pradhan, District Science Supervisor, Department of Education, Bhadrak
11. Mr. Devbrat Mohanty, Counsellor, Ward No. 8, Bhadrak
12. Mr. Pramod Kumar Bhuian, Block Programme Manager, CHC, Barapada
13. Ms. Mansi Mishra, PHC, Ward No. 08, Bhadrak
14. Ms. Ahalyarani, Anganwadi Worker (AWW)
15. Ms. Minatilata Jena, Accredited Social Health Activist (ASHA)
16. Focused Group Discussion at Adiwasi Colony
17. Focused Group Discussion at Ward No. 08
18. Handicraft Workers
19. Ms. Swarnalata Panigrahi, Principal, B.M. Bagurai Government High School

Balasore

1. Mr. P. Soren, Assistant Fire Officer, Balasore
2. Sh. Nilu Mohapatra, Additional District Magistrate, Balasore
3. Mrs. Rizwana, District Emergency Officer, Balasore
4. Ms. Prachitanaya Giri, Additional District Education Officer, Balasore
5. Dr. P. C. Nandi, Additional Public Health Officer, Balasore
6. Focused Group Discussion, Bolang Village, Balasore
7. AWW
8. ASHA
9. Mr. Manoranjan Jena, Secretaty, Shelter Management Committee
10. Multi-Purpose Cyclone Shelter (MPCS), Bolang
11. Dr. Mrutyunjoy Mishra , In-charge, Community Health Centre, Baliapal
12. Mr. Lalit Soreng, Block Development Officer, Baliapal
13. Mr. Sudhnashu Sekhar Mishra, IPS, SP, Balasore

Khordha

1. Pradyumna Kumar Nayak, Block Development Officer, Banpur NAC, 9439266251.
2. Biswaranjan Pati, Chief District Medical Officer, Banpur NAC.
3. Sanghamitra Behera, District Education Officer, Banpur NAC, 9437652225.
4. Joginatha Swain, Assistant Block Education Officer
5. Purna Chandra Baral, Headmaster In-charge, Banpur NAC High School
6. Padmabati Rath, Anganwadi Worker, Muslim Sahi, Ward No.9, Banpur NAC
7. Ulash Mahapatra, Anganwadi Worker, Mali Sahi, Banepur NAC
8. Raj Kishore Ram, Founder of Ma Bhagabati Cane and Bamboo Hasta Silpa Samabaya Samiti, Banpur NAC
9. Bharat Pradhan, Cane and Bamboo artesian, Banpur NAC

Kendrapara

1. Baya Baba Mahila Nadiakata Silp Samabaya Samiti (Ltd).
2. Focused Group Discussion, Akhulipada
3. Multi-Purpose Flood Shelter
4. District Project Officer, Disaster Management, Kendrapara

5. Mr. Dilip Kumar Raut, Assistant Fire Officer, Kendrapara
6. Dr. Anita Patnaik, Chief District Medical and Public Health Officer, Kendrapara
7. Dr. Nrupenbra Kumar Satpati, Consultant, Anaesthesia
8. Mr. Subhashish Sathua, Hospital Manager
9. Mr. Jyoti Prakash Murmem, Constable, Headquarter, Kendrapara
10. Er. Ganesh Chandra Behera, General Manager, District Industries Centre, Kendrapara
11. Mr. Narendra Nath Moharana, Industrial Supervisor, Kendrapara

Puri

1. Mr. Sukanta Das, District Project Officer, Disaster Management, Puri
2. Mr. Pradeep Raut, Assistant Fire Officer, Puri
3. District Programme Manager, National Health Mission, Puri
4. Mr. Himashu Bhushan, Additional District Education Officer, Puri
5. Mr. Santosh Kumar Chaudhary, District Science Supervisor, Puri
6. Mr. Pramod Kumar Kar
7. Block Development Officer, Astaranga
8. Community Health Centre, Astaranga
9. Mr. Gunaneedhi Patnaik, Sahana Project Upper Primary School
10. Focused Group Discussion, Sahana
11. Mr. Subhakar Behera, Honorary Wildlife Warden, Puri