NORTHERN LIBYA Anticipated impacts of the rainy season

CRISIS OVERVIEW

Between 9–11 September 2023, Storm Daniel caused flooding and destruction in the coastal areas of northeastern Libya, including the collapse of two dams in Derna district. The storm also caused significant damage to the cities of Al-Bayda, Shahat, and Sousse in Al Jabal Al Akhdar district, as well as Al Marj in Al Marj district (0CHA 14/09/2023). As at 17 October, OCHA had recorded 4,435 confirmed deaths and more than 8,500 people missing as a result of the Storm (0CHA 19/10/2023). Rescuers were still recovering bodies as at 23 October (Libya Observer 23/10/2023).

The rainy season (typically between October–March) may heighten the humanitarian needs caused by Storm Daniel and put additional pressure on the response (Britannica accessed 27/09/2023; WB accessed 26/09/2023). Floods regularly occur during the rainy season, with almost annual flooding since 2018. While typically at a low level, flooding may significantly affect the people and infrastructure still recovering from Storm Daniel and prior conflict in Libya.

Despite a moderate start to the rainy season in the first weeks of October, rain has already affected cities in southern and northern Libya. On 9 October, heavy rainfall caused a road to collapse in the Eastern Coast neighbourhood of Derna city. Residents have called for an urgent government response to prevent further damage in the coming winter months (The Libya Observer 10/10/2023; Libya Al-Ahrar 02/10/2023).

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KEY MESSAGES

- The rainy season poses various health risks, particularly in communities already affected by Storm Daniel. These include risks of water- and vector-borne disease outbreaks in floodaffected communities, WASH infrastructure damage, mental health deterioration among affected populations, and additional burdens on the strained healthcare system.
- Storm Daniel caused a localised rise in food insecurity in the northeast, with higher prices and restricted market access. Further heavy rainfall may worsen this situation by impeding the restoration of infrastructure central to livelihoods (e.g. roads and crop storage facilities), prolonging displacement, and delaying crop planting.
- Heavy rainfall and flooding may also cause larger-scale damage to critical infrastructure, which is generally in poor condition because of Storm Daniel, conflict, and neglect.
- Refugees, migrants, and pre- and post-Storm Daniel IDPs will be more vulnerable to the negative effects of the rainy season if they lack suitable shelters, cold-weather NFIs, and access to livelihoods and services. Women displaced by Storm Daniel will be at increased risk of gender-based violence (GBV) and inadequate access to health services should the rainy season prompt onward displacement or shelter damage. Children are experiencing high levels of psychological distress and education disruption, which heavy rainfall and flooding may prolong.
- The volatile political situation in Libya will likely preclude effective preparation for and response to the rainy season. After Storm Daniel, tensions between two rival governments the Tripoli-based Government of National Unity (GNU), which governs western Libya, and the Government of National Stability (GNS), based in the eastern part of the country hampered the response (Reuters 02/10/2023; CFR accessed 19/09/2023). Years of conflict also have also undermined institutional effectiveness in Libya, affecting disaster preparedness (WB 18/05/2023).
- While this analysis focuses on northern Libya because of the higher probability of rainfall and the existing needs generated by Storm Daniel in the region, flooding is also possible in southern Libya. The southwestern city of Ubari already saw heavy rainfall and flooding in early October 2023 (AA 02/10/2023; Libya Al-Ahrar 02/10/2023; Carbon Brief 19/09/2023). Flooding in other parts of Libya may strain the current government and international response.
- Seasonal precipitation forecasts anticipate a moderate (40–50%) chance of aboveaverage rainfall for the remainder of 2023. That said, even an average or below-average rainy season can include extreme events, characterised by high rainfall concentration over a short period, generating significant humanitarian impacts.

acaps Anticipatory note 27 October 2023

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About this report

Aim: this report aims to identify the anticipated impacts of the upcoming rainy season in northern Libya, where communities are still recovering from Storm Daniel. It seeks to inform anticipatory action, preparedness, and emergency response among humanitarian organisations.

Methodology: this report is based on a secondary data review and an analysis of precipitation and seasonal temperature forecast sources.

Limitations: because of years of conflict and political instability, there is limited information on certain key areas of interest in Libya, including the state of critical infrastructure and level of national capacity to prepare for or respond to the current rainy season. Seasonal forecasts employed for this anticipatory analysis only provide the average rainfall expected for the season but cannot anticipate the occurrence of extreme events.

CLIMATE OVERVIEW AND FORECASTS

Overview

Heavy rains and storms in Libya are most common in the northern districts between October– March, with the highest average precipitation levels in December–January (Brittanica accessed 27/09/2023). Although mean rainfall is expected to decrease over the coming decades in Libya as the climate becomes increasingly arid, there is a higher chance of extremely heavy rainfall events in the northern Mediterranean regions of the country (Zittis et al. 27/08/2021). The months of October–March also bring lower temperatures, particularly in the north (WB accessed 26/09/2023; DFS 28/09/2023). Temperatures in Derna can drop as low as 1° C (ShelterBox accessed 13/10/2023). Prior to Storm Daniel, flooding had affected parts of Libya every year since 2018, primarily along the Mediterranean Coast. With one exception, all major flooding events in the past five years occurred during the northern rainy season months of November– January. The most recent severe flood pre-Storm Daniel occurred outside this period, in November 2013, when Tripoli experienced the heaviest rain that Libya had received in 40 years, affecting 2,000 people and killing 16 (FloodList 09/12/2023; EM-DAT accessed 29/09/2023).

Forecasts

Precipitation

The first three weeks of October 2023 saw a moderate start to the rainy season along the northern coast of Libya (ECMWF accessed 13/10/2023; ECMWF accessed 25/10/2023). Seasonal precipitation forecasts anticipate a moderate probability (40-50%) of above-average rainfall in northern Libya for the remainder of 2023.

- Columbia University's International Research Institute estimates a 40–50% likelihood of above-average rainfall throughout northern Libya in October–December, with the highest likelihood in the north-central region around Sirte and Jufra districts, in the east around Tobruk district, and in the west around Nalut and Wadi al Shatil districts (IRI accessed 25/10/2023).
- Copernicus similarly predicts a 40% likelihood of above-normal precipitation in October– December in the northeastern, western, and some of the southernmost districts (Copernicus accessed 16/10/2023).
- The European Centre for Medium-Range Weather Forecasts predicts a 40–50% likelihood of above-normal rainfall in the east of Libya, excluding the coast (ECMWF accessed 16/10/2023).

Forecasts for January–March 2024 anticipate below-average rainfall in most parts of Libya (IRI accessed 25/10/2023; ECMWF accessed 04/10/2023). It should be noted that these forecasts only estimate average precipitation and cannot anticipate extreme precipitation events during the forecast period.

Temperature

The latter months of the northern rainy season (December–February) bring the lowest annual average temperatures in Libya, with a mean temperature of 13.6° C and an average minimum of 7.18° C. Forecasts predict above-normal temperatures in most of the country in the next six months (EC accessed 04/10/2023). The International Research Institute predicts a 40–60% chance of above-normal temperatures in most of Libya during the rainy season, except along the northwestern coast, which is predicted to experience a 40% chance of below-normal temperatures (IRI accessed 25/10/2023).

FIGURE 1: TIMELINE OF HEAVY RAINS AND FLASH FLOODS IN LIBYA IN THE PAST TEN YEARS¹

JANUARY 2019

Location: the north-eastern town of Salouk, close to Benghazi. The northern towns of Marj, Misrata, Sabratha and Ajdabiya Facts: heavy rainfall caused a deterioration in infrastructure and major road closures. The northern towns of Marj, Misrata, Sabratha and Ajdabiya also experienced heavy rains, which forced the temporary closure of local schools

(Libya Observer 6/1/2019)

NOVEMBER 2020



DECEMBER 2018

2018

Location: parts of Benghazi in the north-east Facts:heavy rain flooded forcing the temporary closure of its airport, major roads, and major ports, which led to the suspension of oil exports (Al Jazeera 6/12/2018; The Libya Observer 5/12/2018)

MAY-JUNE 2019

Location: south-western Ghat district Facts: floods killed two people and displaced 2,500 residents, damaged infrastructure, and disrupted education and health (OCHA accessed 26/9/2023; Floodlist 05/06/2019)

NOVEMBER 2021

Location: AI Marj district Facts: flash floods displaced around 150 families, damaged houses and disrupted services (IOM 11/11/2021)

¹ Major flooding incidents in Libya, 2018-2022

KEY ANTICIPATED HUMANITARIAN IMPACTS OF THE RAINY SEASON

Increased risk of disease outbreaks

Reduced access to clean and potable water

Water infrastructure: clean water access in Libya was already scarce prior to Storm Daniel, partly given a lack of natural water reserves and the country's precarious water infrastructure, which had suffered from conflict, neglect, and power disruptions (CEOBS 16/03/2018). In 2019, several northern districts experienced 'high' or 'extremely high' water stress levels (on a scale of low to extremely high) (UNICEF 01/09/2022). The country relies heavily on the Great Man-Made River pipeline, which transports groundwater from the Nubian Sandstone Aquifer System and other sites to coastal cities (NATO CFC 14/11/2011). The pipeline has been subject to armed group attacks in recent years, making it more vulnerable to damage from heavy rainfall and flooding (OCHA 26/08/2021; IOM 10/2022; Reuters 02/07/2019). In July 2023, vandalism and illegal water connections caused the pipeline to leak and flood parts of the northeastern town of Ajdabiya (Africanews 21/07/2023). As at July 2022, there were also seven operational desalination plants in Libya, all of which were operating at about 28% capacity because of a lack of maintenance funds (TIMEP 14/07/2022).

Storm Daniel caused additional damage to water infrastructure and contaminated potable water in the northeast (REACH/WFP 09/05/2023; UNICEF 28/09/2023). The GNU reported that 80% of water pipes in affected eastern towns and villages collapsed from the storm (TRT Afrika 19/09/2023). As at 17 October, 14 out of Derna's 49 boreholes were out of service (OCHA 19/10/2023). Humanitarian responders and local service providers are working to restore the Derna desalination plant, which was already out of service before the floods. Storm Daniel also damaged two desalination plants in Al Jabal Al Akhdar district, which provided 65% of the water to the district (UNICEF 17/10/2023). Further rainfall may hamper the restoration of this infrastructure and cause additional damage.

Waste management infrastructure: Libya's solid waste management infrastructure was also already a pressing concern before Storm Daniel, with waste often dumped into open, informal landfills, creating health hazards and contaminating water and soil (CEOBS 09/2023; Logistics Cluster accessed 02/10/2023). Storm Daniel damaged waste management systems in northeastern cities, leading to blockages and flooding in cesspits, sewers, and sewage treatment plants in Al-Bayda, Al Marj, and Sousse. Debris and sediments from the flood obstructed drainage systems, contaminating soil and groundwater and resulting in numerous water-related illnesses. As at 22 October, the General Company for Water and Wastewater had repaired parts of the sewage network in Derna and Al-Bayda (UNICEF 23/10/2023). A lack of essential equipment, such as drainage and sewage pumps, hampers these repair efforts (OCHA 11/10/2023; CEOBS 09/2023; UNICEF 21/09/2023).

Increased waterborne diseases

Prior to Storm Daniel, waterborne diseases were already among the main causes of morbidity in Libya, including acute diarrhoea and acute jaundice syndrome, which particularly affected children (Health Cluster 31/01/2022). No cholera cases had been reported in Libya as at 22 October since the last outbreak recorded in 2009 (OCHA accessed 22/10/2023; Health Cluster 31/10/2022). That said, water contamination poses a great risk of cholera. Neighbouring Sudan has recently reported cholera cases, driven in part by the conflict-related displacement of Sudanese refugees, some of whom are fleeing to Libya. Cholera outbreaks have also been documented in Niger and Chad in recent years (WHO 29/09/2023; IFRC 02/09/2022; OCHA 07/11/2017).

Storm Daniel has increased affected communities' vulnerability to waterborne (e.g. diarrhoea and cholera) and vector-borne (e.g. malaria, dengue, and typhoid) diseases. As at 16 October, 4,464 acute diarrhoea cases had been reported, although a relative decline in cases was observed afterwards. The National Centre for Disease Control has also reported sufficient rubella cases to be considered an outbreak (UNICEF 23/10/2023). Scabies and pediculosis cases have been documented among displaced families living in unsanitary conditions (UNICEF 28/09/2023). Flies and mosquitos proliferate because of stagnant water, particularly in the cities of AI-Makhili, Derna, and Sousse (WH0 22/09/2023).

Further heavy rainfall and flooding would contribute to the accumulation of stagnant and contaminated water in northern Libya, raising the risk of water- and vector-borne disease outbreaks (IMC 18/09/2023). People still displaced from Storm Daniel are particularly vulnerable because of overcrowding and poor WASH practices in camps, which facilitate the spread of disease (WHO 22/09/2023; Arabia Weather 22/09/2023).

Reduced access to healthcare services

Since 2011, conflict has been negatively affecting healthcare facilities across Libya, with nearly 300 closing because of damage and insecurity between 2011–2023. Many others are only partially operational and lack essential medicine and equipment (WB 18/05/2023; Health Cluster 31/01/2022).

Storm Daniel caused significant additional damage to healthcare facilities in the northeast. As at 19 October, 85% of the 231 assessed healthcare facilities were only partially functional or non-functional because of physical damage and the loss of medical equipment and supplies, power, and internet connectivity (IMC 16/10/2023). The worst impacts were on health facilities in AI Jabal AI Akhdar, AI Marj, and Derna districts (WH0 22/09/2023; UNICEF 21/09/2023). The Al-Bayda hospital, Taknis vaccination centre, and Al-Makhili rural hospital, the only vaccination centres for nearby populations, suffered critical damage, including to vaccine stocks (UNICEF 28/09/2023). Residents of Derna face challenges accessing functioning healthcare facilities

because of damaged roads and bridges, and a lack of transport, with most cars washed away by the floods and no public transportation in the city (WHO 11/10/2023). Storm Daniel also killed 101 healthcare staff, compounding a pre-existing shortage of healthcare professionals (WHO 12/10/2023).

Rainfall and potential flooding in the coming months may cause further damage to health facilities, roads, and other transport infrastructure, creating additional barriers to healthcare access. The potential spread of flood-related diseases, described above, will burden the strained healthcare system.

Increased need for mental health and psychosocial support (MHPSS)

Storm Daniel caused significant trauma and distress among affected people, many of whom lost their entire families and homes. Humanitarian responders have reported that MHPSS is an urgent need among the storm-affected communities and that there are insufficient numbers of trained MHPSS specialists available (OCHA 11/10/2023). People are also unaware of the mental health services that do exist and are unaccustomed to seeking MHPSS (WH0 11/10/2023). Needs are particularly high among adult and children IDPs. Symptoms in children include bed-wetting, withdrawal, and aggression (UNICEF 23/10/2023).

Additional rainfall and flooding may cause distress and anxiety among communities affected by Storm Daniel, increasing MHPSS needs. Post-Storm Daniel, recent rainfall in affected communities has already caused fear and additional psychosocial distress (IFRC 10/10/2023). Children with memories of the floods have become sensitive to rain, thunder, and other weather changes, demonstrating trauma-related anxiety (UNICEF 23/10/2023).

Localised food insecurity

Most agricultural, livestock, and oil industry activities in Libya typically occur along the northern coast, which normally experiences relatively high food security levels (REACH/WFP 09/05/2023). However, Storm Daniel raised food prices and disrupted market access in the northeast, causing localised food insecurity, which may be compounded by further rainfall and flooding (REACH/WFP 09/05/2023; DFS 28/09/2023).

Although Storm Daniel only affected a small portion of agricultural land, with no reported impact on the October planting of irrigated crops, market disruptions may occur for a long period given the damage to roads, irrigation sources, grain storage, and other infrastructure (GEOGLAM Crop Monitor 05/10/2023; FAO 13/09/2023). The storm destroyed 80% of markets in Derna, as well as siloes and warehouses in Al-Bayda, Derna, and Sousse, posing longer-term food storage challenges (0CHA 22/10/2023). Storm Daniel also destroyed the fishery

project in Derna and contaminated coastal waters, affecting other fisheries (0CHA 22/10/2023 and 29/09/2023; FA0 13/09/2023). The Derna port was partially closed after the storm, and information on its current state was unavailable as at 17 October.

Food prices rose significantly following the storm, stabilising at an above-average level by 10 October. As at the same date, 50% of storm-affected households surveyed by IOM and WFP reported challenges in accessing affordable basic goods because of higher prices and lower availability (OCHA 11/10/2023; DFS 28/09/2023). A WFP assessment found that 55% of respondents had lost their income either permanently (26.4%) or temporarily (28.6%) as a result of Storm Daniel (OCHA 11/10/2023). Prior to the storm, people in the urban area of Derna city were mostly dedicated to tertiary sector activities such as hospitality, education, health, and tourism, while heavier manufacturing was concentrated in the peri-urban and coastal regions, particularly in Al Sahel and Corsah. People in semi-rural areas were dedicated to agriculture, fishing, and grazing activities (REACH 03/03/2023). The complete loss of livelihoods for almost all affected people has resulted in great shock and trauma, increasing MHPSS needs (UNHCR 28/09/2023).

Additional flooding during the rainy season could further jeopardise livelihoods, prevent the restoration of roads that provide market access, and delay the growing of barley and wheat, which typically occurs over four to six months from mid-November (FAO 13/09/2023). Further rainfall may also increase coastal water contamination, delaying the restoration of access to fisheries and increasing saline intrusion, affecting groundwater and soil productivity (ICRC 14/04/2022).

Critical infrastructure collapse

Housing

The most recent information available, as at 13 October, includes the following.

- · Storm Daniel had affected over 30,800 buildings in eastern Libya.
- In Derna city, the storm completely destroyed almost 900 buildings and damaged over 3,000, the majority of which were residential buildings.
- In Benghazi city, the storm damaged over 13,000 residential buildings.
- In Al Marj city, the storm damaged at least 58 residential buildings.
- In Al-Bayda, the storm damaged over 4,300 residential buildings and possibly damaged at least 8,000 (UNDP 09/10/2023; UNICEF 08/10/2023).

As at 17 October, over 43,000 people remained displaced as a result of Storm Daniel. Information on shelter is limited, with many IDPs sheltering in schools and hotels (0CHA

19/10/2023). Further rainfall and flooding may impede residential reconstruction, while cold temperatures during the winter season will worsen living conditions for displaced people in temporary shelters.

Dams

There is conflicting information on the pre-Storm Daniel number of functioning dams in Libya, with recent sources indicating 14–18 dams across the country (Fanack Water 25/08/2022; ICOLD accessed 23/10/2023; FAO 02/07/2013). Out of these, 11 were completed or became operational between 1972–1982 (FAO 02/07/2013). Most of these dams have suffered damage because of a lack of regular maintenance (Libya Al-Ahrar 21/09/2023). The largest dam in Libya is Qattara dam (technically two dams), located around 40km east of Benghazi, with a capacity of 135 million cubic metres (ICRC accessed 26/09/2023). Al Jaza dam and Al Marj dam are also located in the northeastern district I (EC 18/09/2023; WFP 19/09/2023).ICOLD accessed 23/10/2023; FAO 02/07/2013). Out of these, 11 were completed or became operational between 1972–1982 (FAO 02/07/2013). Most of these dams have suffered damage because of a lack of regular maintenance (Libya Al-Ahrar 21/09/2023). The largest dam in Libya is Qattara dam (technically two dams have suffered damage because of a lack of regular maintenance (Libya Al-Ahrar 21/09/2023). The largest dam in Libya is Qattara dam (technically two dams), located around 40km east of Benghazi, with a capacity of 135 million cubic metres (ICRC accessed 26/09/2023). Al Jaza dam and Al Marj dam (technically two dams), located around 40km east of Benghazi, with a capacity of 135 million cubic metres (ICRC accessed 26/09/2023). Al Jaza dam and Al Marj dam are also located in the northeast (EC 18/09/2023; WFP 19/09/2023).

Storm Daniel caused the Al-Bilad Dam and Abu Mansour Dam, around 13km and 1km south of Derna, respectively, to collapse and flood Derna city with an estimated 30 million cubic metres of water (Al Jazeera 13/09/2023). Following Storm Daniel, some sources reported concerns regarding the condition of the Qattara and Al Jaza dams. While authorities claimed that both dams were functioning well, OCHA received contradictory reports on the condition of the dams in mid-September (DW 18/09/2023). As at 15–16 September, satellite-derived assessments indicated that the Qattara and Al Jaza dams were full, while the water level in Al Marj dam had increased (UNOSAT 19/09/2023). USAID cited reports received on 15 September from UNDAC indicating that all dams in the northeast were intact, except the Derna dams destroyed by Storm Daniel (USAID 13/10/2023). On the contrary, as at 16 September, the Logistics Cluster received unconfirmed firsthand information that Qattara dam was leaking (Logistics Cluster accessed 27/09/2023). As Qattara dam is located roughly 40km from Benghazi, its collapse will potentially have significant impacts on the city.

With regard to AI Jaza dam, there is conflicting information on whether it has been equipped with pumps to prevent rupture in the case of further rainfall. One source reported that AI Jaza's pumps had either been stolen in 2018 or had malfunctioned (The Messenger 13/09/2023). Another reported that the pumps prevented the destruction of AI Jaza dam during Storm Daniel (CEOBS 09/2023). As at 18 September, the authorities had informed OCHA that AI Jaza dam was being fitted with pumps to decrease water pressure (DW 18/09/2023).

Given the extent of conflicting and missing information on these dams, it is unclear whether further rainfall during the rainy season would cause them to overflow or burst. The divisive political response to Storm Daniel may hinder efforts to verify the condition of the dams and restore them if required. As at 1 October, Libya's prosecutor had ordered the detainment of twelve officials working in water resources and dam management as part of an inquiry into the failure of the dams in Derna during Storm Daniel. These people include the current director of the Dams Administration and the head of the Dams Projects Implementation Department (The Guardian 25/09/2023). Depending on the length of their detention, whether they are replaced, and the experience of their replacements, this development could impede action to prevent further damage to dams and flooding during the rainy season.

Map 1. Location and status as at 19 September 2023 of dams in northeastern Libya



Source: MapAction (19/09/2023)

Electricity infrastructure

Storm Daniel damaged at least 169 power plants and 3,860 generators in the northeast (Agenzia Nova 22/09/2023). In Derna city alone, it affected an estimated 25.9km of long-distance electricity lines (UNDP 09/10/2023). Electricity was restored in Derna district within three days of Storm Daniel, and many other areas affected by Storm Daniel had access to electricity as at 6 October (0CHA 22/10/2023; DFS 06/10/2023). There is a lack of comprehensive information on whether electricity has been fully restored across all affected areas.

Further rain and flooding could prevent the complete restoration of electricity and cause further damage to fragile electricity infrastructure in other parts of the country. Electricity infrastructure in Libya is generally old and damaged as a result of a lack of maintenance, theft, and deliberate destruction, leading to both scheduled and unscheduled power outages across the country (EIA 09/05/2022).

Oil and gas infrastructure

Most of Libya's oil reserves are located in northeastern Sirte region (EIA 09/05/2022; IRI accessed 25/10/2023). Five of Libya's six oil refineries and many of the country's crude oil fields are also located along the northern coast (S&P Global 10/09/2023).

Even prior to the conflict, oil power plants and pipelines in Libya had already caused significant pollution because of poor regulation and management. Fighting between 2011–2020 further damaged oil infrastructure (CEOBS 16/03/2018; The Arab Weekly 27/10/2021). Heavy rainfall could cause additional damage to these facilities, leading to spillages and contaminating the surrounding land and water.

Other industrial infrastructure

Untreated industrial waste has caused significant pollution in Libya in the past (CEOBS 16/03/2018). Flooding may expose affected populations to increased contaminants in mud and debris from residences, industrial areas, fuel tanks, and other pollution sources (CEOBS 09/2023; OCHA 29/09/2023).

In northwestern Libya, close to the border with Tunisia, the abandoned Abu Kammash petrochemical complex has been leaking mercury and other dangerous chemicals into the ocean and land for years (EJAtlas accessed 25/10/2023; MEE 14/12/2017). Flooding may increase this leakage, particularly affecting the communities living in the area.

Map 2. Map of current key infrastructure in northern Libya



Sources: ACAPS using data from HOT (accessed 19/10/2023 a); HOT (accessed 19/10/2023 b); HOT (accessed 19/10/2023 c); HOT (accessed 19/10/2023 d)

Heightened impact on people recovering from Storm Daniel and conflict

IDPs, refugees, and migrants

Shelter conditions will likely worsen in the event of increasing cold and heavy rainfall. Lower temperatures will also generate the need for warm clothes, shelter, gas, and other cold-weather NFIs (WB accessed 03/10/2023; DFS 28/09/2023).

Pre-Storm Daniel IDPs, migrants, and refugees: as at May 2023, there were over 706,000 refugees and asylum seekers registered with UNHCR in Libya (IOM 24/05/2023). There were also around 46,000 IDPs in eastern Libya, mostly in Benghazi (UNHCR accessed 27/09/2023; UNCHR 26/09/2023). As at August 2022, eight of the ten districts with the biggest migrant and refugee populations in Libya were in the flood-prone northeast or northwest, and nearly all registered refugees were in the north (REACH 01/02/2023). According to a 2021 REACH

Multi-Sector Needs Assessment (MSNA), the primary needs of surveyed refugee and migrant populations were protection (particularly given a lack of legal documentation), health, and WASH services (particularly because of poor sanitation facilities) (REACH/UNHCR 31/05/2022). These needs are liable to worsen because of flooding and rainfall, which may cause onward displacement or the destruction of documents, contribute to waterborne disease risks, and damage WASH facilities.

People displaced by Storm Daniel: as at 17 October, Storm Daniel had displaced over 43,000 people (0CHA 19/10/2023). These included existing IDPs from Tawergha, who fled the northwestern town used to stage former ruler Muammar Qaddafi's assault on Misurata, which killed 1,000 people (ICRC 16/06/2022; NYT 24/09/2011). Storm Daniel also caused the secondary displacement of several hundred migrants and refugees from Bangladesh, Chad, Egypt, and Sudan (IOM 12/10/2023; OCHA 11/10/2023). UNCHR estimates that around 1,000 refugees and asylum seekers were living in areas affected by Storm Daniel (OCHA 22/10/2023).

Map 3. District-wise pre- and post-Storm Daniel displaced people, migrants and refugees



Sources: ACAPS using data from UNHCR (accessed 19/10/2023); IDMC (accessed 19/10/2023); Kontur accessed 19/10/2023)

94% of the people displaced by Storm Daniel have remained in northeastern cities, with around 16,000 displaced in Derna and high numbers in Benghazi (4,365), Al-Bayda (3,375), Shahat (3,365), and Tobruk (3,331) as at 12 October (IOM 12/10/2023). They are housed with host families, in rented accommodation, or in collective accommodation, including ten schools (OCHA 11/10/2023). The remaining 6% of displaced people have travelled to northwestern cities, particularly Misrata (790) and Tripoli (121) (IOM 12/10/2023). The people displaced by Storm Daniel need shelter, food, MHPSS, and WASH support. Collective accommodation is overcrowded, with limited access to clean water and sanitation facilities, missing doors and windows, and a lack of insulation, light, and electricity (WH0 22/09/2023; OCHA 11/10/2023).

Displaced women

Women displaced both by Storm Daniel and previous conflict are vulnerable to GBV because of the poor conditions of their shelter, which lack proper lighting and suffer repeat power outages. As at 30 September, there was no access to GBV prevention and response services in shelters for Storm Daniel IDPs. Some women, particularly from the Tawerghan community, have been continuously displaced for almost a decade and have urgent reproductive and mental health needs (UNFPA 30/09/2023). Further rainfall and flooding could cause additional electricity disruptions or onward displacement, heightening GBV risks and health needs.

Children

Children comprise 40% of those affected by Storm Daniel. 56% of children surveyed during UNICEF's post-storm Multi-Thematic Rapid Needs Assessment were experiencing psychological distress (UNICEF 17/10/2023). A growing number of unaccompanied and separate children have been identified (DFS 28/09/2023). Further rainfall and flooding may expose these children to additional psychological distress and onward displacement and constrain an already limited child protection response.

Floods in Libya have frequently led to the temporary closure of schools (Africa News 28/11/2022; REACH 24/11/2020; The Libya Observer 06/01/2019). Further flooding in the 2023 rainy season will put additional strain on an education system already struggling because of Storm Daniel, which affected 117 educational facilities, destroyed four, and caused significant damage to 44. As at 22 October, 98 schools were still closed as a result of flood damage, including mud and debris, damage to structures, and a lack of electricity and water. As at 10 October, 11 schools were being used to house people displaced by the floods (OCHA 11/10/2023; UNICEF 28/09/2023). All schools that were not damaged or repurposed have reopened for education, aside from schools in Derna, which are currently providing MHPSS programming and are scheduled to resume formal schooling on 28 October. Additional flooding may prolong school closures and cause further damage to school facilities.

Transport infrastructure

Roads across Libya are old and have been neglected, leading to significant damage. Most railways are unusable (Elmansouri et al. 11/2020). Storm Daniel has worsened this situation in the northeast, inflicting significant damage to major roads and destroying at least 11 bridges (TRT Afrika 19/09/2023). As at 9 October, in Al-Bayda city, 6.6km of local roads were destroyed, 29.3km damaged, and 40km possibly damaged. In Benghazi, according to satellite images, 1.8km of roads were totally damaged, and an estimated 78km were likely damaged (UNDP 09/10/2023). As at 13 October, the only inter-city road that remained impassable was between Derna and the towns of Ayn Marrah and Alqubba. The coastal roads from Shahat to Sousse and Sousse to Derna were damaged and narrow, and permission from forces aligned with eastern General Khalifa Haftar was required to travel the latter road. As at 9 October, a bridge in the Lethron area was also in danger of collapsing (Logistics Cluster accessed 13/10/2023).

Further rainfall and flooding may impede the restoration and reopening of roads in the northeast. During previous winters, rainfall in Libya led to the closure of major roads, although they were usually reopened after several days (Logistics Cluster accessed 02/10/2023). Recent rainy seasons also saw the temporary closure of Benghazi airport and seaport and temporary damage to electricity infrastructure (AI Jazeera 06/12/2018; FloodList 09/12/2013). Any of these occurrences could limit humanitarian access in the days following further flooding and storms. As at 19 October, the port of Benghazi remained functional and had been assessed to be a feasible cargo route, and contractors were available (0CHA 19/10/2023; Logistics Cluster accessed 19/10/2023).

Political

Libya's government is divided between the western Government of National Unity (GNU) and the eastern Government of National Stability (GNS). GNS efforts to maintain control over the northeast may impede access in response to any further rainfall and flooding. Following Storm Daniel, the GNS has been accused of blocking aid delivery from western Libya, sending away western Libyan medical teams, and establishing checkpoints and curfews that impede humanitarian access (AA 02/10/2023; AI 21/09/2023; The Guardian 17/09/2023; NPR 18/09/2023).

The rival governments may also pose a bureaucratic challenge to international humanitarian access in the event of further flooding. Responders to Storm Daniel reported confusion about which government to request a visa from and which to coordinate with upon arrival in the affected areas (FP 22/09/2023).

Security

The fragile security situation, particularly in northeastern Libya, may pose access constraints in the event of further flooding. On 6 October, there was fighting and a communications blackout in Benghazi when GNS-aligned forces attempted to apprehend Mahdi Al-Barghathi, the former Defense Minister of the western government (Reuters 09/10/2023; Crisis24 07/10/2023). The violence temporarily disrupted the WFP's food distribution programme (WFP 12/10/2023). There is a lack of information on whether the clashes have ceased and what the humanitarian needs may be.

Western GNU-aligned militias entered the northeast in late September to support the Storm Daniel response and provide security (Crisis24 21/09/2023; FP 22/09/2023). Fighting between these militias and eastern armed groups may constrain the humanitarian response to flooding during the rainy season.

Social unrest in the northeast may also worsen the security situation. Protests in Derna on 18 September calling for an investigation into the Storm Daniel floods prompted local authorities to expel journalists from the city, arrest protesters, and establish checkpoints. There are current public demands for accountability, particularly from the GNS, which could lead to further restrictions on movement and communications in the northeast (Crisis24 21/09/2023; The Guardian 01/10/2023).

Al-Qaeda-affiliated groups are present around Derna and Benghazi and engage in clashes with Haftar-affiliated forces (Crisis24 06/10/2023). Heightened instability and governance failures in the east may provide space for Al-Qaeda-affiliated groups to increase their activities.

AGGRAVATING FACTORS

Risk of the explosion of explosive remnants of war (ERW)

Heavy rainfall and flooding during the rainy season may increase the risk of ERW by moving or exposing them. The conflict that erupted in Libya in 2011 and intensified between 2014–2020 left many landmines and ERWs, creating a high risk for civilians. Despite the cessation of hostilities in the second half of 2020, there was a drastic increase in the number of accidents reported in Libya between 2021–2022. These included 162 mine and ERW accidents from May 2020 to March 2022 resulting in a total of 329 casualties (132 killed, 197 injured), of whom 76% were civilians (0CHA 05/04/2022; HRW 27/04/2022). According to a 2021 MSNA, the three cities where residents most frequently reported restricted movements because of ERW were all along the northern coast, including in Derna city (Protection Cluster 30/04/2022).

Storm Daniel caused ERW to shift into areas previously considered safe (UNICEF 21/09/2023). Further rainfall and flooding may shift these ERW again, complicating efforts to locate and avoid them and risking the safety of residents.

Political divisions and risk of aid politicisation

Since 2014, nearly all of Libya's key institutions and ministries have been split into eastern and western branches, corresponding to the rival governments (WB 18/05/2023). Political division also characterised the Storm Daniel response, with Libya's GNU and GNS pursuing competing humanitarian initiatives (UNSMIL 02/10/2023). These divisions risk hindering a coordinated response to the upcoming rainy season.

The overall Storm Daniel response was marked by confusion over which national responders were receiving funding and distributing aid. The internationally recognised GNU received the bulk of foreign aid, while the GNS received support from the United Arab Emirates and Russia (France 24 24/09/2023 and 03/10/2023; AA 02/10/2023). The speaker of the eastern parliament, aligned with the GNS, announced a EUR 1.9 billion (USD 2 billion) reconstruction fund and the creation of an emergency committee. On the following day, a deputy argued that the creation of this emergency committee would be illegal (FP 22/09/2023). On the other hand, the GNU announced EUR 18 million in aid for schools in the east. It is unclear how these eastern and western funds will be coordinated and who will allocate them. After years of division, the Central Bank of Libya was recently united in August 2023, but the unification process was still underway as at 10 October, possibly complicating the national allocation of flood response funding (AP 20/08/2023; The Libya Observer 10/10/2023). Rival governments may also take advantage of confusion in the dual response to divert funds from relief to their own accounts (Daily Sabah 03/10/2023; The Guardian 01/10/2023).

The rival governments both proposed reconstruction conferences, but the GNS was forced to delay its conference from 10 October to 1 November because of international donor concerns over the competing responses (Daily Sabah 03/10/2023). The UN, various European governments, and the US have called for a united, independent body to oversee the flood response in the east. Unspecified European governments have informed Libyan officials that funding levels will depend on whether the national response is unified and accountable (The Guardian 01/10/2023). Whether this international pressure is successful at encouraging the creation of a unified response mechanism may have a significant impact on national responses to further flooding during the rainy season.

The political division also presents a risk of the same uncoordinated conflicting messaging and actions that characterised the immediate response to Storm Daniel. Ahead of the storm, the GNS and its allied security forces imposed a curfew in eastern cities and told residents to shelter at home, while local authorities issued contradictory orders for some residents to evacuate. Many residents refused to leave their homes because of this confusing advice and because of a general lack of trust in the GNS and its affiliated security forces (FP 22/09/2023; The Guardian 14/09/2023).

Libya's meteorological service, based in Tripoli and under the control of the GNU, has a low operational capacity as a result of a lack of staff and deficient information technology systems (CEOBS 09/2023). The service lacks the radars necessary to measure rainfall across Libya (Arab News 29/09/2023). It is also unclear whether parts of the population have access to the service. A 2022 livelihoods study by REACH and WFP found that farmers in some areas did not have extensive contact with meteorological services (REACH/WFP 09/05/2023). This may undermine efforts to ensure preparedness prior to the rainy season.