Bangladesh
Tropical Storm/Cyclone

Disaster Summary Sheet – 8 April 2018

The coastal areas of Bangladesh are hit by cyclones almost every year, with the highest wind speed reaching up to 220 km/hr and a tidal range of 3m high that may increase up to 7m further west at the entrance of the Meghna Estuary, to the East of Bhola (UNDP 2010). Cyclone season in the Bay of Bengal, mainly occurs pre and post monsoon season, between April-May and October-November. The most cyclone affected Districts are; Khulna, Patuakhali, Barisal, Noakhali and Chittagong. This region also comprises of small and large offshore islands of Bhola, Hatiya, Sandwip, Manpura, Kutubdia, Maheshkhali, Nijhum Dwip, Urir Char and many other newly formed *char*[1] islands. Annually, between five and six kilometres of the coastlines of Sandwip and Kutubdia islands, as well as between two to three kilometres of Chakoria coastal area, become inundated by high tide or storm surges associated with cyclones (Alam and Collins 2010).

Previous cyclones of the past five years, demonstrate that a pre-monsoon cyclone is twice as likely to occur, than a post-monsoon cyclone. However, a post-monsoon cyclone is likely to have a more devastating impact and be super cyclones.

The storm surges that accompany cyclones cause more destruction than strong winds associated with cyclones. Storm surges are the main cause of death during a cyclone disaster, due to drowning. Further damage is caused by inundation of low-lying coastal areas, erosion, and damage to soil fertility because of saltwater intrusion and damage/loss of buildings and transport networks (WMO 2007). Cyclones that make landfall at high tide create higher storm surges and are therefore more destructive. Tidal bore[2] can also be found in the southern coastal areas of Bangladesh during the months of April-May, and also between September-December. Chittagong, Cox's Bazar, Barisal, Noakhali, Patuakhali, Barguna, and Khulna are high risk areas for tidal bore.

Map 1: Cyclone Trajectories over Risk Area

Humanitarian and Operational constraints

Assessment of needs and distribution of aid may be difficult due to bad weather conditions, flooding of infrastructure and blockage of infrastructure by debris. Every year, the number of people in need exceeds the amount of aid provided by the Government and development partners. Agencies are unable to provide aid to all people in need due to the scale and frequency of disasters.

[1] Highly vulnerable riverine and silt landmasses that are in a constant state of formation and erosion.

[2] A tidal phenomenon in which the leading edge of the incoming tide forms a wave that travels up against the direction of a river or narrow bay's current.

Any question? Please contact our Start Fund Bangladesh analyst, Lamiya Mahpara Ahmed: analyst-start@bd.missions-acf.org / +88 018 8208 6237

Anticipated impact

The impact of a tropical cyclone is largely determined by its wind speed, which can often be fairly well forecasted as cyclones can be seen in the Bay at least six days before landfall. However, the course and duration of the speed of the cyclone can only be known 24 hours before landfall. The stronger the depression, the easier it is to forecast and track a cyclone.

Flooding and heavy rainfall are likely to occur, which can increase the possibility of landslides in the South-eastern Districts of Chittagong, particularly in the hilly areas of Bandarban and Rangamati, where proper infrastructure is already lacking.

Shelter and NFIs: Much of the coastline has primarily two types of housing: *Kutcha* and *Semi-Pucka*. *Kutcha* housing is made of organic materials such as bamboo, mud, jute stick, or catkin grass (Alam et al. 2017). These houses are often unable to withstand the impact of cyclones. Houses made of mud are also prone to collapsed walls if impacted by adverse flooding as well (Dhaka Tribune 17/08/2017).

In the event of cyclones and subsequent flooding, the affected population often shelters on higher ground or an embankment to wait until flood waters recede. This creates dangerous situations for children, as they are at risk of falling in the water when living on narrow strips of land (Plan International 14/08/2017; WHO 2011).

Shelter repair is the main priority in Cox's Bazar, where Rohingya refugees are living in makeshift shelters that are made of plastic sheets, and are unable to withstand the conditions of a cyclone and any consequential hazard (HRP 04/10/2017).

Health: Following a cyclone damage to WASH infrastructure commonly leads to disease outbreaks. Diarrhoea, ARI, and skin-eye-ear infections are common health risks. As many displaced people resort to living under the open sky for protracted periods, they are especially vulnerable to the spread of diseases.

The health system in Cox's Bazar is already overstrained and under staffed due to the recent influx of Rohingya. Treatment for post-disaster diseases and injuries will further overwhelm health services.

The majority of deaths caused by tropical cyclones are due to inundation from storm surges. Prominent causes of death and injury are electrocutions from power lines, collapsing walls, and snake bites.

Food: Flooding and heavy rainfall from cyclones often cause damage to crops, seeds and agricultural land, which may impact upon the quality and quantity of the harvest and exacerbate food insecurity. As the food supply declines, markets face disruption. Subsequently, livelihoods are also disrupted as there is a loss of income opportunities.

WASH: Loss of latrines often result in open defecation; individuals using unimproved sanitation methods are at higher risk of health issues such as diarrhoea, skin infections, and stomach problems. Up to 53% of the coastal region suffers from saline intrusion in surface water, making it difficult to access quality drinking water (Haque 2006). As salinity decreases the amount of available fresh water, people resort to alternative methods to get fresh water. This comprises of the use of filter systems to increase the drinkability of saline water, which poses risks to health (Saha 2017).The risk of disease, such as a cholera, is aggravated in densely populated areas where there have been damages to the WASH infrastructure (WASH Cluster Technical Working Group 01/10/2017). Water contamination is likely to increase in the event of cyclone-induced floods. Faecal matter and animal carcasses may contaminate water sources in the aftermath of a cyclone, leading to an increase in the risk of waterborne disease (ACAPS 04/04/2018).

Protection: Children are vulnerable to exploitation, abuse and violation as they are taking shelter with strangers, or found separated or unaccompanied. Damage to power sources and loss of electricity raise protection issues, particularly for women and children, who risk bring exploited in poorly lit areas. Women and girls often avoid using latrines, as they do not feel safe using non-gender specific facilities. As a result, they often resort to open defecation near their shelters, or control their food and water intake in order to avoid having to use unsegregated WASH facilities. This raises further health concerns.

Livelihood: Amongst the coastal and island communities in the Bay of Bengal most people rely on agriculture and fishing for their livelihoods. Soil fertility is often damaged from saline intrusion due to the flooding of low-lying coastal areas after a tropical storm or cyclone has landed, affecting the planting and harvesting seasons. Saline water also impacts existing aquaculture, apart from Shrimp farms, in the coastal areas. Additionally, non-agricultural productivity is highly impacted due to inundation of land and damages to critical infrastructure.

Nutrition: Due to the high prevailing rates of malnutrition, particularly in Cox's Bazar, the nutrition situation could decline quite quickly after a cyclone. There may not be a direct impact on nutrition, but cyclones generate situations that enhance vulnerability and can result in an increase in malnutrition. Factors such as insufficient hygiene and

inadequate shelter and safe spaces for women to breastfeed may negatively impact nutrition.

Education: School buildings are regularly used as safe havens or cyclone shelters. Past experience has shown that schools used as cyclone shelters, are vulnerable to damage to their infrastructure, learning environment and WASH facilities due to housing a large number of Internally Displaced People (IDP).

Market analysis

Market density in the coastal area is lower than in other parts of Bangladesh, which could create a lack of access to markets, during monsoon or cyclones, as a result of poor market infrastructure (Southern Delta Plan 2013).

Due to the frequency of natural disasters, and general climatic conditions, rice harvest and yields constantly fluctuate. Disasters can have a strong impact on long-term market availability and food security (UNICEF 2009**).**

Impact on critical infrastructure

Cyclones and its associated storm surges often breach embankments, resulting in flooding, as well as prolonged waterlogging (The Daily Star 31/05/2017). This was experienced post- Cyclone Aila and Komen in Chittagong division. The impact of Cyclone Aila, which became a protracted crisis due to the duration of displacement it had caused, can be attributed to broken embankments (ActionAid, Concern WorldWide et al. 2009). Large areas of embankments in Kutubdia, Pekua, Maheskhali, Ramu, and Chakoria were damaged during last year's flooding (Roanu JNA 26/05/2016).

Corrugated Iron (CGI) roofing is not always secured properly onto structures such as latrines and mosques. In the event of heavy winds, improperly secured CGI roofs are likely to fly through the air, posing danger to people in the sites (ACAPS 04/04/2018).

Vulnerable groups affected

Children are at risk of exploitation, abuse and violation. Parents may be busy collecting relief and restoring livelihoods, therefore children are often left unattended for long periods which might increase their vulnerability and exposure to risks.

People with disabilities and older people find leaving their shelters challenging. Similarly, difficult terrain acts as a barrier to accessing cyclone shelters.

In Cox's Bazar, there is an estimated 826,000 Rohingya refugees living in makeshift shelters in settlements and camps (IOM 09/11/2017). The Rohingya are an ethnic, linguistic, and religious minority that have fled persecution from Myanmar, and sought refuge in Bangladesh. They do not have access to Cyclone Shelters due to regulations on permanent structures within the camps, and remain vulnerable to such hazards. Additionally, there are no cyclone shelters within the Rohingya camps. There is limited information on whether Rohingya are allowed to be evacuated to other cyclone shelters. Even if so, there are not enough shelters in Cox's Bazar to protect the host population let alone the huge influx of Rohingya.

There are two ethnic minority groups in Khulna and Satkhira Districts, the Mundas or Mahtas. The Munda/Mahtas, along with Dalits are socially and economically marginalized (Solidarites 2013). Ethnic minorities often have difficulties accessing post-disaster assistance. There are also reports of these groups being unable to access cyclone shelters during evacuations (INTRAC 2010).

Aggravating factors

Environmental Challenges

Due to the funnel shaped coast, Bangladesh recurrently becomes the landing ground of cyclones formed in the Bay of Bengal. A long continental shelf, complex coastal geometry and long tidal range between East and West coasts of Bangladesh are well known factors that allow for the highest storm surges and of the longest duration (BMD 2014). The storm surges gain momentum due to the re-curvature of tropical cyclones in the Bay. As the cyclone moves further north towards the Bangladesh coast, where the bathymetric[3] depth is shallow, the storm surge will become increasingly higher (BMD 2014). Cyclones have a devastating effect on Bangladesh because of the low flat terrain; two thirds of Bangladesh is less than 5 metres below sea level (World Bank 2011). High population density, a lack of maintenance of coastal protection systems, and poorly built houses are significant factors contributing to the impact of cyclones.

Scientific evidence suggests that the rise in ocean surface temperature and rise in sea levels, resulting from climate change, means that the ocean is increasingly having more energy to convert into tropical cyclone wind. Therefore, stronger cyclonic storms in the Bay of Bengal can be expected, though the frequency of cyclones may reduce slightly (The Conversation 20/03/2015).

[3] Bathymetry is the measurement of the depth of water in oceans, rivers, or lakes.

The Sundarbans is of extreme importance to the protection of life and property on the Southwest coast, by forming a natural barrier against cyclones and storm surges. It is a protective margin, which stabilizes the shoreline. However, it is on the frontline of natural disasters, itself. Due to increasing deforestation, the width of the mangrove belt is being diminished, resulting in stronger impact of cyclones i.e. Cyclone Aila. Shrimp and salt farming on the coastal belt contribute to mangrove degradation, deforestation, salt-water intrusion, sedimentation, and pollution (Paul and Vogl 2011).

The large influx of Rohingya in Cox's Bazar has also increased environmental challenges. Due to the increasing population density, Rohingya are contributing to deforestation, overfishing and overcrowding of water sources. Spontaneous human movement have damaged crops, and trees are being felled to be used as cooking fuel in settlements. Poor people also gather firewood from the newly established forest in the *char* islands in Patuakhali, Bhola, and Noakhali, reducing natural defences.

Food Insecurity

The Southwest region is particularly deficient in food diversity. The increase in shrimp farming has led to a reduction in other types of food production.

The tables below lists all Tropical Storm/ Cyclone affected Districts with their respective IPC Chronic Phases from 2014 and 2015. IPC is an Integrated Food Insecurity Phase Classification, through which we can assess areas as IPC Phase 1 (Low Chronic Food Insecurity), Phase 2 (Moderate Chronic Food Insecurity), Phase 3 (High Chronic Food Insecurity), and Phase 4 (Very High Chronic Food Insecurity).

Chronic Analysis IPC Phase[4] (IPC 2014)			
District	**IPC Phase 3**	**District**	**IPC Phase 2**
Pirojpur	3	Feni	2
Satkhira	3	Barisal	2
Khulna	3		
Cox's Bazaar	3		
Noakhali	3		
Bagerhat	3		
Jhalokati	3		
Bhola	3		
Barguna	3		
Patuakhali	3		
Lakshmipur	3		

Chronic Analysis IPC Phase[5] (IPC 2015)					
District	**IPC Phase 4**	**% of People in Phase 3 or higher**	**District**	**IPC Phase 3**	**% of People in Phase 3 or higher**
Bandarban	4	39	Khagrachhari	3	29
			Cox's Bazar	3	27
			Rangamati	3	24

The conclusions of the IPC Chronic Analysis, in the coastal belt, were:

- Access to food is much more limiting than food availability in most districts.
- Dietary diversity for women, and food consumption of households is quite poor in almost every district.
- Children are nutritionally deprived, and the prevalence of chronic energy deficiency among women is very high.

The majority of the cyclone affected districts are classified as IPC Phase 3 (High Chronic Food Insecurity), implying that 20-40% households have a poor/borderline Food Consumption Score and are lacking in livelihood protection (IPC 2016). Additionally, High Chronic Food Insecurity is indicated by a 30-40% prevalence of stunting in the district (IPC 2016).
In Cox's Bazar, as of 15 October, an estimated 17,000 Rohingya children are suffering from severe acute malnutrition (SAM), and 46,000 from moderate acute malnutrition (MAM) (ISCG 15/10/2017). Existing makeshift settlements also had a prevailing GAM rate of 21.2% and SAM rate of 3.6% (UNICEF 08/10/2017).

Poverty and Livelihoods

Poverty is prevalent in the Southern coastal zones, where there is limited crop production as a result of soil salinity and recurrent natural hazards such as cyclones. The coastal and *char* households have the lowest per-capita income in the country.

46% of households in the Southern region are small farmers (with less than 2.5 acres) and 28% of households in the region are agricultural laborers, the highest prevalence

is in the Southwest (Southern Delta Plan 2013). A major impediment for the agricultural sector is the lack of cultivatable arable land due to soil salinity (BBS 2010; Southern Delta Plan 2013). This is due to the introduction of brackish water for shrimp culture, erratic rainfall, consistent tidal intrusion during high tides, and the lack of management of sluice gates.

The main livelihoods amongst the coastal and island populations are agriculture and fishing. The peak cyclone periods occur at the same time as the harvest season. Salt farming is largely concentrated in Cox's Bazar. The main fishing areas are: Barguna where 38% of the households are fishers; Khulna with 29%; and Jhalokati with 26% (Southern Delta Plan 2013). Many farmers and fisherman are hesitant about leaving their means of livelihood and belongings unattended, even if they are aware of the formation of a cyclone (Alam and Collins 2010).

Agricultural laborers experience seasonal unemployment, low demands for labor due to single crop farming, low wage in the lean season (September to October), and high levels of debt. Subsequently, livestock is an important sub-sector for the rural landless and for small farmers, as it provides employment opportunities and a regular monthly income through the sale of meat and dairy products (GoB 2008).

The labour market in Cox's bazar is crowded, and is being further stretched by the influx of Rohingya. Rohingya are formally not allowed to engage in employment, therefore financial access is a key concern for refugees (IRC & Relief International 03/10/2017). This raises tension and protection issues, as Rohingya provided cheaper labour, compromising the host community's access to the labour market and making it difficult to access sustainable livelihoods. An estimated 33% of the host community lives below the poverty line, in Cox's bazar, and 17% live below the extreme poverty line (ISCG 08/10/2017). Labour migration to the cities from the coastal areas, particularly Dhaka, is expected to be driven by livelihood stress. The impacts of migration on women, both those migrating and those staying behind, is not yet sufficiently understood or addressed by national/international policies.

Location and type of housing/infrastructure

High-density settlement in low-lying areas, compounded with poorly constructed housing, increases risks. The most vulnerable shelters are light-weight structures with wooden frames, particularly older structures where the wood has depreciated and the walls have weakened, along with houses made of reinforced or poorly-constructed concrete block (UNDP 2007). Housing made from mud (*kutcha*) are specifically vulnerable to heavy rains and flooding.

District	Type of Structure (%) (Census 2011)			
	Pucka	Semi-pucka	Kutcha	Jhupri
Barguna	5	10	83	3
Patuakhali	5	11	81	3
Pirojpur	7	13	79	2
Bhola	4	14	78	5
Lakshmipur	10	10	78	2
Noakhali	10	10	77	4
Bagerhat	8	14	73	5
Khulna	11	20	66	2
Cox's Bazar	9	14	63	14
Feni	20	5	60	1
Chittagong	21	17	56	7
Satkhira	17	30	51	2

Generally, in cyclone affected areas, a large percentage of the housing is *kutcha* made of corrugated iron roofing, walls made of timber planks or corrugated iron, and bamboo frames, earth floors and clay plinth foundations (IFRC and Red Crescent Societies 2013; Shelter Cluster 2013). An estimated 70% of houses damaged by Cyclone Sidr, in 2007, were *kutcha* housing (IFRC and Red Crescent Societies 2013). Previous assessments show that the priority need for people with damaged homes was cash in order to support the repair. The second priority was corrugated iron and timber.

The coastal and *char* island residents living along the embankments in Chakoria, Kutubdia and Sandwip are mostly landless due to losing their homes several times to coastal erosion (Alam and Collins 2010). An increase in land dispossession, falling economy and insecurity in the rural regions are a few of the motives for poorer households migrating to newly emerged *char* islands, which are highly vulnerable to natural hazards (Gillespie 2010; Raza, Bhattacharjee, Das 2011). Often inadequate land management processes result in poor people building scattered settlements in risky areas with insufficient protection systems in place (Alam and Collins 2010). Vulnerability is exacerbated for households in isolated and scattered settlements due to the likely exclusion from preparedness information.

Heavy rain and landslides threatens the makeshift shelters, made of bamboo and plastic, where Rohingya families are living. Most of the new sites have been built on and around the hillsides of a former wildlife reserve. During Cyclone Mora, around

70% of the makeshift shacks in the Balukhali refugee camp were damaged (Reuters 31/05/2017). There is now a much higher population density, following the influx of around 836,000 Rohingyas since August 2017, implying that damages would be more than double the impact of Cyclone Mora (ISCG 25/03/2018).

Unwillingness/inability to relocate to emergency shelters

Regardless of pre-cyclone alerts, many people choose to not go to cyclone shelters. People fear that their belongings will be stolen, amongst other protection concerns.

The lack of proper transport infrastructure plays a significant role in people's vulnerability to cyclone disasters. Most of the roads near coastal areas are built from earth. During the cyclone period, heavy rainfall and wind damages and destroys transport routes. Cyclone shelters are often remote and scattered, therefore people are reluctant to relocate to far away areas as they do not want to abandon their livelihoods (Alam and Collins 2010). Women and girls are also often concerned with protection and privacy issues in cyclone shelters.

Previous similar disasters

	Cyclone Mora	Cyclone Roanu	Tropical Storm Komen
Date	30 May 2017	21 May 2016	30 July 2015
Affected population	3,300,000	1,203,555	2,600,000
Affected areas	Chittagong District (Swandip, Anwara, Lohogara, Bashkhali), Cox's Bazar District (Chokoria, Teknaf, Maheshkhali, Kutubdia), Rangamati District, Bandarban District (Naikhonchhari), Bhola District	Barisal, Noakhali, Lakshmipur, Chandpur, Cox's Bazar, Bhola, Barguna, Patuakhali, Feni	Chittagong, Cox's Bazar, Noakhali, Feni, Bandarban, Patuakhali, Bhola, Barguna
Priority needs of population	WASH, Shelter, Food Security	Shelter, Food Security, WASH,	Shelter, WASH, Food Security

Each cyclone is distinctive, with different impacts, which makes it difficult to compare. Even if a cyclone does not have a great direct impact or result in a large number of casualties, medium term recovery needs may be high due to consequential waterlogging.

Cox's Bazar and Chittagong have suffered three recent cyclones in the last two years, Cyclone Mora in May 2017, Roanu in May 2016 and Cyclone Komen in July 2015. The makeshift Rohingya settlements were especially vulnerable to damage. An estimated 70- 80% of makeshift shelters in the camps were damaged or destroyed, and 20% of structures, as well as health centres in the official camps, were devastated. These periodic disasters imply that any damage or loss to physical infrastructure may not have been repaired yet (Roanu JNA 26/05/2016). Any future cyclone will exacerbate existing issues. The affected Rohingya and host community population of Cox's Bazar can be expected to face more difficulties in meeting its WASH and health needs throughout the present cyclone season (UNICEF 20/06/2017).

Response capacity

Local and national response capacity

A key aspect of Bangladesh's disaster risk reduction is the Cyclone Preparedness Program (CPP) which was devised by the Government of Bangladesh in collaboration with the United Nations, the International Red Cross and the Bangladesh Red Crescent Society. The Cyclone Preparedness Program includes an early warning system that is activated by the Bangladesh Meteorological Department's radar stations, which are located in Dhaka, Kehpupara and Cox's Bazar.

An estimated 3,763 Cyclone shelters are located within Bangladesh; each reportedly capable of sheltering up to 5,000 people. However, many existing cyclone shelters are in dilapidated condition and fail to provide for the special needs of women and people with disabilities, as well as lack shelter space for livestock (see Map 3 below for reference). Though the early warning and evacuation system is vital in saving lives in Bangladesh, greater precision in forecasting is still needed, particularly regarding landfall location and location specific inundation depth; broadcasting of warnings in local dialects; and raising awareness to promote timely and appropriate evacuation is also needed.

In the event of a disaster, the government usually responds with the distribution of cash and rice for affected communities. Targeting is done by the government in coordination with the Disaster Management Committees (DMCs). Government distributions are increased with support from development partners (UN and NGO). Local government officials try to coordinate these.

Due to the Rohingya Influx in Cox's Bazar, there is currently a high INGO presence in cyclone affected areas. Due to the likely scale of damage in the Rohingya camps in the event of a cyclone resources will be stretched. It is also of concern that much of the human and financial resources will be directed to Cox's Bazar, meanwhile other affected areas risk being overlooked.

Population coping mechanisms

Food prices often rise immediately after the cyclone and the availability of agricultural inputs in the markets are reduced (WFP 03/06/2017).The most commonly identified coping mechanism is borrowing money at a high interest rate (ER Cluster 2013). Additionally, many resort to selling their productive assets, such as livestock.

Every year, between September and October, the coastal region faces a lean season before the harvest period. In order to cope, people reduce the number of meals and food quality and diversity, which results in a rise in the prevalence of malnutrition (IPC 2013). Furthermore, during this time there is an out-migration of male labour.

Limitations, Information gaps and needs

- To understand the impact of a cyclone requires an in-depth understanding of the underlying vulnerabilities. An agreed list of pre-crisis baseline data for all the affected areas is difficult to find. Similarly, granulated pre-crisis baseline data is not yet available.
- As the most common cyclones in Bangladesh can be termed "low-profile" disaster events, there is little publically available evaluation material, which would be informative qualitative secondary data. Information management is a key area where the humanitarian community can play a principal role in providing capacities and needs assessments (UN 30/05/2017).
- There are very few reports illustrating the scale of the recovery gap between cyclones/disasters.
- Time-series records of storm surge height are scarce.

Lessons learned

- The Government of Bangladesh and international communities must prioritise the quick restoration of livelihoods across cyclone-affected areas. They must be more proactive in identifying urgent food security and livelihoods projects that will provide income-generating opportunities for communities, as well as re-establish assets.
- After Cyclone Sidr in 2007, water-borne diseases were managed effectively due to the quick provision of safe water post-cyclone, as well as the rapid distribution of relief goods and shelter material.
- Cash for Work is the most effective way to target vulnerable households, as only the poorest are willing to participate. However, when preparing a Cash for Work response, it must be taken into account that people with disabilities and chronic illnesses may be unable to participate. Cash for Work activities that concentrate on rebuilding and strengthening embankments must ensure adequate technical supervision and standards must be agreed by development partners (UNDP 2012).
- Refurnished shipping containers provide a suitable alternative to permanent structures, for creative spaces and mental health and care practice (Start Fund 2017).
- A policy of distributing all transitional shelter kits to women in the household, can unintentionally result in a growth in child marriage and polygamous marriages, in order to receive more kits (KI Shelter Cluster TWG 2013).
- Transitional shelter responses do not often involve landless families, consequently excluding the most vulnerable members of the community (KI Shelter Cluster TWG 2013).
- Making the distinction between cyclone affected houses and prevalent sub-standard housing may be challenging (Shelter Cluster 2013). Self-recovery is significant in building resilience however monitoring and support in repair should be provided.
- Careful cultivation of coastal vegetation dramatically reduces the impact of storms. During Cyclone Sidr in 2007, mangrove forests in the Sundarbans helped mitigate property damage and reduce the death toll by bearing the brunt of the cyclone winds (The Diplomat 24/07/2017).
- The time of day is a significant factor in the impact of a cyclone. Warnings should be issued before people have gone into their shelters for the night to increase the chance of hearing the message. During cyclone Mora people were alerted late at night, at around 10:00pm, when many people were already in their shelters and asleep. The cyclone struck at 06:00am (The Daily Star 09/06/2017).
- Use trusted information sources to share key messages about what to do in the case of a cyclone. Receiving information through friends/family, religious leaders, and community leaders are some of the highest trusted sources of information. For the Rohingya communities, Majhis and humanitarian workers

were listed as the seventh and eighth most trusted sources, respectively, behind the army (Internews 10/2017).

- Use of technical vocabulary in messages such as “forecasted movement direction” and “time of landfall” leads to misunderstanding and may divert from the significance of the message. Warning messages work best when reduced to essential information that is regularly updated and understood by everyone (Roy and Kovordanyi 2015).
- Cyclone shelters often lack adequate WASH facilities. If toilets are present, they are frequently located downstairs underneath cyclone shelters. This means they risk becoming inundated or inaccessible during cyclones. The lack of safe facilities leads to unsanitary conditions.
- As with other health care activities, reproductive and sexual health care can be cut off after a severe cyclone (Plan International 10/2013). This will be of particular concern for women who go into labour and give birth during and immediately after a cyclone. A traumatic event such as a cyclone may lead to early labour. Based on demographic data and family counting, an estimated 60,000 Rohingya women are pregnant in total.
- Cyclone Mora (2017) hit during Ramadan. Cash based responses should take into account delays that can be incurred by public holidays as banks close. After cyclone Mora, cash based responses to Bangladeshi suffered some delays due to Eid.

Methodology

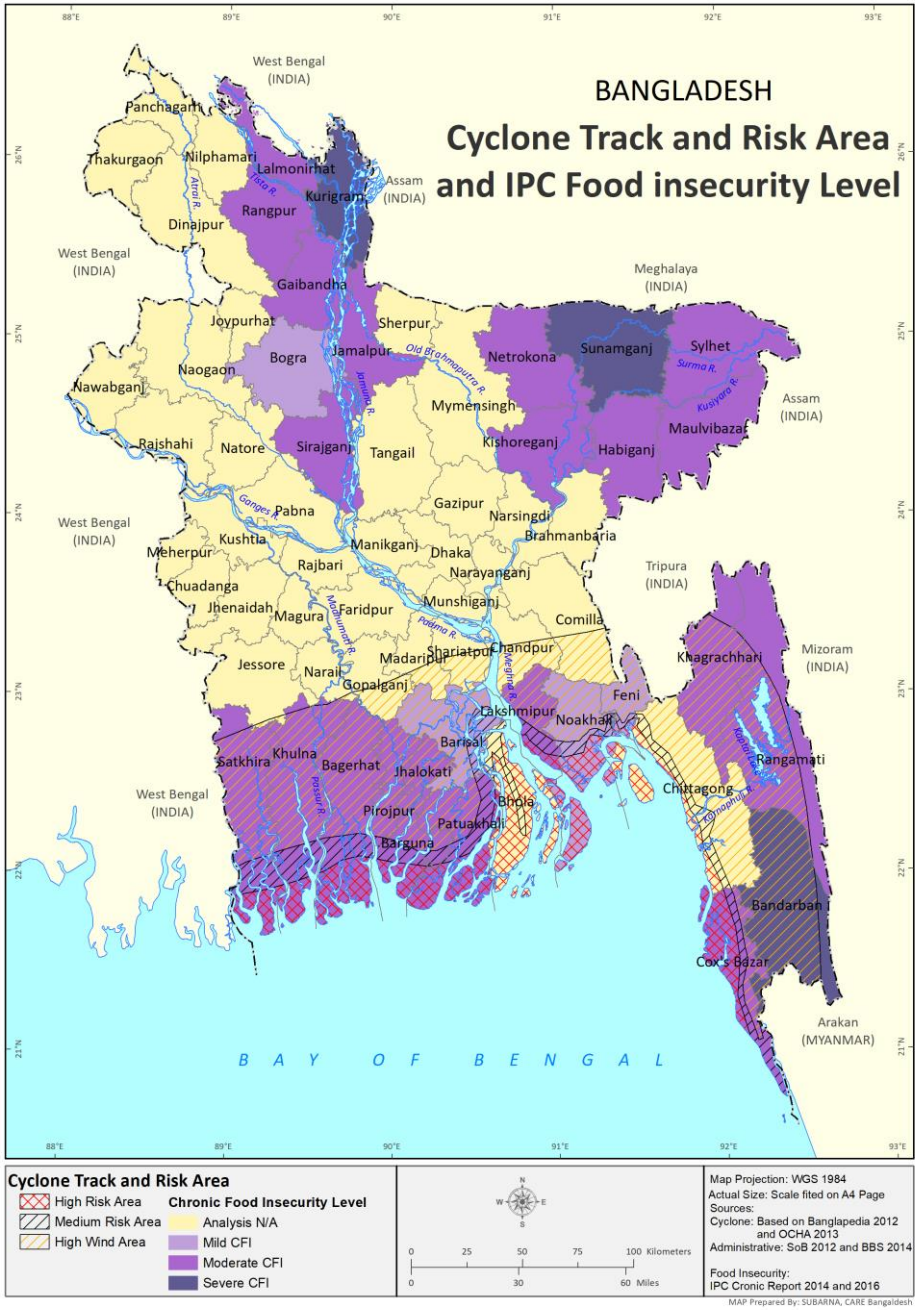
Depending on our scales, the methodology should explain what the scales measure and how. This Briefing Note has been produced by Start Fund Bangladesh and has been prepared using an ACAPS approved methodology. The note aims to understand the overall cyclone situation in Bangladesh; and to inform Start Fund Bangladesh members and relevant stakeholders. The note is based on a review of all secondary data available to analysts by date. The Start Fund Bangladesh thanks all those who have contributed to the note and welcomes additional information that could complement a possible update of this report.

Key characteristics

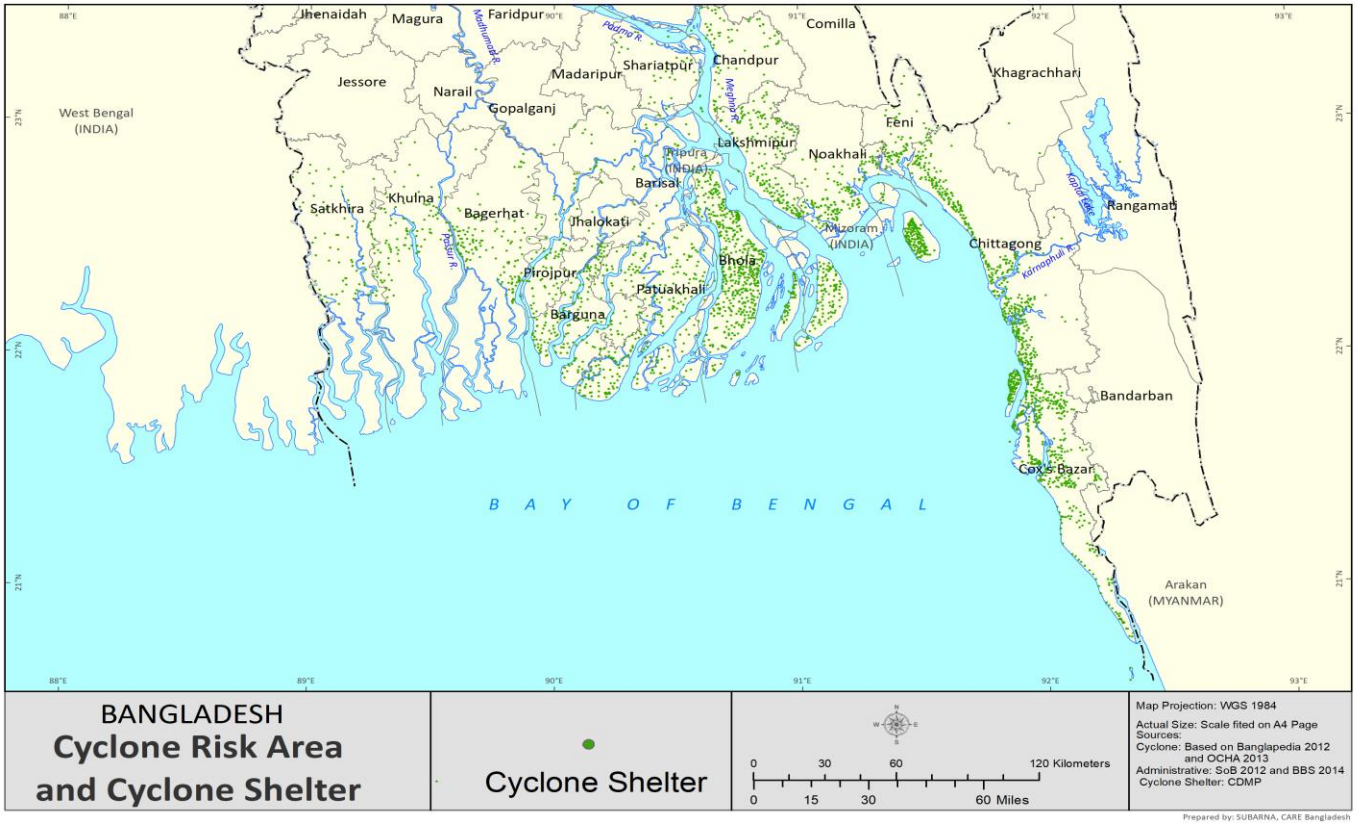
Key indicators	Barguna	Barisal	Bhola	Jhalokati	Patuakhali	Pirojpur	Chittagong	Cox's Bazar	Feni	Lakshmipur	Noakhali	Bagerhat	Khulna	Satkhira
Population density/km² (2011)	490	844	456	900	454	800	1400	7579	1500	1023	740	391	530	483
Female pop Male pop 2011	455,368 437,413	1,187,100 1,137,210	892,726 884,069	353,522 329,147	782,413 753,441	565,029 548,228	3,77,089 3,830,633	1,120,386 1,169,604	743,243 694,128	901,408 827,780	1,622,914 1,485,169	728,091 724,325	1,184,557 1,216465	1,003,182 982,777
% Extreme poverty headcount ratio (2016)	10	40	20	27	15	31	4	16	15	18	3	24	21	30
% Average source of drinking water tube well (2011)	83.02	93.61	95.22	95.22	94.86	72.56	83.28	85.70	89.23	82.82	88.56	49.72	80.28	79.20
% Average source of drinking water tap (2011)	7.26	2.47	1.26	1.02	3.11	7.47	11.45	4.08	7.61	10.24	4.81	12.62	2.56	7.69
% Average non-sanitary toilet facilities (2011)	19.95	16.54	28.67	14.59	23.32	21.64	21.16	33.73	19.92	18.37	20.13	18.65	18.32	37.51
% Severely underweight children (2016)	7	7	9	6	8	6	8	9	8	10	10	7	6	7
% Average Literacy rates (2011)	63.90	65.54	50.69	68.17	59.64	68.63	56.96	43.15	61.63	52.77	56.42	61.22	60.88	53.33
% Disability rates	2.09	1.34	1.33	1.92	1.62	2.01	1.26	1.48	1.34	1.28	1.36	1.73	1.70	1.72

Sources: National statistical systems, Global Population Statistics, UNFPA country profiles, Population Stats, CIA World Factbook, WHO country statistics, World Bank Databank.

Map 2: IPC Food Insecurity Levels in Cyclone Risk Areas



Map 3: Cyclone Shelters over Risk Area



Type of Shelter	Number of Shelter
Moderate usable Shelter	54
Moderate usable Shelter cum Killa	1
Not usable Shelter	260
Not usable Shelter cum Killa	2
PEDP-II	913
Usable Shelter	2494
Usable Shelter cum Killa	35
(blank)	4
Grand Total	**3763**