

Impact of Storm Daniel in eastern Libya and the collapse of dams in Derna

OVERVIEW

- On 10 September 2023, Storm Daniel made landfall in Libya, causing heavy rainfall, flash floods, and strong winds. It affected coastal towns and cities in the northeast of the country (Al Jazeera 11/09/2023; Reuters 12/09/2023; IOM 11/09/2023). Before making landfall in Libya, the storm also hit Bulgaria, Greece, and Türkiye, killing at least 14 people (CNN 07/09/2023). In those countries, the storm flooded homes, caused landslides, and destroyed roads and agricultural assets and produce (FT 08/09/2023; EUobserver 11/09/2023; AA 10/09/2023).
- It is likely that the storm most affected Derna, a port city in Derna district (Cyrenaica region) that sits on a river delta. Two of its dams collapsed because of heavy rainfall, leading to the water swiping away entire neighbourhoods in the city (NBC 11/09/2023; Euronews 11/09/2023; Reuters 12/09/2023; CNN 11/09/2023). Derna city had a pre-storm population of around 125,000; as at 12 September, around 2,000 bodies had been recovered following the floods (Asharq Al-Awsat 13/09/2023; Independent 13/09/2023). The storm also damaged or destroyed critical infrastructure and disrupted electricity and communication lines (IOM 11/09/2023; NBC 11/09/2023).
- On 13 September, the Libyan News Agency reported that the storm killed around 5,300 people across northeastern Libya. 10,000 people remained missing (Al Jazeera 13/09/2023; UN 12/09/2023). The storm significantly damaged homes and critical infrastructure in all affected areas, including roads, bridges, and telecommunication networks (IOM 11/09/2023; NBC 11/09/2023).
- Initial reports indicate that the storm severely affected dozens of villages and towns. The most affected municipalities (baladyat) include Albayda, Almarj, Al Owailia, Albayda, Benghazi, Derna, Shahhat, Sousa, Taknes, Talmeitha, Tobruk, and Toukra in northeastern Libya (IOM 11/09/2023).
- The eastern Libyan authorities have asked for national and international intervention and for relevant organisations to assist in search-and-rescue operations (Al Jazeera 11/09/2023).

Anticipated scope and scale

- According to a local official, the Wadi Jaza dam between Derna and Benghazi (which are 250km apart) is on the brink of collapsing (NYT 12/09/2023).
- Some reports say that the flash floods resulting from the collapse of the dams in Derna swiped away as much as 25% of the city (Sky News 12/09/2023; Reuters 13/09/2023). Despite heavy flooding in 2021, the city still lacked preparedness for a disaster of such an unprecedented magnitude.
- The extent of needs exceeds the current local response capacity. The presence of two rival governments in Libya (the Government of National Unity and the Government of National Accord) and political turmoil and division are likely to result in a lack of national coordination efforts, slowing down rescue operations and the emergency response (CNN 13/09/2023; Time 13/09/2023).
- According to local officials, as many as 10,000 people across Libya are missing. The actual number is likely higher, since the disaster has disrupted phone and internet services and limited data collection (i24 12/09/2023).
- Health facilities lack the capacity to treat the people in need and will likely be overwhelmed by the number of injured people. Water stagnation and contamination from the floods will also increase the risk of waterborne disease outbreaks, such as cholera (Crisis24 11/09/2023; Carbon Brief 12/09/2023).
- The intended function of one of the collapsed dams, Wadi Derna Dam, was to protect the city of Derna from the seasonal Wadi Derna River and provide water for irrigation and agriculture (The Guardian 12/09/2023; Hidrotehnika accessed DD/MM/2023). The collapse of the dam will most likely affect the agricultural sector in the area. The reconstruction of the dam is most likely needed to protect the city from future flooding.



Humanitarian constraints

- Physical and logistical constraints limit humanitarian movements and response. The floods destroyed or severely damaged several roads and bridges. Local authorities are requesting the activation of alternative sea routes for aid (AA 11/09/2023 a and 11/09/2023 b). The closest functioning international airport to Derna is Al Abraq International Airport, 99km away. It is the main entry point for international aid to affected areas (CBC 12/09/2023).
- Three Libyan Red Crescent workers have died and at least 12 have gone missing while rescuing people from the floods (Al Jazeera 11/09/2023; EuroNews 11/09/2023).
- Libya continues to face a fragile security situation that is expected to become worse with the impact of the flooding. Since the start of the civil war in the country in 2011, humanitarian facilities and personnel have regularly faced attacks and insecurity (OHCHR 23/05/2018; WHO 29/08/2022; UNICEF 05/12/2022; AI accessed 13/09/2023; UNFPA accessed 13/09/2023).
- Administrative impediments by both governments challenge the humanitarian response. Limitations on cash withdrawals and money transfers also challenge humanitarian operations (USAID 07/04/2023). Since March 2022, the Libyan Directorate for Passports operating under the Tripoli-based Government of National Accord has not issued any visas for international staff (Serbia MFA accessed 13/09/2023). This is the longest suspension so far, leading to the delay and cancellation of humanitarian activities. The registration process for humanitarian organisations is complex and time-consuming, and increased scrutiny by national authorities continues to shrink the humanitarian space (OCHA 17/04/2023).
- Political instability affects humanitarian access and operations in Libya. The lack of a central government and political division challenge coordination efforts and funding, especially with the two governments having different priorities and agendas (NBC 11/09/2023; Euronews 11/09/2023).

INFORMATION GAPS

- As at 12 September, the figures for injuries and deaths have not been confirmed, and the numbers varied depending on the source and authorities. Most sources put the casualties between 5,000–10,000 (IOM 11/09/2023). Reported numbers of missing people also varied from one official to the other.
- It is unclear how the reported numbers of fatalities and people missing are consolidated, especially with only a few available needs assessments by humanitarian organisations, as communication networks are cut off in many affected areas (Al Jazeera 11/09/2023).

CRISIS IMPACT

Shelter and NFIs: the floods swiped away houses and carried vehicles and debris. Apartment buildings near flood currents partially collapsed (CNN 11/09/2023; NY1 11/09/2023). Because of a lack of shelter, some displaced people are staying in at least 17 public schools in and around Benghazi city, while others are staying on roadsides and in other public areas (IOM 11/09/2023; Floodlist 12/09/2023; MEMO 11/09/2023). Some of the immediate needs following the floods likely include shelter, blankets, mattresses, plastic sheets, kitchen sets, and winter clothing (IOM 11/11/2021).

Health: despite the very limited information on the humanitarian impact of the floods on people, health is highly likely one of the priority needs. At least 7,000 people are estimated to be injured across affected areas, and the city of Derna lacks the capacity to respond to the increasing health needs. The only hospital normally functioning in Derna has only five bedrooms, and it is currently out of service (AA 12/09/2023; France 24 12/09/2023; Al Jazeera 12/09/2023). The flooding has also inundated the Medical Center of Albayda, the main hospital in Albayda city, and patients have had to be evacuated (El País 12/11/2023).

Another issue is that the floods tend to turn into stagnant pools that often become breeding grounds for mosquitoes and bacteria, increasing the risk of waterborne diseases. People's exposure to contaminated water from inundated industrial sites, sewer systems, and septic tanks poses a significant health threat (Crisis24 11/09/2023). There are corpses lined up on the street outside the hospital in Derna, increasing the likelihood of the spread of diseases (Devdiscourse 12/09/2023).

WASH: access to potable water is a priority need. Before the floods, water networks in Derna were already in poor conditions and suffered from a lack of maintenance (REACH 29/11/2022). These networks are likely not operational following the flooding. During the 2021 floods in eastern Libya, access to safe drinking water was severely affected (IOM 11/11/2021).

Education: on 9 September, the Ministry of Education in eastern Libya allowed schools to suspend classes because of inclement weather, at least until 14 September (AA 11/09/2023 c; Libya Observer 09/09/2023). This suspension is likely to be extended in the coming weeks in the affected areas, especially with displaced people using many schools as shelter.

Food security: the number of people in need of food assistance is unclear. Before the floods, over 324,000 people, including 174,000 Libyans and 150,000 non-Libyans, were in need of food assistance across Libya (WFP 10/09/2023). After the 2021 floods in eastern Libya, food emergency assistance for the displaced included fortified wheat flour, pasta, pulses, rice, tomato paste, and sugar (IOM 11/11/2021).

Impact on critical infrastructure: the floods destroyed roads and bridges and disrupted phone and electricity lines (CNN 11/09/2023; Reuters 12/09/2023). The collapse of the two dams severely flooding Derna also worsened the situation in the city. The collapse of the dams was partly a result of a lack of maintenance besides heavy rainfall (Reuters 13/09/2023). As at 12 September, the oil ports of Brega, Es Sidra, Ras Lanuf, and Zueitina were closed, affecting economic activities and governmental revenue; oil production is a significant source of income in eastern Libya (Reuters 12/09/2023; US EIA 09/05/2022).

AGGRAVATING FACTORS

Political instability: aiming for more stability in the country, Libyan politicians agreed in 2021 to have two governments: the Government of National Accord based in Tripoli in western Libya and the Libyan National Army in Tobruk in the east. The disputes cross economic, tribal, regional, political, and religious lines. The political instability caused civil unrest and protests in 2022, with protesters demanding the dissolution of all political bodies, first and foremost the House of Representatives (GIS 11/08/2023; The Guardian 10/02/2022). The lack of a central government and political division resulted in dwindling investment in public infrastructure and services (NBC 11/09/2023; Euronews 11/09/2023). Currently, the eastern Libyan government has declared the city of Derna as a disaster zone, while the head of Libya's Tripoli-based government has declared areas exposed to floods as disaster zones (AA 11/09/2023).

Libya has been in civil war since 2011. This war has led to protracted violence, the emergence of several (conflicting) armed and political groups seeking to control the country, damage to critical infrastructure, and severe disruptions to the country's oil production (The Borgen Project 02/04/2018; The Guardian 26/10/2011; OCHA 26/01/2023; IOM 17/01/2023; UN 30/08/2022; Reuters 12/09/2023).

Derna experienced heavy armed conflict from 2014 to early 2019. Tribal, military, and religious factors overlapped and fuelled local fractures and conflict dynamics. Many armed groups were active in and around the city, which the Libyan National Army also targeted with air strikes and land assaults. During armed conflict, the city suffered heavy damage to its public infrastructure and residential buildings, resulting in important population displacements (REACH 29/11/2022).

Landmines and explosive remnants of war (ERW): as a result of the conflict, landmines and ERW contaminate some areas of Derna municipality (Baladya). This constitutes a security risk and movement barrier for the population. With the floods and the collapse of buildings, the risk is higher as landmines and ERW can move around. Only 25% of households residing in Derna reported being aware of the presence of mines or ERW in their neighbourhoods (REACH 29/11/2022).

Presence of displaced people: many of those affected by the storm and flooding are likely to be migrants, refugees, and IDPs. As at August 2023, Libya reported over 700,000 people displaced in mixed movements (either as a migrant, asylum seeker, or refugee) besides more than 125,000 IDPs (IOM 24/08/2023). As at April 2022, the city of Derna was hosting 46,600 IDPs and returnees from Derna, as well as IDPs from other areas of the country (REACH 29/11/2022).

Access to essential services: before the floods, around 5% of households living in Derna reported having no access to electricity, while 51% reported no or rare access to water from the public network. Around 87% of Libyan households in Derna could not afford healthcare services (REACH 29/11/2022).

FUNDING AND RESPONSE CAPACITY

The lack of a central government and political division risk complicating or hampering rescue operations and coordination efforts. Humanitarian needs are significantly high. There are not enough trained rescuers in Libya (BBC 12/09/2023).

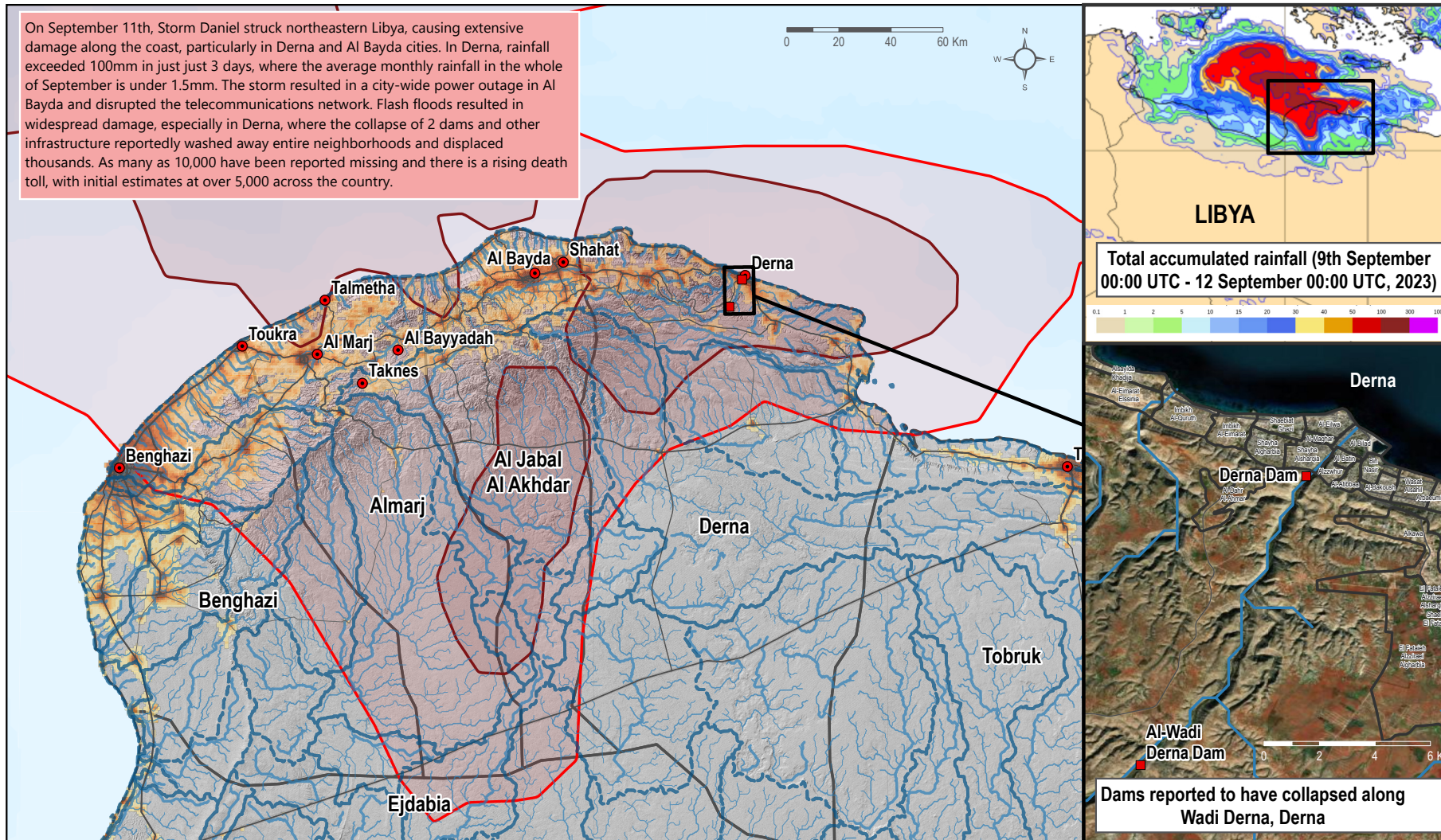
Egyptian military officials have arrived in Benghazi along with a rescue team and helicopters. The Tripoli-based government has sent a plane with 14 tons of medical supplies and health workers to Benghazi (El País 12/09/2023). The UNSMIL is also operating in Libya and monitoring the situation (AA 11/09/2023 a).

During the 2021 floods in the region, OCHA coordinated the rapid distribution of aid. The WFP, UNHCR, UNFPA, UNICEF, local authorities and local NGOs, and LibAid were involved in the coordination of this response to the 2021 floods, but there has not been a storm like Daniel in the region in decades (IOM 11/11/2021).

The UN has deployed resources to assist in the response efforts. The UN has announced coordinating with Libyan authorities to support the response efforts (OCHA 12/09/2023).

STORM DANIEL ACCUMULATED RAINFALL AND EXPOSED POPULATION IN LIBYA

On September 11th, Storm Daniel struck northeastern Libya, causing extensive damage along the coast, particularly in Derna and Al Bayda cities. In Derna, rainfall exceeded 100mm in just 3 days, where the average monthly rainfall in the whole of September is under 1.5mm. The storm resulted in a city-wide power outage in Al Bayda and disrupted the telecommunications network. Flash floods resulted in widespread damage, especially in Derna, where the collapse of 2 dams and other infrastructure reportedly washed away entire neighborhoods and displaced thousands. As many as 10,000 have been reported missing and there is a rising death toll, with initial estimates at over 5,000 across the country.



Total accumulated rainfall (9th September 00:00 UTC - 12 September 00:00 UTC, 2023)



Dams reported to have collapsed along Wadi Derna, Derna

- 50-100mm accumulated rainfall
- 100-300mm accumulated rainfall
- Affected settlements
- Affected dams
- Admin 2 boundaries
- Derna Neighborhood (REACH)
- Population density (WorldPop, 2020)
Persons/km2
5124
0
- Trunk road (OSM)
- Secondary road (OSM)
- Primary road (OSM)
- Watersheds (HydroSHEDS Level 7)
- Stream flow (HydroRivers)
Ordinal class
1
2
3 - 4
5 - 6

Note: rainfall accumulation is estimated based on ECMWF forecast. Areas of high rainfall not necessarily affected by flooding

Data sources: Total accumulated rainfall: ECMWF early-run high resolution forecast (HRES); Neighbourhoods in Derna: REACH Area-Based Assessment (Nov-Dec 2022); Elevation: SRTM; Rivers and watersheds: WWF HydroSheds; Roads: OSM (2023); affected settlements: IOM (11/09/2023).
 Projection: Transverse Mercator
 File: REACH_Libya_Storm_Daniel_Potential_Exposure_Sept2023
 Contact: reach.mapping@impact-initiatives.org

Note: Data, designations and boundaries contained on this map are not warranted to be error-free and do not imply acceptance by REACH partners, associates or donors mentioned on this map.

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Source: REACH (12/09/2023)