Bangladesh Shelter Cluster
ShelterCluster.org
Coordinating Humanitarian Shelter

BANGLADESH
EARLY RECOVERY CLUSTER

PHASE 3 SHELTER, WASH, EARLY RECOVERY DETAILED ASSESSMENT

BANGLADESH – TROPICAL STORM MAHASEN

FINAL ASSESSMENT REPORT

18 JUNE 2013

ACKNOWLEDGEMENTS

On behalf of the Shelter, WASH and Early Recovery Clusters, we would like to acknowledge the valuable guidance and support of the Government of Bangladesh, Department of Disaster Management (DDM), Ministry of Disaster Management and Relief (MoDMR). The close collaboration of the Government and the clusters has led to a well-coordinated assessment that has yielded useful and actionable information about the impact of Tropical Storm Mahasen.

Special gratitude is due to the Deputy Commissioners, the Upazila Nirhbahi Officers and the Union Chairmen for their on-the-ground knowledge and assistance in coordinating operations. Additionally, their support in obtaining secondary data and community level perceptions of impact provided invaluable contextualization to the assessment.

We would also like to thank the lead agencies for each District (ACF, DAM, Muslim Aid) and all of the agencies that provided qualified staff for the field data collection part of the assessment (ACF, ASHRAY Foundation, BDRCS, British Red Cross, Caritas, CCDB, Christian Aid, Hope'87 Bangladesh, IFRC, Impact Initiatives, Islamic Relief, Jago Nari, Oxfam, Muslim Aid, Plan International, Saint Bangladesh, SAP Bangladesh, Save the Children, Shushilan, TdH-Netherlands, VOSD, UNICEF, UNDP).

A final thank you to the REACH Initiative for their guidance on the methodology and assistance with the analysis, mapping and report writing.

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ACRONYMS

ACF	Action Against Hunger
BWDB	Bangladesh Water Development Board
CFW	Cash for Work
DAM	Dhaka Ashania Mission
DDM	Department of Disaster Management
DMIC	Disaster Management Information Center
DPHE	Department of Public Health Engineering
GoB	Government of Bangladesh
HCTT	Humanitarian Country Task Team
JNA	Joint Needs Assessment
LGED	Local Government Engineering Department
MoDMR	Ministry of Disaster Management and Relief
ToT	Training of Trainers
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNO	Union Nirbahi Officer
UP	Upazila Parishad
WASH	Water, Sanitation and Hygiene

GEOGRAPHIC CLASSIFICATIONS

Name Used in Report	Definition
Division	Highest form of governance below the national level
District	Major administrative sub-division. Each district is run by a Deputy Commissioner who is appointed by the government.
Upazila	The intermediate tier of regional administration, similar to a county
Union	The lowest administrative classification with an elected chairperson
Ward/Village	The smallest territorial, administrative and social unit

1. EXECUTIVE SUMMARY

1.1. CONTEXT

Tropical storm Mahasen made landfall on May 16, 2013 in the Barisol division of southern Bangladesh. The Government of Bangladesh (GoB) raised a Signal 7 warning, alerting people to take shelter in tropical storm shelters and solid mud-brick structures. As a result of the successful early warning, more than 1 million people living in the storm's path were evacuated to storm shelters leading to a much smaller loss of life than expected. After landfall, the tropical storm quickly weakened and was downgraded to a tropical storm before dissipating over northern Bangladesh[1]. Immediately following the tropical storm, the GoB reported 17 casualties as a result of the tropical storm with 463,303 people directly affected. The Government also reported 23,539 totally destroyed and 109,687 partially damaged shelters[2].

1.2. ASSESSMENT METHODOLOGY

This assessment includes four components of data collection and analysis. First, there are the secondary data sources from the national government and agencies working in the target areas. Second there are the household surveys that serve as the backbone of the assessment. Thirdly, key informant interviews were held among Union and Upazila officials in the target areas. Finally, there is the GIS and mapping component which includes static and web-based interactive mapping of all data collected, collated and analyzed. The use of these different data collection methods further facilitates the cross-verification of field information, which was conducted as part of the analysis.

The sampling methodology included two sampling methods: (1) purposive sampling of most affected districts, upazilas and unions, and (2) random sampling among households within each ward.

Based on the findings of the JNA Phase 1 and affected numbers from the Disaster Management Information Center (DMIC), the top 3 most affected Districts, the top 4 most affected Upazilas within each of those Districts and the top 3 most affected Unions within each of those Upazilas were selected. Within each Union, an average of 9 Wards was assessed and the households within each Ward were randomly selected.

1.3. KEY FINDINGS AND RECOMMENDATIONS

Shelter

- Assessment findings supported by anecdotal evidence suggest that displacement is not a significant concern in this situation. The 3% displacement found in this assessment is likely due to normal seasonal displacement and not resulting from Mahasen, therefore any response could focus on household level activities.
- Housing damage appears to be predominantly to roofing or structural frames although damage has also been sustained to other house components such as walls and foundations, but to a lesser extent. 31% of households have begun repairing and rebuilding their homes, likely with reclaimed materials. Any interventions should employ flexible approaches to material supply although CGI sheeting and timber were among the most requested materials. A combination of material distribution, technical support and capacity building complemented with cash appears to be a suitable response modality
- Those who do not own property, those who own less than 5 decimals of land, and those who occupy land in flood plains or char areas (outside embankments) – will not qualify for government assistance, and therefore remain at risk of insufficient housing. Durable housing solutions are considered unsustainable in these locations due to

[1] UNOCHA Flash update for Tropical storm Mahasen, OCHA Regional Office for Asia and the Pacific, 17 May 2013 <http://reliefweb.int/report/bangladesh/un-ocha-flash-update-7-tropical storm-mahasen-bangladesh-and-myanmar>
[2] DMIC Sitrep, 20 May 2013

recurrent flooding and erosion. Longer term planning should include disaster risk reduction activities such as embankment improvements, disaster resistant housing and evacuation and relocation for these populations.

- Based on the gap analysis no humanitarian agency has yet to plan activities in Bhola district for fully damaged households and, given its remote nature, should have some priority to address or confirm needs in this district.

WASH

- Priority assistance should be in the form of rehabilitating improved sanitation facilities. This could be integrated with a shelter construction/rehabilitation project where the sanitation component should be included or coordinated with an appropriate organization. Support could also be provided in terms of materials for substructure construction (one slab and 5 rings recommended for a total cost of 2,500 BDT). These rehabilitation projects must include DRR components to reduce vulnerability in the future.
- Given the increase in use of surface water and the corresponding increase in symptoms of water-borne disease, complementary assistance could focus on rehabilitating existing tube wells and re-establishing household access to ground water.
- Assessment results revealed that even when households have access to hygiene products such as soap, symptoms of disease are still higher than average following Mahasen. This suggests that households may not be aware of proper use or use the product as frequently as needed to decrease the incidence of disease given the new sanitation situation. This could be solved by integrating WASH messages into other sectors' interventions as well as to conduct a KAP survey to understand current Knowledge, Attitudes and Practices.

Early Recovery

- Cash assistance for livelihood resumption to avoid negative coping strategy targeting the most affected livelihoods is recommended (daily laborers and marginal farmers in Barguna Sadar, Bhola Sadar, Patharghata, Kala Para, Char Fasson and Amtoli). Even though no major change in the source of livelihood was reported due to Mahasen, income levels were reported to have decreased. The number of households earning less than BDT 3,000 has increased from 20% before Mahasen to 60% after; mainly due to May and June being the lean agricultural period, but likely exacerbated by the storm. Most commonly reported impact was agriculture crop damage (pulses, groundnut, homestead vegetables; followed by loss of livestock, *Aman* rice seedling, fisheries, and daily laboring on a smaller scale
- Markets were found to be fully-functional soon after Mahasen. This indicates that cash-based support would be useful to boost local economy and livelihoods. 47% of households have already restarted livelihood activities; 21% will be able to do so within a month; 23% were not sure when they would restart livelihood activities
- Cash for work interventions after the monsoon season is recommended to rehabilitate essential community infrastructure. Fully damaged and partially damaged embankments and sluice gates require immediate repair and rehabilitation. If not addressed in a timely manner, flooding and water logging including intrusion of saline water may lead to longer term impact on the livelihoods and environment. Using CfW could also address lagging livelihood re-instatement and negative coping strategies (11% households reported selling assets; 38% will borrow loans at high interest; 17% of affected HHs will take up alternative livelihood; 13% will migrate outside)
- Considering the vulnerability of the area to tidal surge, storm and cyclone, climate resilient agriculture/livelihoods is recommended
- DRR awareness and preparedness by local communities
- Early warning focusing on saving lives as well as livelihoods to be promoted in the coastal districts

3. Context of Tropical storm Mahasen in Assessment Area

Tropical storm Mahasen made landfall on May 16, 2013 in the Barisol division of southern Bangladesh. The Government of Bangladesh (GoB) raised a Signal 7 warning, alerting people to take shelter in tropical storm shelters and solid mud-brick structures. As a result of the successful early warning, more than 1 million people living in the storm's path were evacuated to storm shelters leading to a much smaller loss of life than expected. After landfall, the tropical storm quickly weakened and was downgraded to a tropical storm before dissipating over northern Bangladesh[3]. Immediately following the tropical storm, the GoB reported 17 casualties as a result of the tropical storm with 463,303 people affected. The Government also reported 23,539 totally destroyed and 109,687 partially damaged shelters[4].

Based on the initial reports of the government and humanitarian agencies on the ground, it was determined that the districts of Barguna, Bhola and Patuakhali were the most affected by the storm. Phase 1 Joint Needs Assessment (JNA) was triggered in order to have an initial overview of needs in the most affected areas. The assessment focused on the districts of Barguna, Bhola and Patuakhali. The JNA Phase 1 found that 1,042,340 people were affected by the cyclone; roughly 25% of the population. It also drew on Disaster Management Information Center (DMIC) figures estimating that a total of 118,792 shelters were damaged, 19,353 of which were classified as full damaged and 99,439 as partially damaged. The assessment estimated that the displaced population at the time ranged from 5,400 to 38,000 people according to Upazila and Union officials. The main needs were identified as livelihood support and food assistance[5]. Based on the Government report and Phase 1 JNA, HCTT endorsed activation of this Phase 3 Shelter, WASH, Early Recovery Detailed Assessment in Barguna, Bhola, and Patuakhali districts. **Table 1** outlines the overall figures of affected households and proportions by Upazila.

Table 1: Overview of Affected Population

District	Upazila	Number of HHs[6]	Affected Households[7]	
			Number of Affected Households	Percentage of Affected HH
Total		**663,482**	**222,815**	**33.58%**
Bhola	Bhola Sadar	88,068	643	0.73%
	Lalmohon	60,988	632	1.04%
	Char Fasson	94,649	73,022	77.15%
	Manpura	17,080	4,580	26.81%
	Sub Total	**260,785**	**78,877**	**30.25%**
Barguna	Barguna Sadar	62,086	32,050	51.62%
	Amtoli (Taltoli)	63,212	43,810	69.31%
	Pathorghatha	43,085	21,345	49.54%
	Betagi	27,922	4,400	15.76%
	Sub Total	**196,305**	**101,605**	**51.76%**
Patuakhali	Patuakhali Sadar	68,813	2,359	3.43%
	Galachipa	80,054	11,350	14.18%
	Kalapara	57,525	20,100	34.94%
	Rangabali	no data	8,524	
	Sub Total	**206,392**	**42,333**	**20.51%**

[3] UNOCHA Flash update for Tropical storm Mahasen, OCHA Regional Office for Asia and the Pacific, 17 May 2013 <http://reliefweb.int/report/bangladesh/un-ocha-flash-update-7-tropical storm-mahasen-bangladesh-and-myanmar>
[4] DMIC Sitrep, 20 May 2013
[5] Joint Needs Assessment Phase 1 Report, Tropical Storm Mahasen, 23 May 2013
[6] Bangladesh 2011 Census
[7] D Form, 10 June 2013

4. ASSESSMENT METHODOLOGY

4.1. OBJECTIVES

The overall objective of this assessment is to assess the shelter, WASH and early recovery situation and needs in the three target districts of Barguna, Bhola and Patuakhali. The specific objectives of this assessment are twofold: (1) to complete an assessment that will provide information on the sector specific (Shelter, WASH, Early Recovery) impact of Mahasen, and (2) to share the results to support a planned and coordinated response in the Mahasen affected locations.

4.2. COORDINATION BETWEEN GOVERNMENT, CLUSTERS & AGENCIES

This assessment is the result of a collaborative structure led by the GoB in partnership with the Shelter, WASH and Early Recovery Clusters in Bangladesh. At the field level, individual agencies coordinated field operations for each assessed District. In Barguna, Action Against Hunger (ACF) led data collection teams consisting of staff from cluster members, while in Bhola, Muslim Aid took the lead and in Patuakhali, Dhaka Ashania Mission (DAM) was the lead agency. Each cluster's Technical Working Group (TWG) then validated the findings and assisted the cluster leads with analysis support. The REACH Initiative supported the process by providing guidance on the methodology and technical expertise in database management and the analysis process.

4.3. GENERAL METHODOLOGY

This assessment includes four components of data collection and analysis. First, there are the secondary data sources from the national government and agencies working in the target areas. Second there are the household surveys that serve as the backbone of the assessment. Thirdly, key informant interviews were held among Union and Upazila officials in the target areas. Finally, there is the GIS and mapping component which includes static and web-based interactive mapping of all data collected, collated and analyzed. The use of these different data collection methods further facilitates the cross-verification of field information, which was conducted as part of the analysis.

Secondary data: The assessment team reviewed secondary data from national government sources, such as DMIC sitreps, census data, GoB D Forms as well as international sources, such as UNOCHA and the World Bank. The JNA Phase 1 report and databases were used to inform sampling and background information for the assessment. This information has been integrated into the analysis of the primary data for this assessment report.

Household surveys: The assessment coordination team designed a household survey for households located in tropical storm affected areas with the support of relevant clusters. This included demographic information on the households, socio-economic household data, as well as sector-specific questions on shelter, WASH and early recovery. See **Annex 2** for the assessment questionnaire. The purpose was to generate specific data to inform the needs and type of projects required, and to assess the level of vulnerability of households affected. The assessment team sought wide coverage of the affected areas, with 4615 hosuehold surveyed in the targeted areas and a statistically representative sample size at the upazila level.

The sampling methodology included two sampling methods: (1) purposive sampling of most affected districts, upazilas and unions, and (2) random sampling among households within each ward.

Based on the findings of the JNA Phase 1 and affected numbers from DMIC, the top 3 most affected Districts, the top 4 most affected Upazilas within each of those Districts and the top 3 most affected Unions within each of those Upazilas were selected. Within each Union, an average of 9 Wards was assessed and the households within each Ward were randomly selected. Random selection of households within each Ward was accomplished in the field following the following steps:

1. acquiring the total number of households per Ward (both affected and non-affected) from the Union Chairman

2. dividing the total number of households in the Ward by the number of households sampled per Ward (usually 14), effectively providing the interval at which the enumerator must sample the households (i.e. the number of houses to skip)
3. beginning at a central point in the Ward (e.g. school, central water point, mosque)
4. dropping a pencil on the ground to define the direction in which the enumerator will walk
5. skipping the number of houses defined by the interval until reaching the target number of households (usually 14)

Key informant interviews: Key informant interviews (KIIs) were held with relevant government officials. A total of four KII forms were used to capture information from: Upazila Nirbahi Officers (UNO) and Union Parishad (UP) Chairmen, Department of Public Health Engineering (DPHE) and Health Officers, Local Government Engineering Department (LGED) and Bangladesh Water Development Board (BWDB) Officers and District Forest Officers. This information was used to contextualize the situation and assess community-level priorities and needs.

GIS and mapping: Multiple scales of mapping have been undertaken to inform the assessment in the planning and implementation stages, to support the dissemination of data collected by the assessment, as well as to support the identification of priority areas. In partnership with a team of technical experts from the REACH Initiative, assessment data was incorporated into static and web based maps. The web-based interactive map is also being made available with data being updated on an ongoing basis (see www.sheltercluster.org).

4.4. Assessment Area

The assessment area was defined by the JNA Phase 1 assessment that identified the most affected Districts, Upazilas and Unions. According to the JNA Phase 1 and DMIC data, Barguna, Bhola and Patuakhali were the most affected Districts. Within each one of these Districts, the four most highly affected Upazilas were chosen followed by the three most affected Unions within each Upazila. Households within nine Wards in each Union were sampled according to the sampling methodology explained in **Section 4.3** of this report.

Generalizing Results and Statistical Analysis

This assessment used a purposive sampling method to target most affected Districts, Upazilas and Unions. Households were then randomly sampled from within each Ward with a representative sample at the Upazila level. This allows for a statistically relevant analysis of affected households across all affected Upazilas, as 87% of the affected population lies within the assessed areas. The following generalizations can be made: (1) across the three assessed Districts; (2) across the twelve assessed Upazilas; (3) across all affected Districts; (4) across all affected Upazilas. Results are indicative at the Union level for those Unions that were assessed. Limitations in generalizing the analysis are outlined in **Section 4.7**.

4.5. Training, Logistics and Human Resources

All training, logistics and human resources were coordinated and managed by the core assessment team consisting of representatives of the three clusters. Once the assessment was launched, a Training of Trainers (ToT) conducted by the core assessment team took place on May 27, 2013. These trainers were then sent to the field to conduct a training with the field enumerators on May 28. Field enumerators consisted of staff from local and international agencies working in the target areas. A full list of agencies and staff who participated in the primary data collection is attached (Annex 3). All logistics were coordinated by the lead agencies for each district and the required vehicles were sourced from agencies participating in the assessment.

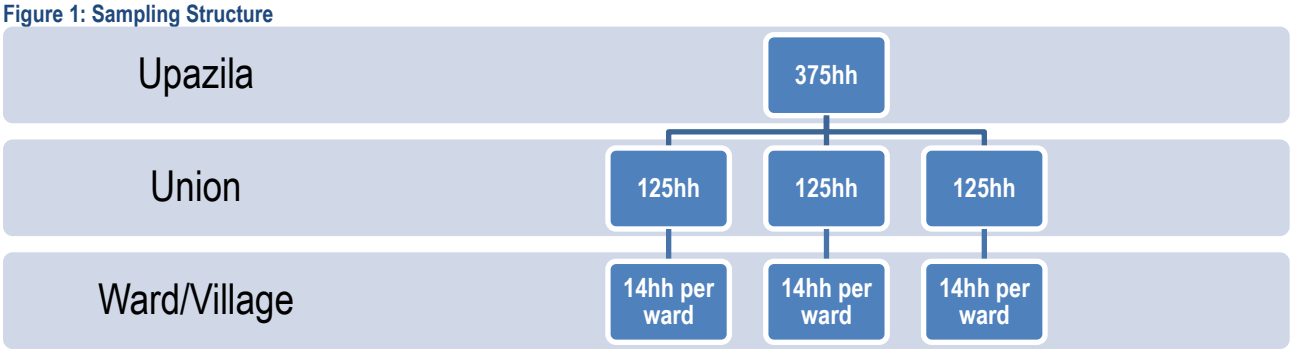
4.6. SCOPE OF ASSESSMENT

Table 2 shows the sampled locations and their corresponding sample sizes. The target sample size for each target administrative level was: (1) District: 1500; (2) Upazila: 375; (3) Union: 125; (4) Ward: 14. **Figure 1** illustrates this sampling breakdown. **Map 1** also shows the geographic location of all assessed areas with red hash shading.

Table 2: Sampled Locations

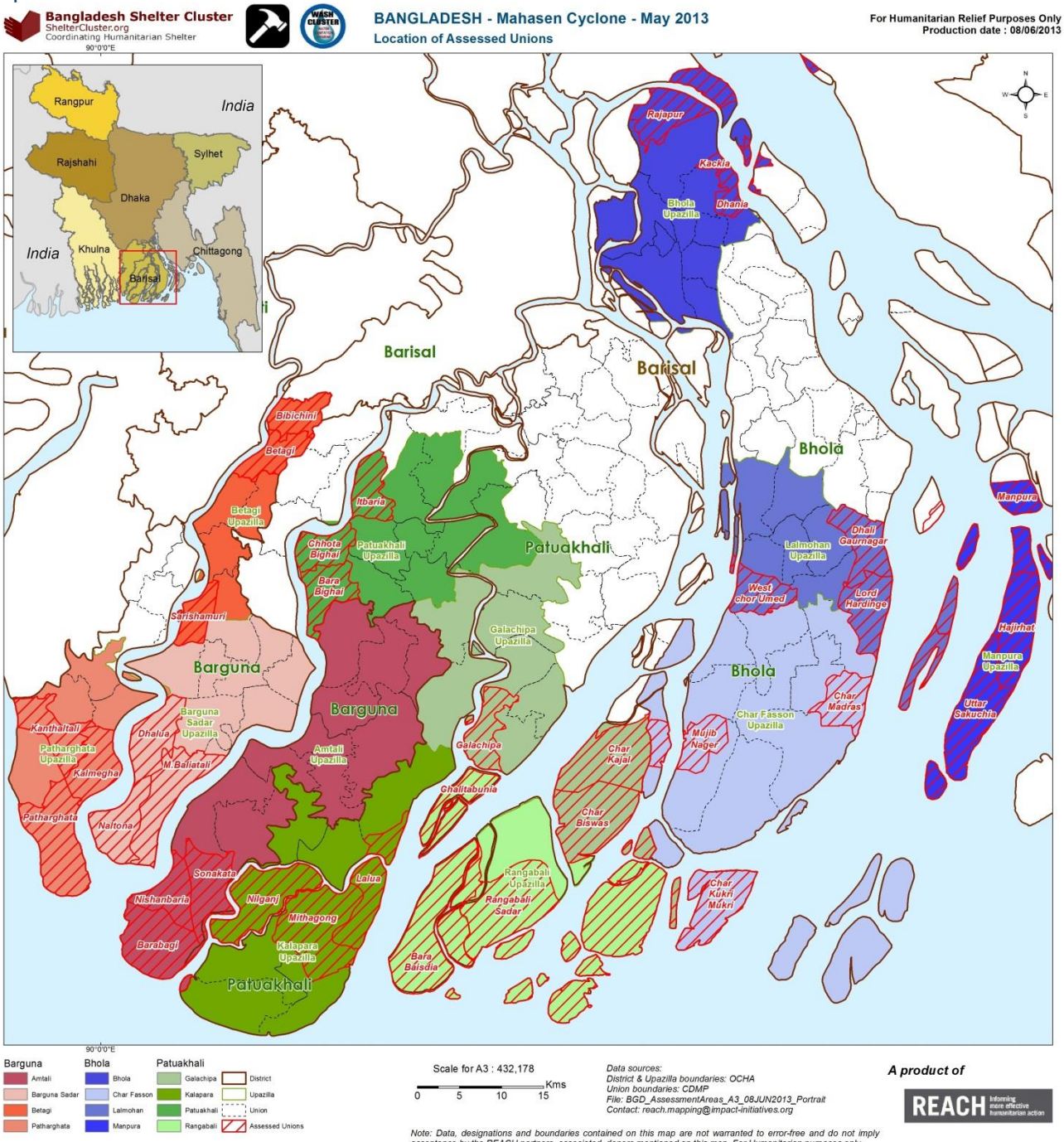
District	Upazila	Union	No. HHs[8]	HHs Surveyed[9]
Barguna	Barguna Sadar	Naltona	4828	128
		M. Baliatali	7093	128
		Dhalua	6082	132
	Betagi	Betagi	3787	126
		Bibichini	3991	133
		Sarishamuri	3582	128
	Patharghata	Patharghata	7242	144
		Kanthaltali	5137	132
		Kalmegha	6939	118
	Amtali (Taltolli)	Nishanbaria	3226	129
		Sonakata	2921	108
		Barabagi	4321	124
Bhola	Bhola Sadar	Rajapur	8910	150
		Kachia	3131	110
		Dhania	6456	138
	Char Fasson	Char Kukri Mukr	1727	138
		Mujib Nagar	1993	118
		Char Madras	7045	135
	Lalmohan	Lord Hardinze	5577	133
		Dhali Gaurnagar	8692	131
		Paschim Char Umed	7711	132
	Manpura	Hazirhat	5535	139
		Manpura	4479	126
		Uttar Sakuchia	3795	121
Patuakali	Patuakhali Sadar	Boro Bighai	4473	118
		Chhoto Bighai	4220	126
		Itbaria	4492	126
	Galachipa	Char Kajal	5376	115
		Char Biswas	4188	149
		Galachipa Sadar	4259	127
	Kala Para	Nilganj	7282	130
		Mitiganj	2844	128
		Lalua	5313	123
	Rangabali	Boro Bisdia	5669	127
		Rangabali Sadar	6830	105
		Chalitabunia	1646	140
TOTAL				**4615**

Figure 1: Sampling Structure



[8] Bangladesh 2011 Census
[9] The target number of sampled households per Union was 125. These figures represent the actual number of households surveyed per Union.

Map 1: Assessed Areas



4.7. LIMITATIONS OF ASSESSMENT

While every effort was made to ensure that this assessment yielded the highest quality data with the lowest incidence of error, there were a few constraints that limit the internal and external validity of the results:

1. **Sampling bias**: Due to the fact that the sampling methodology consisted of purposive sampling among the most affected Districts, Upazilas and Unions, the assessment sample was highly biased toward the most affected households of the population. In other words, members of the population that were not affected were less likely to be included in the sample. This affects both the internal and external validity of the assessment, limiting the generalizability of the findings to the affected population. Given that 87% of the affected population is represented in the areas sampled, the results are valid for only the affected population. Generalizing beyond the affected population is not possible.
2. **Questionnaire limitations**: The questionnaire had some systemic issues as well as translation problems. Some of the questions in the questionnaire were clearly biased toward affected households and did not have an option for households to respond with answers consistent with not being affected by the tropical storm. This likely had an effect on biasing the results. Furthermore, some of the translations from English into Bangla did not retain the original English meaning. Some questions also were not translated into Bangla, calling into question whether all enumerators understood the meaning of the questions enough to record correctly. These issues likely introduced error into the results that would not normally have been present.
3. **Logistics**: Due to poor weather and high waters, some areas that were originally planned to be assessed could not be accessed. This only applied to a few Wards and the households from those Wards were distributed among other more accessible Wards. This did limit the distribution across a few of the Unions, however.
4. **Seasonal effects**: The assessment happened to take place during a period of particularly poor weather while also coinciding with seasonal tidal surges and the agricultural lean season. These external impacts were not measured by the assessment, thus they cannot be separated from the possible Mahasen-imposed impacts. This likely led to greater livelihood damage numbers among the assessed population.

5. Cross-Cutting Assessment Results

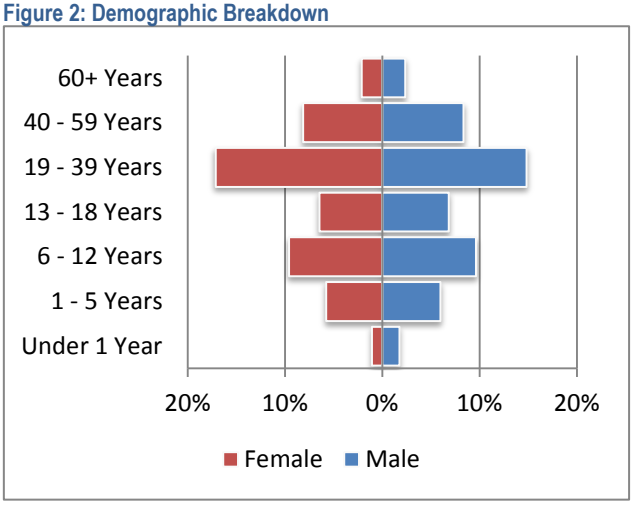
5.1. Demographic Characteristics

Key Statistics

- Hindu largest minority group in assessed areas
- 8% of households in Patuakhali report women of child-bearing age as being pregnant
- 66% of all reported disabilities were among men; most commonly physical disabilities

A total number of 4,615 households were assessed for this assessment. The proportion of male to female household members was nearly 50%. The largest age cohort was 19-39 years old, with slightly more females within this cohort than males. **Figure 2** illustrates the demographic breakdown of assessed households.

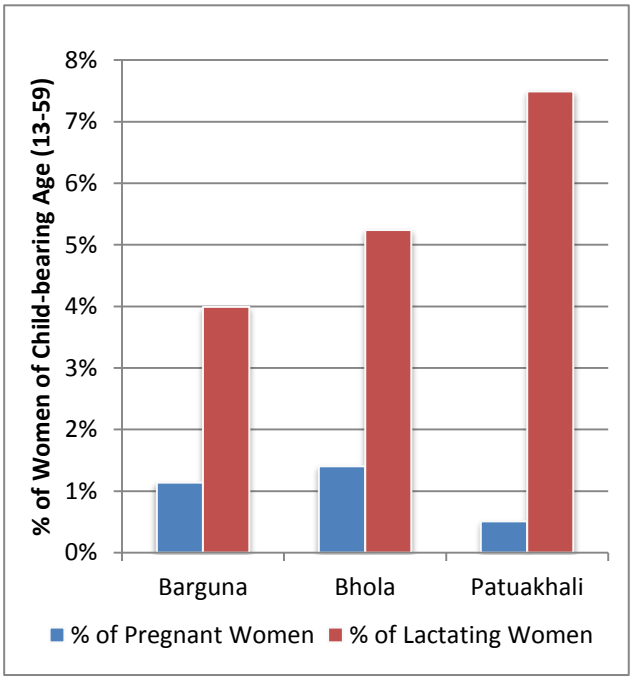
Figure 2: Demographic Breakdown



Among all women of child-bearing age (13-59), households in Patuakhali reported having the most numbers of lactating women at nearly 8% of all women of child-bearing age. Unsurprisingly, households in Pautakhali also reported having the least number of pregnant women among the assessed Districts, at 0.5%. **Figure 3** shows the percentages of pregnant and lactating women within each district. There are nearly equal numbers of pregnant women in Barguna and Bhola.

The largest minority group across all assessed areas was Hindu, with the largest concentrations in the Upazilas of Betagi, Manpura and Patharghata. Numbers for all other minority groups were minimal.

Figure 3: Pregnant & Lactating Women



Across all Upazilas, the incidence of disability was much more common among men than women, with 66% of all reported disabilities being among men. As can be seen in **Figure 4**, Bhola Sadar and Betagi have high incidences of male physical disability at 6.5% and 9%, respectively. This was also the most common disability type reported across all Upazilas. Women with physical disabilities also had higher than average reported numbers in Bhola Sadar and Betagi Upazilas.

5.2. Socio Economic Context

Key Statistics

- 96% of assessed households live in rural areas
- 75% of households live on char and coastal areas
- Households reporting "no income" increased 257% from before the storm

96% of assessed households live in rural areas. This can be generalized to all affected Upazilas and Districts (i.e. the most affected households live in rural areas). A very large number of households have lived in their current location for more than 15 years (77%) with another 15% having lived in their current location for 5-15 years. This has a direct influence on the types and establishment of livelihoods as well as the types of shelters constructed. The assumption would be that shelters and livelihoods would be better established and more able to withstand repeated storms. The next section will cover these issues.

Figure 5: Land Type

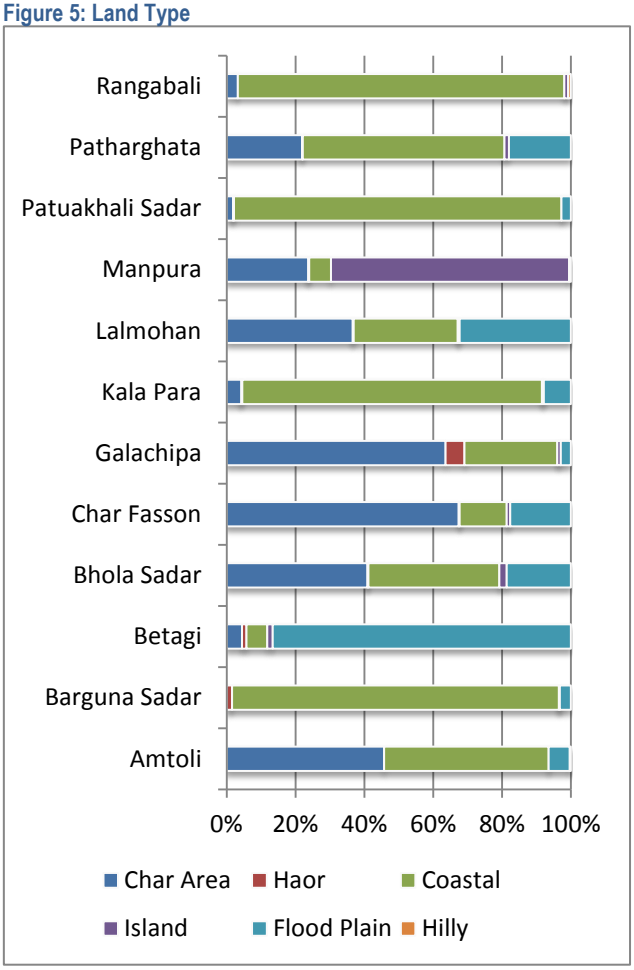
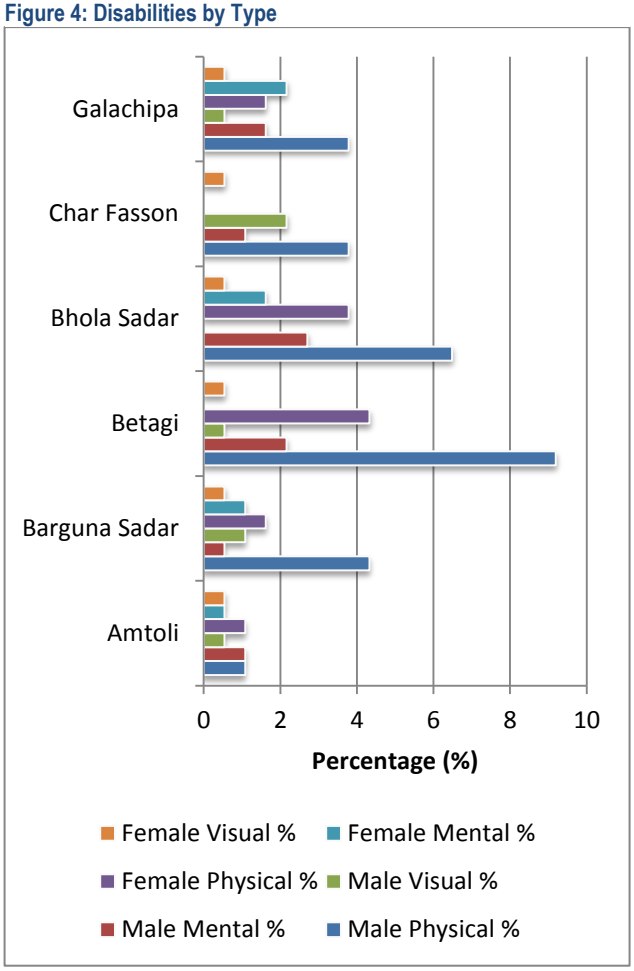
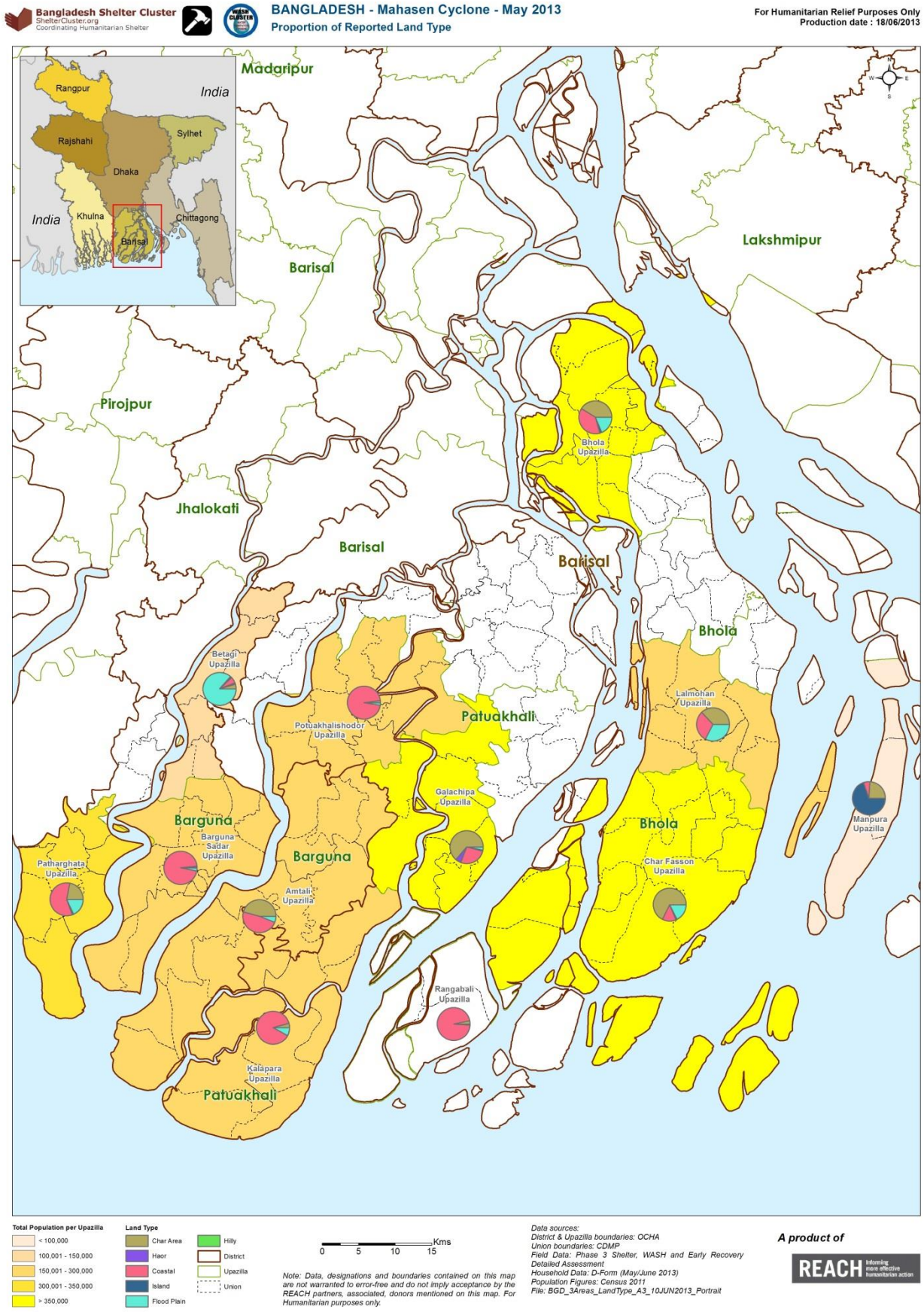


Figure 4: Disabilities by Type



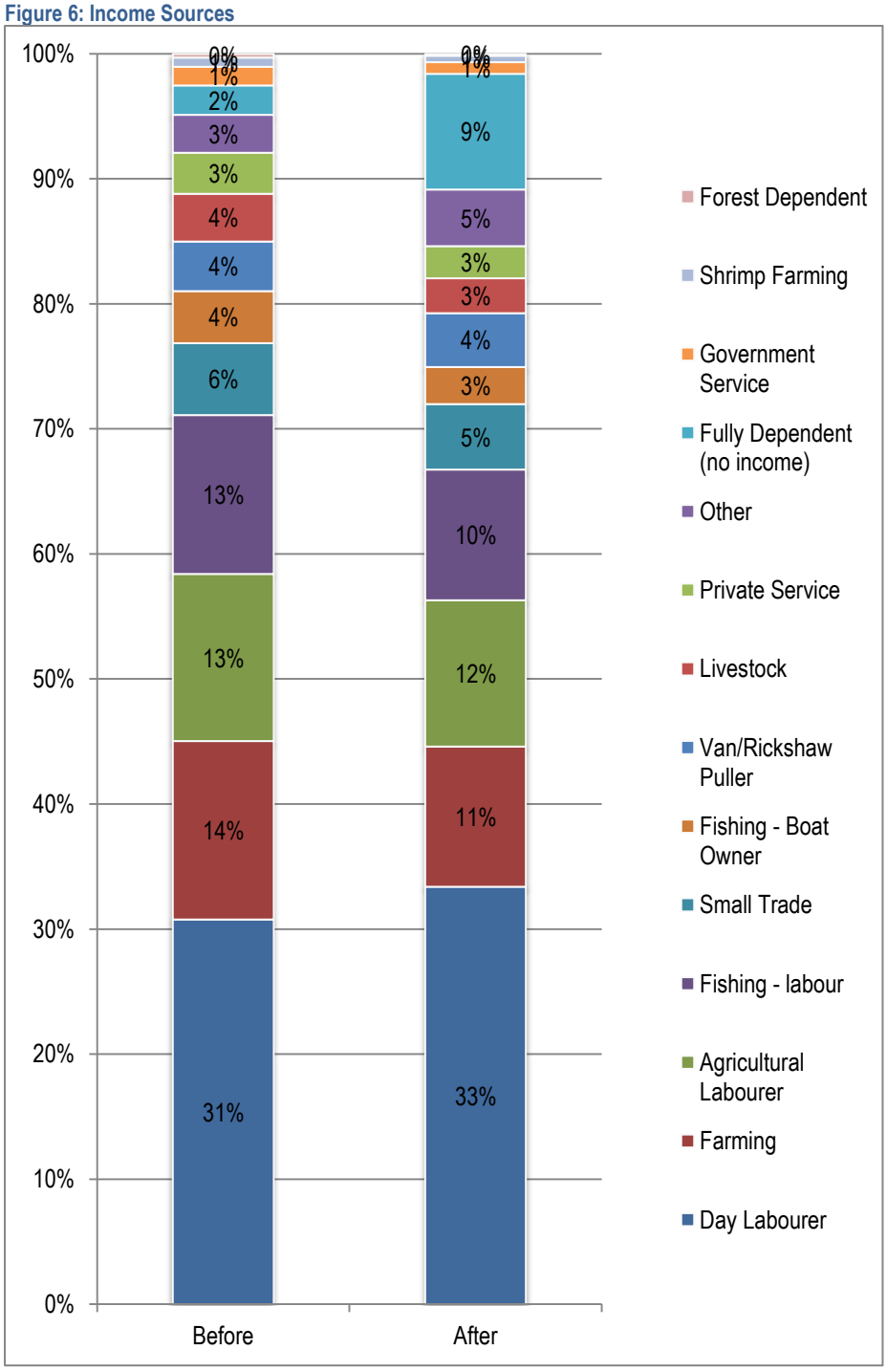
The majority of households live in *Char* (islands of silt within rivers) and coastal areas – 75%. These areas are tropical storm and flood-prone and often among some of the poorest households in the region. **Figure 5** illustrates that the only notable outliers among this trend are Manpura and Betagi Upazilas. Manpura is an island, thus is categorized as an island land type, while Betagi sits on a wide flood plain. **Map 2** also illustrates this trend geographically.

Map 2: Reported Land Types



Very little change occurred in the assessed areas after the Tropical Storm Mahasen compared to before, as seen in **Figure 6**. The sources of income remained largely the same, with the exception of the category "no income," which increased 257% compared with before the storm. Income levels were reported to have decreased after Mahasen with the proportion of households earning less than BDT 3,000 increasing from 20% before Mahasen to 60% after. This is likely not directly linked to Mahasen but due to month of May and June being the lean period in these districts. The most common income source remained day laborer, followed by farming, agricultural labor and fishing (fish culture as well as sea fishing).

Figure 6: Income Sources



6. Sector-Specific Assessment Results

6.1. Shelter Sector

Key Shelter Statistics

Table of statistics

District	Pop.	Damage				Vulnerability		Self Recovery
	# of HH	Fully	Partially	% HH with fully or partially damaged	Poverty Rate	% HH living on char or flood plains and do not own land	% HH with < 10 Decimals of land	% HH who have begun to rebuild and repair
Bhola	372,723	4,957	19,389	6.5%	41.66%	15%	36%	41%
Patuakhali	346,462	10,597	28,665	11.3%	34.54%	8%	10%	31%
Barguna	215,842	6,856	61,812	31.8%	51.13%	20%	33%	22%
Totals	**935,027**	**22,410**	**109 866**	**14.1%**	**42.33%**	**15%**	**25%**	**31%**

Other relevant figures:

- 97% of families report not being displaced.

Key Recommendations

- Assessment findings supported by anecdotal evidence suggest that displacement is not a significant concern in this situation. The 3% displacement found in this assessment is likely due to normal seasonal displacement and not resulting from Mahasen, therefore any response could focus on household level activities.
- Housing damage appears to be predominantly to roofing or structural frames although damage has also been sustained to other house components such as walls and foundations, but to a lesser extent. 31% of households have begun rebuilding their homes, likely with reclaimed materials. Any interventions should employ flexible approaches to material supply although CGI sheeting and timber were among the most requested materials. A combination of material distribution complemented with cash appears to be a suitable response modality.
- Those who do not own property, those who own less than 5 decimals of land, and those who occupy land in flood plains or char areas (outside embankments) – will not qualify for government assistance, and therefore remain at risk of insufficient housing. Durable housing solutions are considered unsustainable in these locations due to recurrent flooding and erosion. Longer term planning should include disaster risk reduction activities such as embankment improvements, disaster resistant housing and evacuation and relocation for these populations.
- Based on the gap analysis no humanitarian agency has yet to plan activities in Bhola district for fully damaged households and, given its remote nature, should have some priority to address or confirm needs in this district

Observed Impacts on Shelter

Due to the limitations of the sampling methods employed in this assessment discussed in **Section 4.7**, the findings do not confidently distinguish between housing damage that was directly related to Mahasen impacts and substandard housing that appear to be a chronic factor in the affected areas. As a result, absolute values for damage levels and locations are indeterminate. Assessment data can, however, be used to express trends that can be used to inform operational response planning by describing typical damage sustained to housing, what building elements tended to fail, the vulnerabilities that may be present, and what locations may be particularly affected. The following outlines findings that can be used as evidence to support those plans and beneficiary selection criteria.

Displaced Populations: Overall, 97% of households are currently living in the same location they were living before Tropical storm Mahasen, having returned from storm shelters in the days that followed (see **Figure 7** for disaggregated values at Upazila level). Anecdotal evidence supports this understanding while local knowledge suggests that the small numbers of respondents who did indicate displacement (3% overall) are likely in natural migration patterns due to seasonal changes in livelihood, particularly in agricultural sectors. Therefore, displacement does not appear to be a factor to consider for response planning. As a result, it is recommended that any potential interventions to these communities should focus on activities at the household level rather than work toward household return, host family support, or collective center support. With that said, the JNA Phase 1 did report spontaneous settlements in Bhola. It is possible that some of these are located in Bhola Sadar given the larger than average reported displacement. This should be confirmed.

Figure 7: Household Displacement

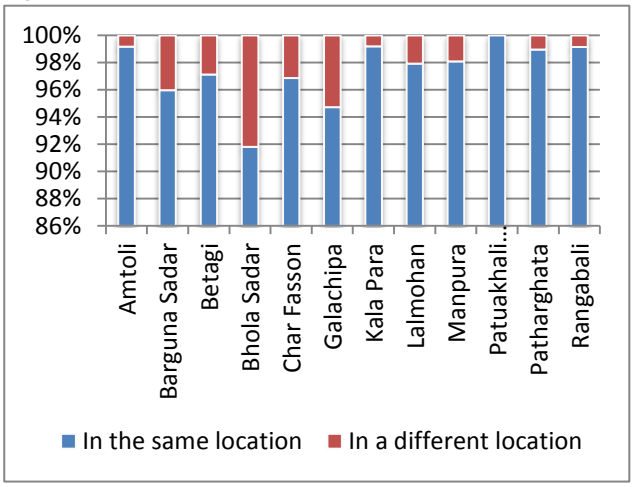


Table 3: Housing Types Before Mahasen

	% Pucca	% Semi-Pucca	% Traditional	% Jhupri
2011 Census	2%	6%	88%	4%
Amtoli	0%	1%	94%	5%
Barguna Sadar	0%	0%	99%	1%
Betagi	0%	0%	99%	0%
Patharghata	0%	2%	92%	6%
Bhola Sada	1%	1%	95%	3%
Char Fasson	0%	3%	88%	8%
Lalmohan	0%	2%	89%	10%
Manpura	0%	1%	75%	24%
Galachipa	1%	1%	98%	0%
Kala Para	0%	0%	100%	0%
Patuakhali Sadar	0%	1%	99%	0%
Rangabali	1%	1%	97%	1%

Vernacular housing types and construction methods: A full 94% of households across all Upazilas reported living in a traditional house before the storm (see **Table 3**). This is generally consistant with the data in the 2011 Census with the exception of Bhola District (Manpura, Lalmohan and Char Fasson) who have higher percentages of Jhupri houses in this assessment. The high percentage of Jhupri houses in Manpura could be explained by the fact that Manpura is an island. Given that the majority of households have returned to their previous homes (see *Displaced Populations* above), the majority of houses inhabited by affected households are traditional houses. The most common types of materials these traditional houses are made of include: (1) a CGI roof, (2) CGI sheets or timber planks for walls, (3) timber or a small number of bamboo for the frame, (4) earth floor and (5) a clay plinth foundation. When traditional housing is damaged there is a reasonably high ability to reclaim roofing CGI sheets, timber framing and some wall materials. Therefore, it could be assumed that a majority of affected households will have some access to these more durable materials which they have been able to salvage. **Photo 1** shows a traditional house being rebuilt with reclaimed materials.

Photo 1: House Being Rebuilt with Reclaimed Materials

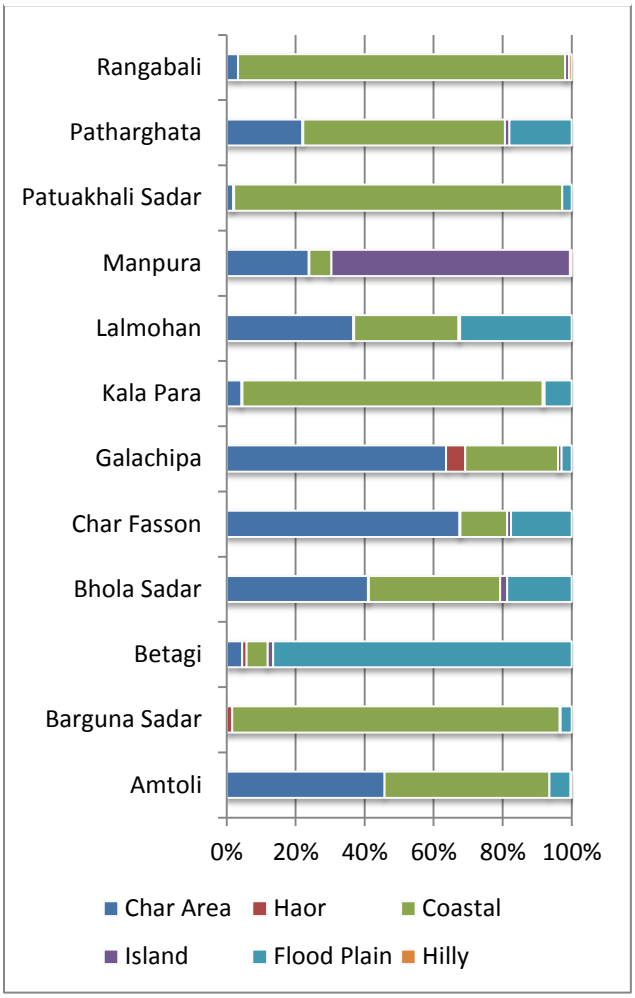
Examination of damage types reveals that regardless of construction method or location, roofs and structure are the dominant failures of the houses examined, although damage to walls and foundations/plinths is also seen (see table xxx). It is difficult to discern or disaggregate what elements failed as a result of impacts of Mahasen and what are generally poor housing construction methods, particularly as it applies to those identified as "partially damaged". However, clearly there are needs to improve housing and any future interventions should employ flexible approaches that can address a wide variety of construction problems that affected communities may experience and adapt repair to several types of housing damage particularly to fully damaged houses that are not addressed in government interventions.

Table 4: Damage by Housing Element

	% with roofing damage	% with Wall Damage	% with Structural Damage	% with Foundation damage
Amtoli	66%	55%	74%	34%
Barguna Sadar	79%	48%	65%	28%
Betagi	63%	49%	79%	19%
Patharghata	68%	100%	100%	65%
Bhola Sada	77%	79%	93%	59%
Char Fasson	95%	27%	29%	7%
Lalmohan	46%	27%	46%	31%
Manpura	70%	23%	43%	35%
Galachipa	95%	18%	41%	32%
Kala Para	56%	36%	72%	13%
Patakhali	78%	26%	57%	55%
Rangabali	55%	22%	21%	18%

***Land and property insecurity and settlement areas**:* Private ownership is the most common tenure type among assessed households, at 87%. Bhola Sadar, Lalmohan and Manpura report higher than average numbers of squatter households at 27%, 18% and 13%, respectively. For at least Lamohan and Manpura, this may be related to the shelter type reported before Mahasen. Higher proportions of Jhupri houses were reported with 42% in Manpura and 17% in Lalmohan. In relation to the majority of households reporting private ownership, 84% of households claim that they still hold legal papers to their shelter.

Figure 8: Land Type by Upazila



A relatively small number of households in Barguna and Patuakhali (16% and 10%, repsectively) report feeling threatened by eviction. 41% of households in Bhola District, however, report a threat of eviction. The definition of eviction for this assessment, however, was ambiguous and could have been comfused with the term "evacuation". With that said, the statistically significant difference among household repsonses in Bhola is worth exploring. One possible explanation could be that 54% of all reported households that live in char areas were located in Bhola District.

The large proportion of households live in *char* areas (islands of silt within rivers), flood plains, and coastal areas (75%). These areas are tropical storm and flood-prone and often are where some of the poorest households in the region reside. **Figure 5** illustrates that the only notable outliers among this trend are Manpura and Betagi Upazilas. Manpura is an island, thus is categorized as an island land type, while Betagi sits on a wide flood plain.

Table 5: Household Ownership Types

District	Upazila	% HH who own their own house	% HH who do not own their own land	% HH who live in Char areas or Flood plains	% HH who own <10 decimals of land
Barguna	Amtoli	84%	48%	52%	23%
Barguna	Barguna Sadar	95%	34%	3%	44%
Barguna	Betagi	99%	44%	91%	47%
Barguna	Patharghata	88%	51%	40%	15%
Bhola	Bhola Sada	62%	47%	60%	17%
Bhola	Char Fasson	78%	52%	85%	41%
Bhola	Lalmohan	80%	26%	69%	46%
Bhola	Manpura	64%	57%	24%	19%
Patuakhali	Galachipa	96%	45%	66%	3%
Patuakhali	Kala Para	100%	41%	12%	11%
Patuakhali	Patakhali	99%	25%	5%	19%
Patuakhali	Rangabali	96%	41%	3%	1%
	Average	**87%**	**42%**	**43%**	**25%**

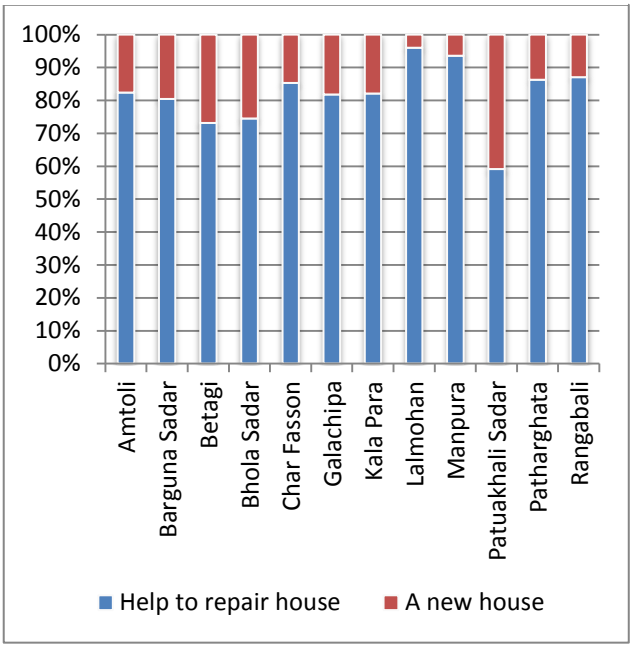
Failure of housing in Char and Flood Plain areas and of households who are not property owners or do not own sufficient land to accommodate a sustainable house structure (< 5 decimals of land) are significant factors to consider for planning interventions as it is linked to chronic structural housing inadequacy and, more practically, that these poorer populations will not qualify for government or humanitarian assistance due to the unsustainable nature of the settlement location. **Table 5** outlines a number of these risk elements, disaggregated by Upazila. Betagi, Char Fasson, and Lalmohan appear among the locations at higher risk for land insecurity due to the location of many of the households and that many households own less that 10 decimals of land. Interventions to these areas should focus on addressing systemic problems through disaster risk reduction, livelihood support in areas where land security is possible, and development projects.

Community and Household Level Perceptions of Priorities

Repair of houses vs. Building a new house: 81% of households responded that they needed help to repair their house. Households in Betagi, Bhola Sadar and Patuakhali Sadar Upazilas, however, responded with higher frequency than households in other assessed Upazilas. 20%, 27% and 41% of households in these three Upazilas, repsectively, responded that they would need assistance with a new house. **Figure 9** illustrates this.

Perceptions of shelter needs: **Figure 10** shows the overall results for shelter material needs. CGI and timber

Figure 9: Shelter Assistance Needed



were the most suggested materials that would be needed for housing reconstruction. This is supported by the predominance of traditional housing in the assessed area. This also corresponds to the first priority shelter needs reported by households, with 60% reporting materials and tools as the first priorty need and 66% reporting that materials and tools are the main limiting factor to them being able to repair their home. Cash is a highly requested implementing modality along with labor which suggests that material and labour markets are performing; thus cash and provision of materials would be interventions worth high consideration. Although technical assistance was not an option for consideration in this assessment, it is also a strongly suggested intervention type that would promote better rebuilding techniques.

Figure 10: Shelter Materials Needed

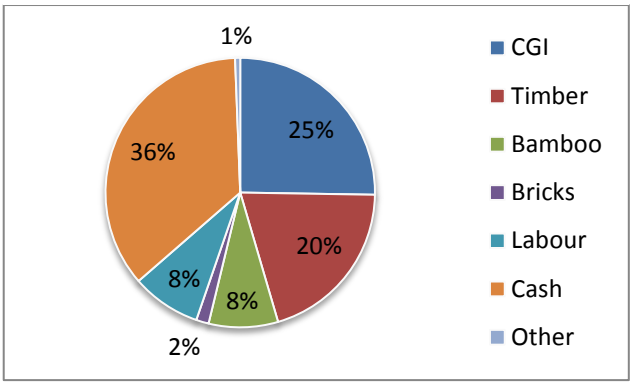
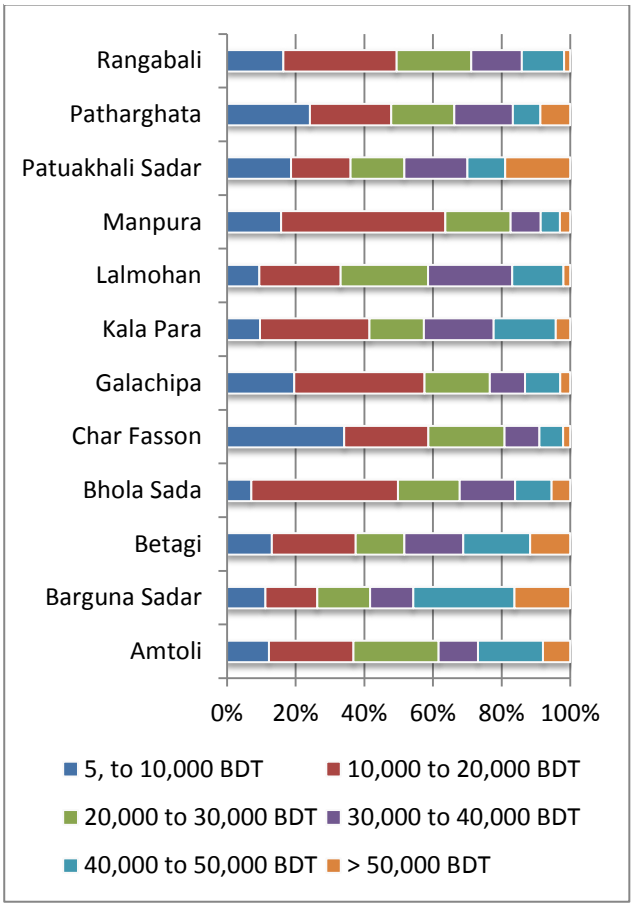


Figure 11: Estimated Repair Costs



Estimated repair costs varied widely across Upazilas. **Figure 11** shows the relative costs of repair by percentage of households repsonding per cost range. Overall, 29% of households responded that the repair costs would fall between 10,000-20,000 BDT, followed by 19% for 20,000-30,000 BDT, 16% for 5,000-10,000 BDT and 14% for 40,000-50,000 BDT.

While not a direct coorelation these figures could give an indication on the level of damage to the partly damaged houses and assume the fully dmaaged are greater than 50,000 BDT and in some cases 40,0000 BDT.

To put this into context the shetler cluster working group advice that whats termed a 'transitional shelter' costs over 100,000BDT.

Government interventions valued at 20,000 BDT are planned for 15,000 households with fully damaged houses. This intervention will likely not satisfy all of the needs of families with fully damaged houses considering the perceptions of costs of the families assessed and the families will need to give their own contributions in terms of labour, salvaged materials and financial suppport if they are to recover.

Intervention Gap Analysis

District	Fully Damaged (HH)	Govt Assistance (HH)	Humanitarian Assistance (HH)	Total Assistance (HH)	GAP
Bhola	4957	4,000	0	4,000	957
Patuakhali	10,597	6,500	1,100	7,600	2,997
Barguna	6,856	4,500	1,000	5,500	1,356
TOTALS	**22,410**	**15,000**	**2,100**	**17,100**	**5,310**

GoB Planned Response in Shelter: The dominant planned interventions in shelter for the Mahasen response is the GoB 300M BDT plans to target 15,000HH with packages roughly valued at 20,000 BDT. The GoB beneficiary criteria include the following characteristics: (1) beneficiary household will only receive support if it is damaged from the impacts of Tropical storm Mahasen; (2) priority will be given to the most affected households (fully damaged houses), poorest, female-headed, widows, disabled, and freedom fighters; (3) households must own their own land. Other discussions have included that land size must be larger than 5 decimals in size.

Humanitarian agencies, as of the time of writing this report, have shared plans to provide some 2,100 transitional housing solutions targeting families with fully damaged houses. No humanitarian agency has yet to plan activities in Bhola district for fully damaged households and, given its remote nature, should have some priority to address or confirm needs in this district. Using D-Form data on fully damaged houses, all currently planned interventions would leave a projected gap in the three Districts assessed of 5,310 households that would remain in need of shelter assistance.

The D forms for the 3 Districts report some 109,866 partially damaged houses. The perceived value of this damage and subsequent repair costs vary. The gap in response for partially damaged houses is unclear due to the lack of ability to discern damage resulting from the storm and the background level of chronically poor housing. Also there has been a sign of self-recovery for what are probably those households with existing capacity, the lesser affected and perhaps those that received the government General Relief (GR) cash or the humanitarian cash/materials in the relief phase. But it is probable that there will be a case load of vulnerable families with damaged houses who do not have the capacity to recovery without external support. This case load may also be linked to specific vulnerable groups such as land less outside of the embankments.

6.2. WASH Sector

Key Findings

1. Water
   - No significant effect of Mahasen on water source options
   - Households using surface water reported highest incidence of symptoms of water borne disease (55% diarrhea, 20% skin disease, 31% stomach pain)

2. Sanitation
   - Not a significant level of complete destruction of latrines were reported as a result of Mahasen, however, widespread moderate damage to sanitation facilities led to an increase in the use of unhygienic latrines. This amounts to a 62% and 44% respective decrease in the use of water-sealed and non-water sealed sanitary latrines and a 187% increase in no sanitary facilities.
   - Rehabilitation of sanitation facilities is mostly hampered by the loss of financial resources, preventing purchase of construction materials as well as hiring labor
   - The main district affected was Barguna, with high percentages of sanitation facility damage observed, followed by Patuakhali district.

3. Hygiene
   - Hygiene practices declined significantly in the affected area
   - 67% of households reporting symptoms of disease (diarrhea, skin problems, stomach pain) also reported practicing unhygienic behavior
   - The primary reason for the significant effect on hygiene practices is due to shifting from improved latrines to unimproved latrines

Recommendations/Response Priorities

- Priority assistance should be in the form of rehabilitating improved sanitation facilities. This could be integrated with a shelter construction/rehabilitation project where the sanitation component should be included or coordinated with an appropriate organization. Support could also be provided in terms of materials for substructure construction (one slab and 5 rings recommended for a total cost of 2,500 BDT). These rehabilitation projects must include DRR components to reduce vulnerability in the future.
- Given the increase in use of surface water and the corresponding increase in symptoms of water-borne disease, complementary assistance could focus on rehabilitating existing tube wells and re-establishing household access to ground water.
- Assessment results revealed that even when households have access to hygiene products such as soap, symptoms of disease are still higher than average following Mahasen. This suggests that households may not be aware of proper use or use the product as frequently as needed to decrease the incidence of disease given the new sanitation situation. This could be solved by integrating WASH messages into other sectors' interventions as well as to conduct a KAP survey to understand current Knowledge, Attitudes and Practices.

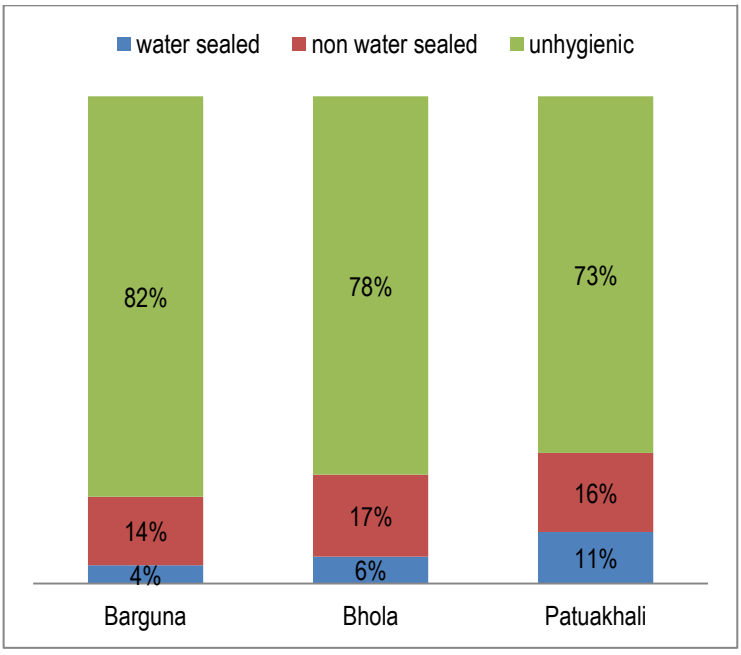
Sanitation facilities: Tropical storm Mahasen produced more minor to moderate damage to latrines and sanitation facilities than complete destruction of these facilities. Comparing the reported damage by respondents to data collected during the Census 2011[10], 75% of households in Barguna district were using hygienic latrines, 82% in Patuakhali district and 82% in Bhola district. Only 5% of households overall reported having lost all access to sanitation facilities and resorting to open defecation. **Table 6** illustrates the transition to open defecation based on data from this assessment and Census 2011 information.

Table 6: Household Transition to Open Defecation

District	Upazilas	Latrine user before	Number of latrines destroyed	Number of latrines damaged	% users change to open defecation
Barguna	Amtoli	322	10	275	3%
	Barguna Sadar	366	9	333	2%
	Betagi	366	9	296	2%
	Patharghata	362	13	322	4%
Bhola	Bhola Sada	347	8	276	2%
	Char Fasson	260	15	177	6%
	Lalmohan	377	1	298	0%
	Manpura	347	16	249	5%
Patuakhali	Galachipa	344	21	192	6%
	Kala Para	356	1	301	0%
	Patuakhali Sadar	333	111	208	33%
	Rangabali	313	4	202	1%

With all districts combined, the effects of the tropical storm on latrine facilities were significant, as nearly 80% of households assessed reported damage. Households in Barguna reported slightly more damage (around 88% of households interviewed) compared to Bhola and Patuakhali districts where around 75% of households assessed reported damage.

Figure 12: Sanitation Facility Type After Mahasen



After the tropical storm, less than 20% of households reported having access to hygienic latrines in Barguna district, compared with slightly over 20% for both Bhola and Patuakhali Districts, as seen in **Figure 12**. This is a 62% and 44% respective decrease in the use of water-sealed and non-water sealed sanitary latrines and a 187% increase in no use of sanitary facilities compared with before Mahasen. **Map 3** shows the change in use of latrines geographically, while **Map 4** shows the complete loss of sanitation facilities.

Overall, most households are currently using unhygienic latrines, as their latrine is not yet rebuilt. **Table 7** shows that the level of damage of the shelter did not have a large impact on the capacity of households to rebuild their sanitation

[10] http://www.ngof.org/wdb/watsanmap.php

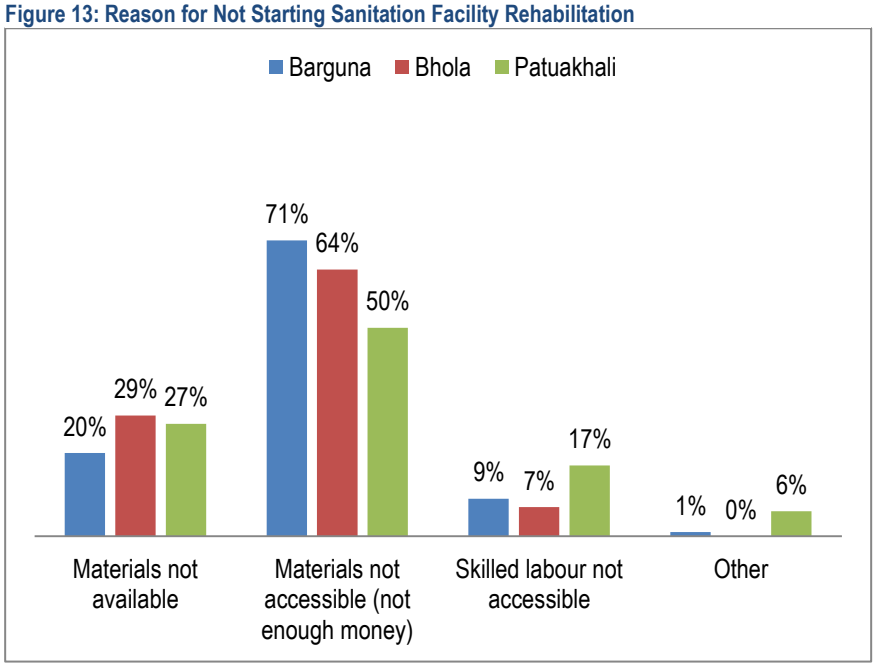
facilities. Households in Bhola, however, exhibit a higher sanitation facility rebuild rate, likely due to the fact that shelters in Bhola were destroyed at a lower rate than in the other two Districts.

Table 7: Households Rebuilding Latrines by Shelter Damage Category

	Collapsed Shelter		*Partially Damaged Shelter*		*Minor Damaged Shelter*	
District	**Rehab Begun**	**Rehab NOT Begun**	**Rehab Begun**	**Rehab NOT Begun**	**Rehab Begun**	**Rehab NOT Begun**
Barguna	19%	81%	18%	82%	19%	81%
Bhola	14%	86%	26%	74%	30%	70%
Patuakhali	24%	76%	17%	83%	17%	83%

Figure 13 outlines the main constraint to rehabilitation as lack of accessibility to the needed materials due to lack of money. Between 50-71% of households across the three Districts rated this as the main reason for not starting rehabilitation of their sanitation facilities. Physical access to materials (from 20% of household in Barguna to 29% of households in Bhola) was the second most common constraint across the Districts.

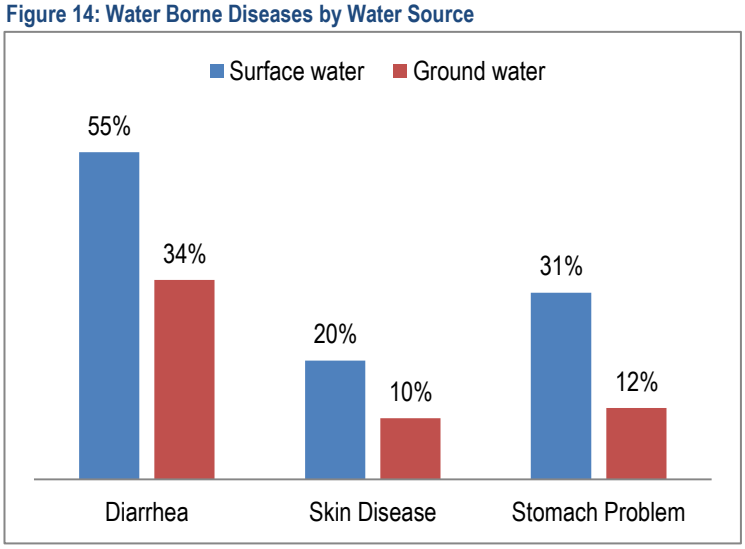
Figure 13: Reason for Not Starting Sanitation Facility Rehabilitation



Privacy for women and girls when using latrines is a concern for more than 77% of the interviewees, especially in Patuakhali district. Further information is needed to understand the sources of this problem.

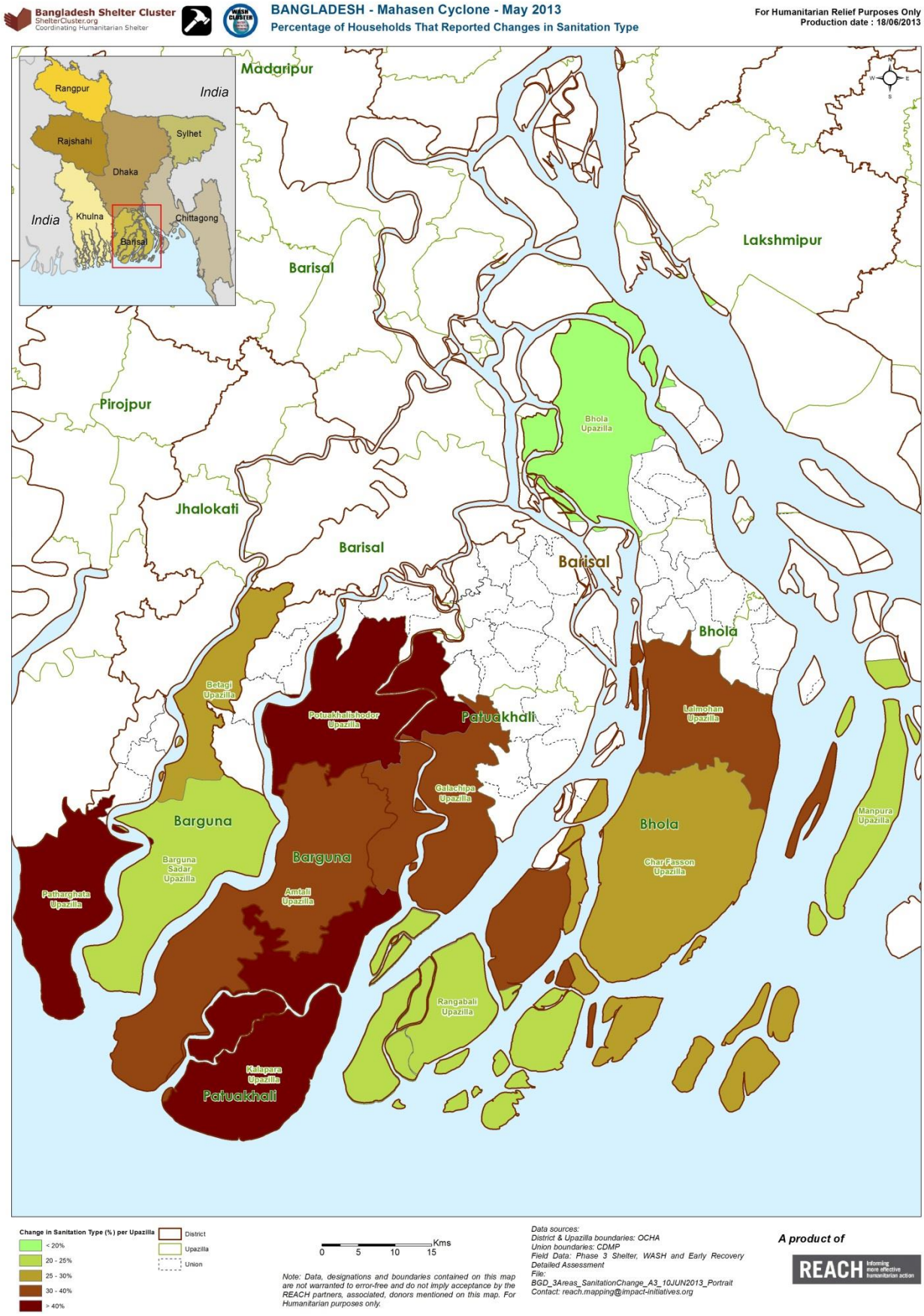
Water and symptoms of disease: A significant increase in water borne diseases was observed in the affected areas since Tropical storm Mahasen. **Figure 14** illustrates that diarrhea was the most commonly reported symptom of disease for both surface and ground water sources[11]. Skin disease and stomach problem were reported at somewhat lower rates. Households using surface water for drinking purposes reported symptoms of water borne diseases like almost two times more than those using ground water. This suggests that surface water is being used without any treatment and has the potential to further increase the presence of water borne diseases. This is a clear effect of Tropical storm Mahasen, as the results show a 3%

Figure 14: Water Borne Diseases by Water Source

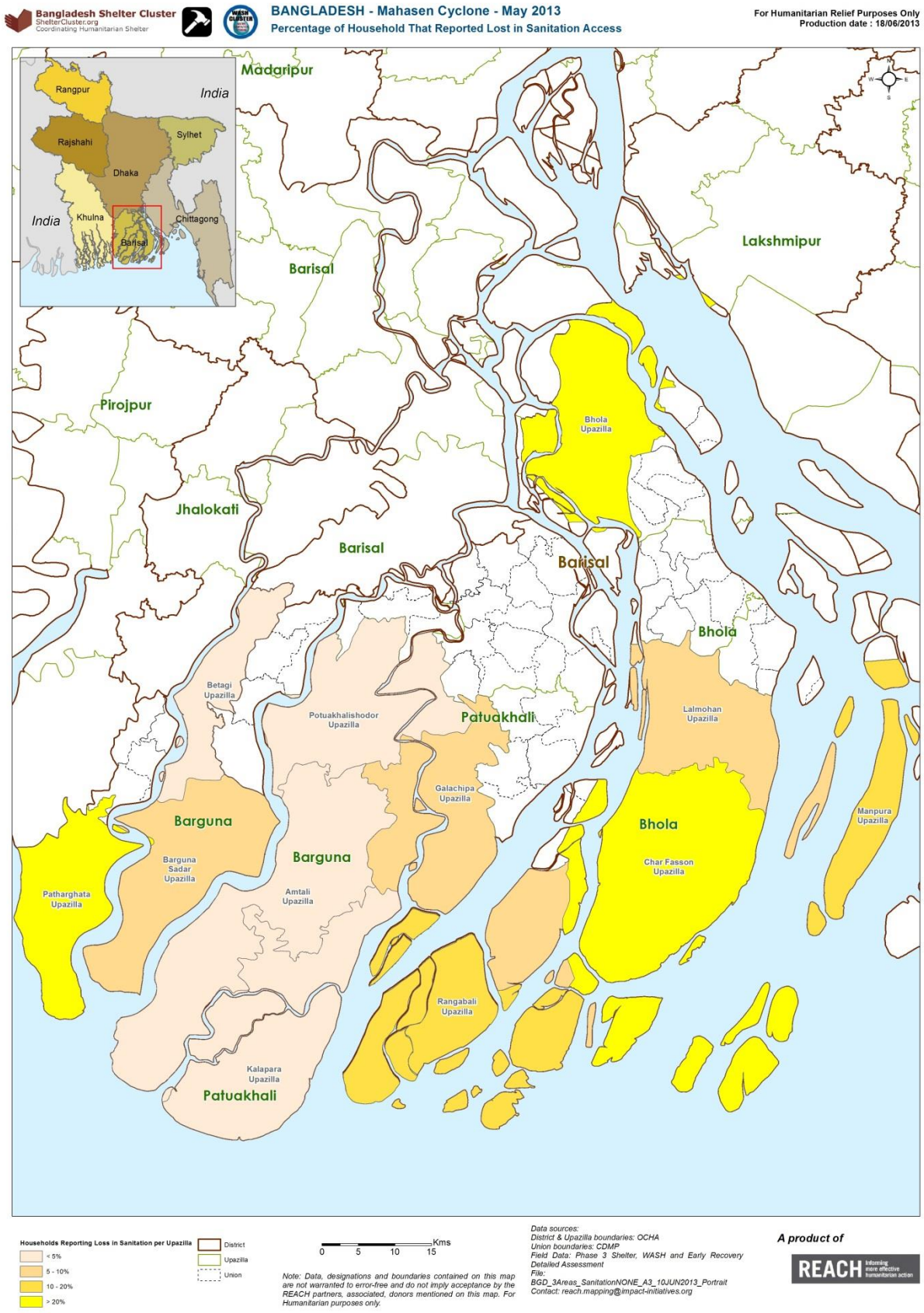


[11] Surface water sources: dug well, pond, river and rain water harvesting

Map 3: Households Reporting Change in Sanitation Type



Map 4: Loss of Access to a Sanitation Facility

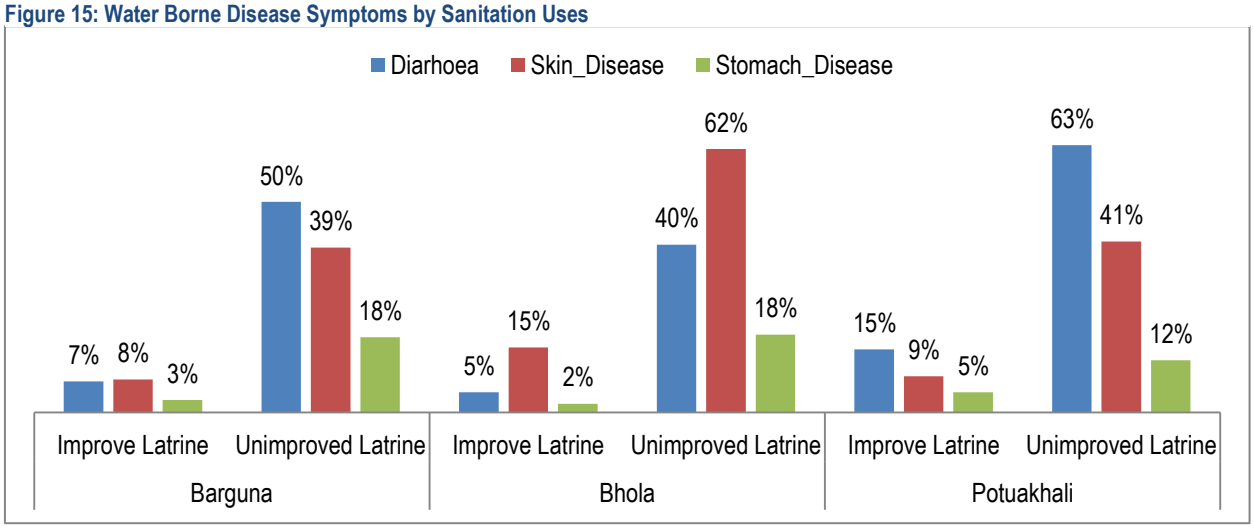


drop in the use of ground water sources and an associated increase in the use of surface water.

Assessment results show that the use of unimproved latrines has a significant contribution in the spread of symptoms of water borne diseases. As seen in **Figure 15**, households with improved latrine facilities were less likely to report water borne diseases compared to those with unimproved latrine or no latrine.

During the assessment only 7%, 5% and 15% of households using improved latrine reported experiencing diarrhea, skin disease and stomach problems, respectively, while households using unimproved latrines reported symptoms of disease at much higher rates - 50%, 40% and 63% percent, respectively. This suggests that having access to improved sanitation can reduce diarrhea and other symptoms of water borne disease remarkably.

Figure 15: Water Borne Disease Symptoms by Sanitation Uses



Practice of hygienic behavior is a key factor of controlling water borne diseases and among the assessed households it was observed that households without hygiene practices – particularly those not washing hands with soap or ash – were more likely to report symptoms of diarrheal diseases. **Figure 17** shows that 55% of surveyed households who did not use soap or ash to wash their hands reported symptoms of water borne diseases since the Tropical storm Mahasen.

Among these 55% of households, diarrhea was the most commonly reported symptom. **Figure 16** illustrates this. It is interesting to note that even for those households practicing more effective hygiene practices, reported symptoms of diarrhea is also as high as 36% as shown in **Figure 16**. The reason for this might be the lack of knowledge of proper hygiene and its practice.

Figure 17: Water Borne Disease Symptoms by Hygiene Practice

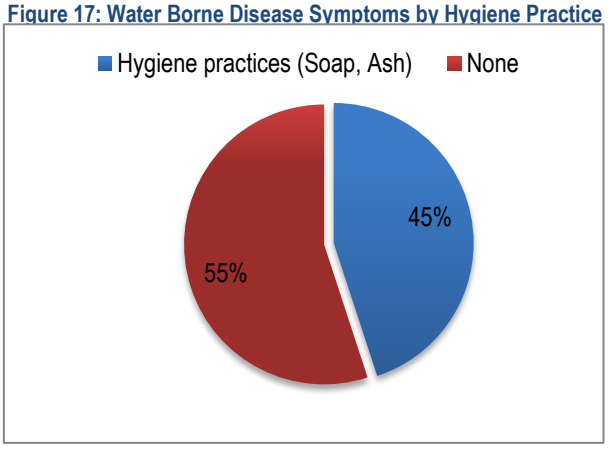
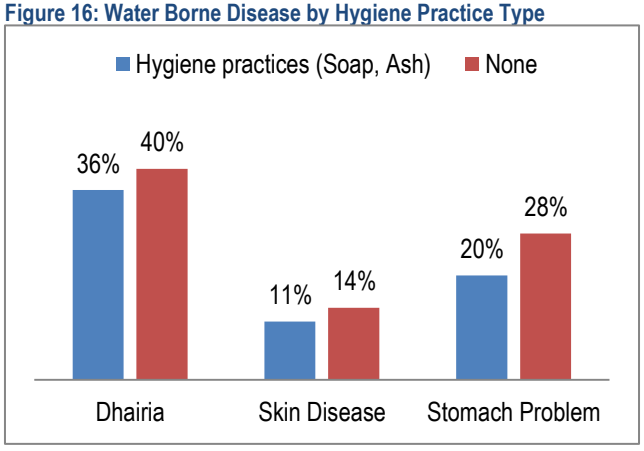


Figure 16: Water Borne Disease by Hygiene Practice Type



6.3. EARLY RECOVERY SECTOR

Key Findings/Recommendations

- Cash assistance for livelihood resumption to avoid negative coping strategy targeting the most affected livelihoods is recommended (daily laborers and marginal farmers in Barguna Sadar, Bhola Sadar, Patharghata, Kala Para, Char Fasson and Amtoli). Even though no major change in the source of livelihood was reported due to Mahasen, income levels were reported to have decreased. The number of households earning less than BDT 3,000 has increased from 20% before Mahasen to 60% after; mainly due to May and June being the lean agricultural period, but likely exacerbated by the storm. Most commonly reported impact was agriculture crop damage (pulses, groundnut, homestead vegetables; followed by loss of livestock, *Aman* rice seedling, fisheries, and daily laboring on a smaller scale
- Markets were found to be fully-functional soon after Mahasen. This indicates that cash-based support would be useful to boost local economy and livelihoods. 47% of households have already restarted livelihood activities; 21% will be able to do so within a month; 23% were not sure when they would restart livelihood activities
- Cash for work interventions after the monsoon season is recommended to rehabilitate essential community infrastructure. Fully damaged and partially damaged embankments and sluice gates require immediate repair and rehabilitation. If not addressed in a timely manner, flooding and water logging including intrusion of saline water may lead to longer term impact on the livelihoods and environment. Using CfW could also address lagging livelihood re-instatement and negative coping strategies (11% households reported selling assets; 38% will borrow loans at high interest; 17% of affected HHs will take up alternative livelihood; 13% will migrate outside)
- Considering the vulnerability of the area to tidal surge, storm and cyclone, climate resilient agriculture/livelihoods is recommended
- DRR awareness and preparedness by local communities
- Early warning focusing on saving lives as well as livelihoods to be promoted in the coastal district

6.3.1 LIVELIHOODS/INCOME

It is evident that the livelihoods of most of the affected families were from loss of agricultural crops; followed by fishing and casual labor that have now lost both their incomes and assets as a result of Mahasen and flooding of the area. The early restoration of livelihoods and productive assets is an essential step toward the recovery of disaster-affected communities. This has been particularly important and urgent for an affected population that is heavily dependent on farming, fishing and day-laboring. Most fishermen reported to be unable to repair or buy fishing nets without external assistance; while marginal farmers struggled to acquire vegetable seeds, Aman seedling and tools to resume vital agricultural production. These failures prolonged vulnerable families' dependency on external support, and deepened levels of debt. Remarkably, markets were found to be fully-functional soon after cyclone. This indicates that cash-based support would be useful to boost the local economy and livelihoods.

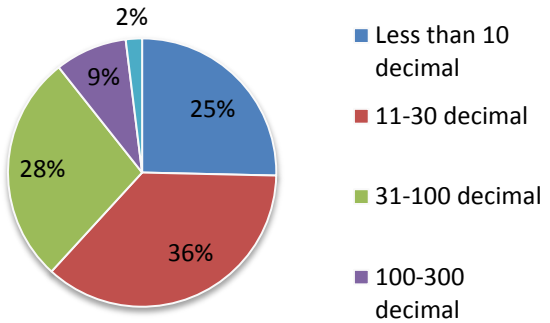
Impact on agriculture

The most commonly reported damage to livelihoods was agricultural crop damage due to waterlogging and flooding. Following the tropical storm Mahasen on 16th May, the area also was affected by the high tide following the full moon on 23rd May and the subsequent heavy rain and flooding on 28th, 29th and 30th May.

Photo 2: Waterlogged Field in Patuakhali District

Livestock loss, agricultural seed loss and fisheries damage followed closely behind, as seen in **Figure 19** below. This loss of livelihoods, including the lean period in May and June, likely corresponds to the increase in households reporting "no income".

Figure 18: Amount of Land



58% of households overall reported owning their own land. The most common amount of land among assessed households was 11-30 decimals (36%), followed by 31-100 decimals (28%) and less than 10 decimals (25%).

Households reported that the main constraints to them being able to restart their livelihood activities were debris or water on agricultural land (32%) and high pressure on the daily laborer market (15%). These are interrelated, as the decrease in number of households being able to practice agriculture has likely resulted in an increase in people available for daily labor.

Among the affected population, 38% households lost their agricultural crops (e.g. ground nuts, pulses, peas, chilies including a few *Boro* rice (over 85% of Boro crop was harvested before the storm). Simultaneously, 13% households lost their agricultural seeds, which may cause a longer term effect for the subsequent crop production if assistance is not provided immediately. Additionally, farmers affected are experiencing inadequate resources to procure seeds and other agricultural inputs to resume farming. Households also reported (11% of the households assessed) selling their household assets or fixed assets to cope with the impact.

Impact on homestead crops and agroforestry

Damage of homestead vegetable, trees and agroforestry crops created immense loss for small and marginal households. Around 64% of the households owned less than 30 decimal of land, which is mostly homestead land. The homestead is a productive asset for the poor marginal farm-based households that ensure year round vegetables and agroforestry products like spices, timbers, fuel etc.

Impact on livestock & poultry

13% of the affected households assessed lost their livestock and 6% lost their poultry resources. Traditionally, the practice of livestock and poultry rearing is not as common in this coastal area due to unfavorable rearing facilities. The poor and marginal households have few livestock and poultry, which they lost in this incident. A large number of livestock and poultry were reported to be injured from falling trees and collapsing sheds and most of these animals are visibly weak and susceptible to diseases.

Figure 19: Livelihood Loss

Impact on fisheries

Fishing is a vital livelihood option in this area. Open water fishing (river and sea) and fish culture are both widely practiced. 11% of households reported damage of fish ponds and hatcheries, while 8% households lost their fishing devices e.g. fishing boats, nets etc. The damage of fisheries resources has pushed a large number of households relying on fishing towards harmful coping strategies like borrowing loans in high interest.

Impact on off-farm livelihoods

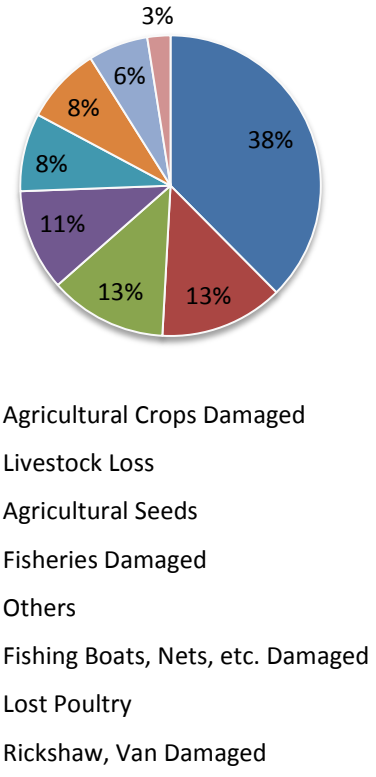
Apart from the above livelihood options, 11% households reported damage of other livelihood assets like small shops, rickshaws/vans that are directly related to their daily subsistence.

Resumption of Livelihoods

Many households (47%) report that they have already restarted their livelihood. Still others report that they do not know when they will restart their liveihood activities (23%) or will restart within 1 month (21%). Households in Bhola Sadar and Patharghata report lower than average numbers of restarted livelihoods (16% and 18%, respectively). They also report "not knowing" what they will do at a higher rate than households in most other Upazilas.

It should be noted that May and June is the lean period in the southwestern coastal area with limited employment opportunities. *Boro* crops have already been harvested and the next crooping season (*Aman*) is yet to be started. Sea and river fishing is not possible in May and June due to unfavourable weather and the sea being rough during this period. .

Figure 20 below shows the distribution of households reporting when they would be able to restart their livelihood.



Coping strategies practiced by affected households

The most commonly reported coping mechanism among assessed households was the borrowing of money at a high interest loan, from neighbours and relatives (38%). The second most commonly reported strategy was the selling of household assets such as small livestock and poultry (11%). These are considered harmful coping strategies and their use is highly concerning. High interest loans often lead to a perpetual inability to repay the loan and further debt, especially in an area often hit by storms. Selling of household assets leads to further lack of resilience, as households deplete productive assets. **Figure 21** illustrates the coping mechanims among assessed households.

Figure 20: Plans for Restarting Livelihood Activities

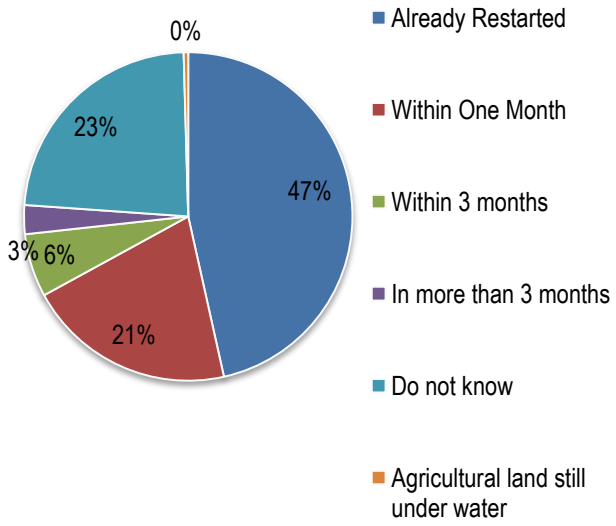
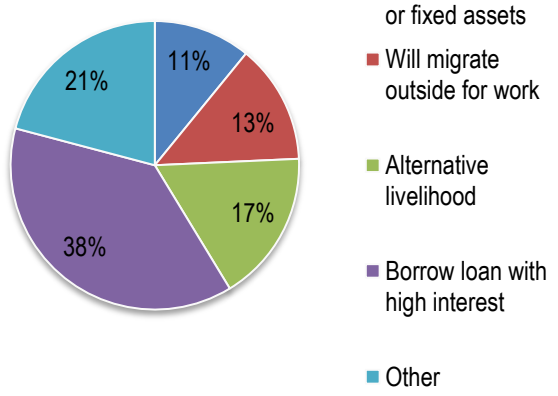


Figure 21: Coping Strategies



6.3.2 COMMUNITY INFRASTRUCTURE

Community structures were not greatly affected by Mahasen. The majority of key informants (UNOs, UP Chairmen, and LGED, BWDB officials) confirm that the storm was not powerful enough to significantly damage community structures market places, roads, culverts, etc. With that said, a few sections of the coastal embankments were damaged or breached during Cyclone Sidr in 2007 and have not been appropriately reconstructed or repaired. These weakened sections have been further damaged by the tropical storm Mahasen, compounding the effect of the situation. According to BWDB officials, around 12.5 kilometers of embankment are fully damaged and 40 kilometers has been partially damaged in different sections of the embankments in the assessed 3 districts. In addition to this, some earthen roads, culverts and bridges have been washed-out/damaged due to the high tidal surge, which will be managed under the LGED regular maintenance plans during the dry season. However, the following community structures and embankments require urgent repair and rehabilitation:

Most affected community infrastructure

- Bhola Town Protection Ring Embankment
- Sluice gate (Bhola and Patuakhali)
- Earth road (Patuakhali, Bhola)

Embankment requiring urgent repair and rehabilitation

- Polder Number-56; fully damaged; 1km length (Bhola Sadar)
- Polder Number-55/3, 58/1, 58/2; fully damaged; 1.6km (Bhola)
- Polder Number: 12, fully damaged, 6km (Patuakhali)
- Polder Number *41/3, 41/5, 41/6, 41/7, 39/1, 43/2, 44, 54/B* (Barguna) 4km; inundation due to breaching of embankment
- 6 km completely damaged (Patuakhali Sadar, Baufal, Dumki, Mirzagonj & Dasmina Upazila); sluice gate fully damaged -3 nos. & partially damaged -14 nos.
- 9 embankments fully damaged, 4 km length (Barguna); these were damaged during cyclone Sidr
- As reported during key informant interview with BWDB and LGED, there are 22 polders in Barguna district. All the embankment were fully damaged or partially damaged during the last cyclone Sidr in 2007. After Sidr no maintenance was done, and as a result the damaged sections of the embankments have become weaker. A total of 9 embankments were reported to be fully damaged covering 4 km; and additional 22 embankments were reported as partially damaged which cover 50 km. 50 sluicegate were also reported to be in non-workable condition and require maintenance immediately.

7. List of Annexes to this Report

Annex 1: **Assessment Terms of Reference**

Annex 2: **Household Survey**

Annex 3: **List of agencies/staff who participated in primary data collection**

Annex 4: **List of community infrastructure requiring repair and rehabilitation**

Annex 5: **Full package of assessment maps**

IMPACT Initiatives

REACH Informing more effective humanitarian action

This assessment was supported (in the framework of the shelter cluster) by REACH, an interagency program of IMPACT Initiatives (IMPACT).

REACH was born in 2010 as a joint initiative of two INGOs (IMPACT and ACTED) and one UN program (UNOSAT). Based in Geneva, REACH operates through global advocacy and country-level deployments.

REACH's **purpose** is to promote and facilitate the development of information products that enhance the humanitarian community's decision making and planning capacity.

REACH's **overall objective** is to enhance the effectiveness of planning and coordination by aid actors in countries that are in crisis or at-risk of crisis.

Since 2011 REACH has formalized a partnership with the Global Shelter Cluster (GSC) to support the strengthening of its coordination and planning capacity. Dedicated REACH teams (including assessment, database and mapping experts) are available to be rapidly deployed to the field in the immediate hours after emergencies in order to facilitate interagency assessments and mapping activities on behalf of the shelter cluster. Resulting information products are used to enable better planning and coordination by the cluster, and are widely disseminated.

REACH's partnership with the GSC is directed by a dedicated Steering Committee including representatives from ACTED, IFRC (as GSC co-lead), IMPACT, the European Commission's Joint Research Centre and UNOSAT.

www.reach-initiative.org

IMPACT HEAD OFFICE

Chemin de Balexert, 7
1219 Châtelaine – Switzerland
Phone: +41 (0) 22 566 2963
geneva@impact-initiatives.org
www.impact-initiatives.org

Humanitarian Aid and Civil Protection

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PHASE 3 SHELTER, WASH, EARLY RECOVERY CLUSTER
DETAILED NEEDS ASSESSMENT
IN BARGUNA, BHOLA AND PATHUAKHALI DISTRICTS, BANGLADESH

The Phase III Detailed Assessment is a joint initiative of the Government of Bangladesh and the Shelter, WASH, and Early Recovery Clusters, with support from the REACH Initiative.

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