



IOM LIBYA

MUNICIPALITY EMERGENCY PREPAREDNESS REPORT

An Analysis of Risks in the Municipalities of Ghat and Shahhat

SEPTEMBER 2024

RISK ANALYSIS AND EMERGENCY PREPAREDNESS

BACKGROUND

Over the past year, Libya has experienced an array of extreme weather events, particularly flash floods, that have significantly affected communities across the country. These events, which have occurred with increased frequency, highlight how [climate change and environmental degradation](#) continue to affect Libyan communities.

One of the most consequential extreme weather events that Libya experienced was ushered in by Storm Daniel. On September 10, 2023, Storm Daniel made landfall in eastern Libya, leading to substantial rainfall and sudden flooding in the northeastern regions and coastal cities, with Derna being the most affected. The subsequent collapse of the Mansour and Derna dams severely compounded the damage across Derna municipality and precipitated internal displacement in the region. Based on a November 2023 [assessment](#), DTM Libya estimated that at the time, 44,862 individuals remained displaced because of the storm.

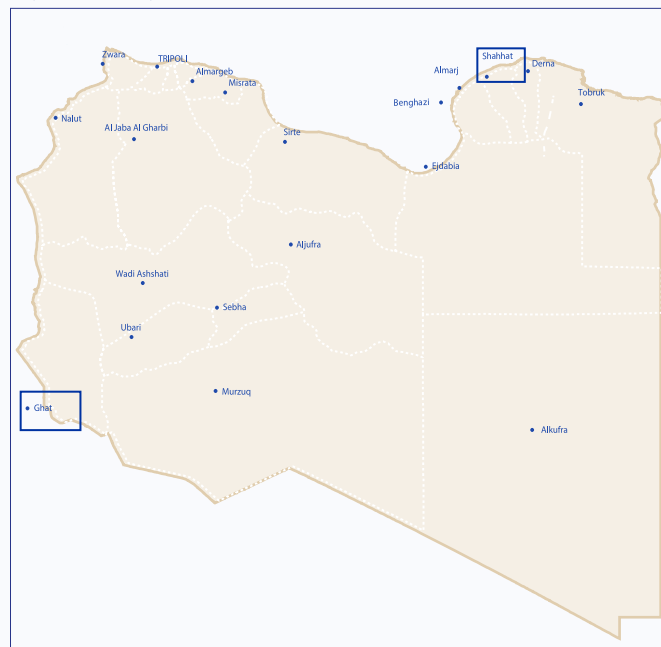
In Shahhat municipality, Storm Daniel caused significant flooding, impacting both agricultural and residential areas. In general, the northeastern part of Libya, where Shahhat is located, experiences heavy rainfall during the months of September, October, and November each year. As a result, the area is considered prone to seasonal flooding.

Prior to this, on June 3, 2019, Ghat municipality and the surrounding areas were heavily affected by torrential rains which led to significant floods. Residents reported that water levels reached up to two meters in certain areas. In the immediate aftermath of the flooding, Ghat municipality reported that its water and sanitation services were severely limited. Overall, more than 5,075 people were displaced from flood-impacted areas, once more illustrating the extent to which extreme weather events can affect civilian populations.

More recently, on August 16, 2024, heavy rainfall in the towns of Ghat and Tahala caused [significant flooding](#). IOM estimated that over 7,000 individuals were displaced in the region of Ghat, with 4,346 Libyans who were sheltering in camps, informal temporary accommodation, one school, and with host families. Alongside them, 2,745 migrants were being accommodated by relatives and friends in neighborhoods that were not affected by the floods.

Against this background, DTM Libya has sought to both bolster risk analyses and to better understand the extent of emergency preparedness in certain municipalities in Libya. In particular, DTM Libya conducted semi-structured discussions, using a Vulnerability and Capacity Assessment (VCA) T1 tool, in the municipalities of

Map 1.0 The Municipalities of Ghat and Shahhat



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Ghat and Shahhat through which to better gauge their level of preparedness and to understand the range of natural hazards that the residents of those municipalities have experienced.

As respondents indicated, each municipality faces its own unique combination of natural hazards, including flash floods and extreme desert winds. A number of the aforementioned natural hazards were exacerbated by, or closely interlinked with, climate change shocks. For this reason, this report also speaks to a range of climate change shocks that respondents indicated affect their municipalities. Overall, the respondents pointed out that while emergency preparedness services exist in both Ghat and Shahhat, they do not operate at full capacity and thus, are strained in responding to disasters as well as hazards. As the respondents also indicated, additional measures, which are further outlined in this report, can bolster emergency preparedness in each municipality.

METHODOLOGY

The data that was used for this report was derived through semi-structured group discussions, which were guided by the aforementioned VCA T1 tool. DTM met with key municipality officials in Shahhat in March 2024 and in Ghat in June 2024. Additional data was collected through a VCA workshop on July 14-16, 2024 in Shahhat municipality, which included local organizations, members from the community, and officials from the municipality.

SHAHHAT

RISK IDENTIFICATION

Shahhat is a coastal city that lies in a valley in the Green Mountain uplands. It is considered to be the second largest city in the Green Mountain, after the city of Albayda. When reflecting upon the array of risks that Shahhat faces, numerous respondents indicated that they consider several areas in the city to be at high risk of extreme weather events, particularly flash floods and wildfires.

Of particular importance to respondents were four main assets, including the city's forests, power stations, monuments, and civilian infrastructure. As numerous respondents indicated, an array of structural buildings in the city, including fire stations, hospitals, schools, and residential

buildings are considered to be vulnerable to the effects of extreme weather events, particularly flash floods. Respondents specifically highlighted that in the recent past, civilian infrastructure, including power stations, suffered damage from lightning and extreme flooding. This in turn affected the electrical supply across the city and resulted in serious disruptions.

Other respondents indicated that the entrance of Shahhat was a vulnerable area, with an array of sites such as Shahhat Hospital, Gorina Hotel, mosques, schools, gas stations, sewage systems, and residential buildings that were constructed in vulnerable areas. In doing so, the respondents further reiterated that civilian infrastructure is

particularly at risk of flooding. Relatedly, the respondents indicated that two civilian areas, namely Souq Aljumaa (Friday market) and Hay Aljamie (University neighbourhood), are considered to be the most at risk of the adverse effects of extreme weather events and natural hazards.

Taken together, all of the respondents indicated that civilian infrastructure in Shahhat is at high risk of experiencing the effects of extreme weather events, most notably flash flooding. While the prevalence of different risks varies, there is nevertheless, an indication that they have the potential to significantly disrupt residents' livelihoods as well as the city's operations. As such, these distinct risks are further discussed below.

NATURAL HAZARD RISKS

Flash Floods



Wildfires and Sandstorms



Ground Collapses



- High Frequency
- Medium Frequency
- Low Frequency

Shahhat experiences annual wildfires during the summer season, which are often exacerbated by extreme heat. These natural hazards significantly affect the agricultural sector, particularly during the fruit harvesting season. The respondents noted that most farms in the municipality experienced significant soil erosion, resulting in their transformation into rocky terrain, which is not suitable for harvesting.

In the aftermath of Storm Daniel and the extreme flooding that followed, the municipality experienced ground collapses, some of which reached a depth of 12 meters and affected public infrastructure as well as private homes. Approximately 1200 families were provided with compensation for the damages they incurred.

CLIMATE CHANGE SHOCKS

Desertification and Soil Erosion



Desert Winds



Heatwaves



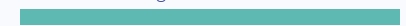
- High Frequency
- Medium Frequency
- Low Frequency

The respondents indicated that Shahhat experiences prevalent desertification, particularly across its agricultural land and pastureland. This process is exacerbated by the lack of vegetation cover, which has made sandstorms a recurring phenomenon, causing frequent incidents in the municipality. It is also exacerbated by increasingly frequent and extreme heatwaves that further reduce vegetation cover.

Residents in the southern part of the municipality are often affected by the south winds known as desert winds. These winds have intensified due to desertification, forest erosion, and the cessation of agricultural activities as well as national reforestation projects. As such, they are increasingly contributing to a set of conditions that accelerate desertification.

ADDITIONAL RISKS

Blackwater Leakage and Water Contamination



Waste Accumulation



Damaged Groundwater Wells



- High Frequency
- Medium Frequency
- Low Frequency

Shahhat faces challenges related to waste management insofar as malfunctioning sewage treatment plants fail to purify blackwater into usable water for agriculture. These treatment plants have been non-functional for over a decade and have significantly constrained the municipality's capacity to maintain its farmland, which requires a substantial amount of irrigation.

Additionally, the municipality's sewage pipelines have not been maintained. In some instances, this has resulted in blackwater leakages into waterlines, which have contaminated groundwater. An increasing number of groundwater wells are susceptible to contamination and deterioration. Due to the pollution of these wells, there have been periodic shortages in drinking water across the municipality.

SHAHHAT

RISK ANALYSIS MATRIX

As respondents indicated, there are at least four risks that they consider to be crucial to monitor in Shahhat, including floods, wildfires, water contamination, and desertification.

These risks are often exacerbated by additional hazards and their impact can be magnified by broader environmental changes as well as

environmental degradation. As such, these risks should be considered on an individual basis, but also in relation to one another to ensure comprehensive preparedness.

Table 1.0 Risk Analysis Matrix for Shahhat Municipality

RISK	LIKELIHOOD	IMPACT	EXPLANATION
FLOOD	High	High	Flooding recently affected Shahhat in the aftermath of Storm Daniel. Given the increasing frequency of extreme weather events, it is considered a high risk.
WILDFIRE	Medium	High	With recent increasing temperatures, more frequent heatwaves, and the resulting effects, wildfires are considered to be a medium risk, with a high risk impact.
WATER CONTAMINATION	Medium	Medium	Given an array of challenges with blackwater spillage, existing water contamination, difficulties with groundwater wells, water contamination is a prevailing risk. However, the municipality can still adopt certain measures to mitigate its impacts.
DESERTIFICATION	Low	Medium	With the increasing frequency and strength of desert winds, broader conditions appear to be accelerating desertification in certain areas of Shahhat.

RECENT EXPOSURE

As previously indicated, one of the most consequential extreme weather events that Libya experienced was ushered in by Storm Daniel. On September 10, 2023, substantial rainfall and sudden flooding in the northeastern regions and coastal cities,

including Shahhat resulted in significant damage to civilian infrastructure and the surrounding areas. The subsequent collapse of the Mansour and Derna dams severely compounded the damage and precipitated internal displacement in the

region. In Shahhat, flooding was particularly extensive in the southern part of the city, with pasturelands and agricultural land being the most affected, as illustrated in Map 2.0. As also indicated in the map, civilian infrastructure sustained additional damage.

Map 2.0 Illustration of 2023 Flooding in Shahhat



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SHAHHAT

EMERGENCY PREPAREDNESS

The municipality of Shahhat is structured in such a way as to include multiple entities that contribute to emergency preparedness. Respondents noted that engineering and technical advisory bodies are responsible for planning and providing guidance on emergency preparedness measures. In practice, these experts work on a voluntary basis to enhance the city's infrastructure and emergency preparedness services. Additionally, economists and engineers contribute to infrastructure development and improving emergency services.

Shahhat has a Safety Authority which is composed of 50 staff members who can be called upon by municipal authorities to respond to an array of emergency situations, ranging from flash floods to wildfires. They are largely considered the backbone of

emergency responses at the municipality.

In broad-scale emergency situations, the respondents indicated that they also establish committees composed of members of an array of stakeholders, including the Red Crescent, the National Safety Authority, the Ministry of Interior, and the Safety Authority. While there are no specific designated centers for disasters, these committees can designate schools, public places, or elevated areas, as shelters for people seeking refuge. These emergency measures have previously been deployed to transform public schools into temporary shelters for displaced residents.

More broadly, when it comes to monitoring weather patterns and potential risks, there is only one weather station in Shahhat,

which is not operational. Instead, residents typically access weather-related information through social media networks and informal networks. This in turn means that residents do not necessarily have stable, reliable, and predictable access to weather-related information.

Respondents also indicated that while there are additional emergency preparedness services in place, such as a civil defense force, they do not operate at full capacity and are strained in responding to emergency situations. In particular, respondents pointed to an array of capacity challenges, including financing and material constraints that preclude these services from operating at full capacity. This, in turn, renders the municipality reliant primarily on its Safety Authority.

BOLSTERING PREPAREDNESS

Throughout the course of a VCA workshop in July 2024, respondents indicated that there are an array of measures through which emergency preparedness and monitoring can be further bolstered in the municipality. These measures relate to the maintenance of critical infrastructure; the creation of effective communication networks; the acquisition of a vehicle fleet; and increasing awareness amongst community members.

One area in particular that respondents indicated could be improved relates to monitoring and maintaining dams in the region. Respondents indicated that Shahhat had a limited capacity to cope with water disruptions and shortages. This, in turn, necessitates regular monitoring and maintenance of dams, particularly those that may be situated near waterways. As respondents indicated, it is vital to monitoring not only rainfall levels, but the flow of waterways in the area immediately surrounding the dams. This points to the importance of monitoring critical civilian infrastructure, more broadly.

Respondents also indicated a need for new culverts to drain water. Additional drainage culverts would allow water to freely flow under various obstructions. As such, the

culverts would provide effective stormwater management by allowing the flow of water under roads, trails, and railways. Given that culverts can be installed below ground, they can be shielded from the adverse effects of extreme weather events and can serve as crucial components of civilian infrastructure. They would further bolster the resilience of the municipality's critical infrastructure.

Additionally, respondents indicated that there are an array of steps through which to bolster monitoring infrastructure in the municipality. Overall, respondents indicated that there is a severely limited network for emergency monitoring. In most instances, respondents who were involved in emergency monitoring and responses, used their own equipment (e.g., wireless and satellite phones) to reach out to specialized entities in the government for support. To further bolster emergency monitoring efforts across the municipality, additional equipment and coordination would be required amongst respondents.

Another aspect of emergency preparedness and monitoring that respondents indicated was important to bolster related to transportation. As it currently stands, there is no established fleet of vehicles for first

responders. Rather, participants noted that they used their private vehicles and boats during emergencies in the municipality. This also has implications for monitoring potential risks in the municipality, as it renders monitoring efforts constrained to the personal resources of residents. A municipal fleet would bolster emergency monitoring efforts across the municipality and would ensure that respondents have more consistent access to monitor potential risks in the municipality.

Finally, respondents pointed to the importance of increasing awareness amongst residents about potential risks, so that residents can monitor their surroundings. In particular, respondents suggested that residents can be taught to monitor areas that are more susceptible to wildfires and flooding, and can adopt an array of adaptation pathways to mitigate the associated risks.

More broadly, respondents often pointed to the importance of establishing an early warning system, which does not yet exist in Shahhat. Building upon the aforementioned measures, an early warning system would further bolster emergency preparedness in the municipality.

GHAT

RISK IDENTIFICATION

Ghat city is situated in a relatively low-lying valley, surrounded by elevated terrain on both the eastern and western sides. These differences in the elevation of the terrain are significant in shaping the natural flow of water during rainfall events. Water from the surrounding highlands is likely to flow toward the lower elevations in the valley, where Ghat and its nearby villages are located.

The presence of several waterways converging near Ghat exacerbates this risk. During periods of heavy rainfall, water from the higher elevations is likely to flow down into the valley, following the natural drainage paths indicated on the map. The flow accumulation in these lower areas could lead to significant flooding, particularly in and around Ghat. The roads and other

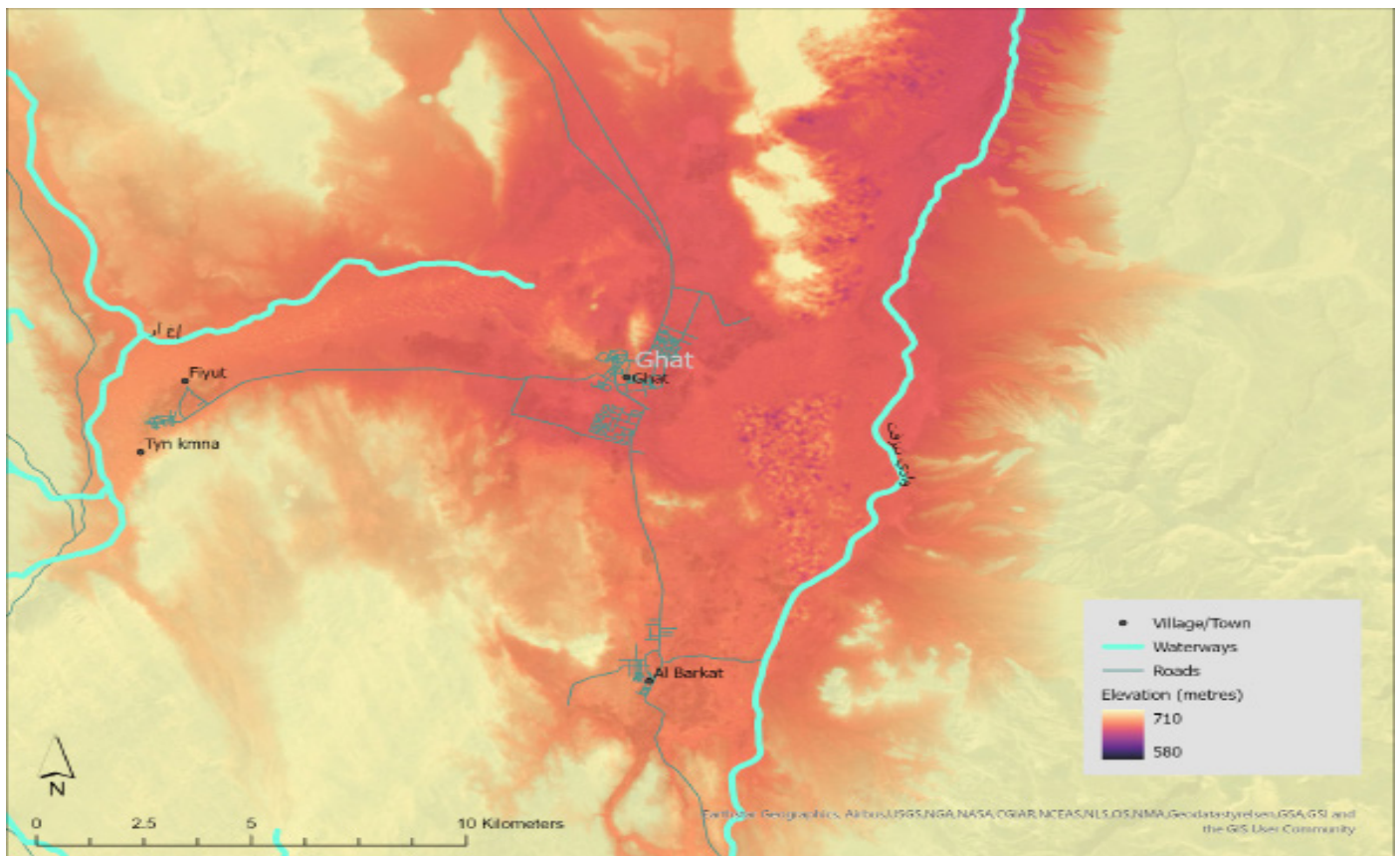
critical infrastructure shown on Map 3.0 (below) are also potentially at risk, as they cross several waterways and lower-lying regions.

Given these features of the topography, it is essential to recognize the heightened flood risk for Ghat and surrounding settlements. The combination of low elevation and watercourse convergence emphasizes the need for comprehensive flood risk management. This includes implementing early warning systems, developing flood defenses, and ensuring infrastructure resilience, particularly key civilian infrastructure (e.g., power stations and water management facilities). With proactive planning, the municipality can better prepare for and mitigate the potential impacts of flooding in this vulnerable region.

In addition to this, numerous respondents pointed to a combination of risks by both man-made and natural hazards and climate change shocks that have the potential to impact the community. Many of these additional risks, such as ground collapses and extreme rainstorms, have the potential to further exacerbate the existing risk to flash flooding. As such, these risks should be considered both individually and in relation to one another to ensure comprehensive monitoring and preparedness.

More broadly, the respondents acknowledge that the array of risks vary in their frequency of occurrence and as such, have different potential impacts on the municipality. Given the variation in risks and the potential impacts, each type of potential risk is further discussed below.

Map 3.0 Elevation Levels in Ghat



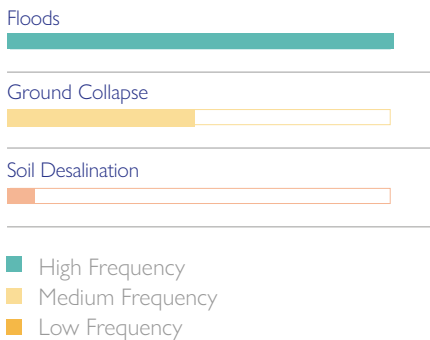
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GHAT

RISK IDENTIFICATION

Ghat faces an array of risks, climate change shocks, and hazards, which should both be considered individually and in relation to

NATURAL HAZARDS



Respondents indicated that the majority of farms in Ghat are located in valleys that render them particularly vulnerable to floods as well as other natural hazards. The respondents noted that the region recently experienced a large flood, estimated to have been more than one billion cubic meters, which damaged many homes. Over 300 families were displaced in the municipality as their homes sustained significant damage. Approximately 10% of the residents who were displaced sought temporary shelter outside of their municipality.

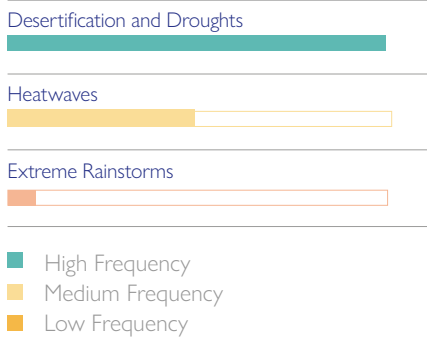
Additionally, the water network partially destroyed and operates at reduced (50%) capacity principally because most of the agricultural wells were located in the stream of floods and were polluted. As for the sewage networks, most of them were destroyed and were not repaired.

RISK ANALYSIS MATRIX

As respondents indicated, there are at least four risks that are considered crucial to monitor in Ghat, including floods,

one another. As respondents have indicated, these risks occur with different frequency and as such, have varied impacts. These

CLIMATE CHANGE SHOCKS



During the summer months, Ghat is affected by high temperatures, which can range from 38C to 50C. These severe temperatures strain the electrical grid in the municipality and result in outages, which are increasingly frequent and affect residents' livelihoods as well as overall well-being.

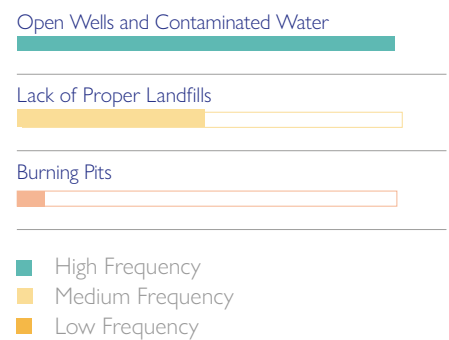
More broadly, the municipality is located in a desert climate, but has been the site of increasing desertification. This process is exacerbated by increasingly frequent and extreme heatwaves. Against this background, the farmland in the municipality is affected by severe droughts, which are becoming more frequent.

Despite this, in certain limited instances, the municipality has also experienced extreme rainstorms which have affected houses in the municipality.

desertification, water contamination, and heatwaves. These risks are often exacerbated by additional hazards and

risks are often exacerbated by additional hazards and their impact can be magnified by environmental degradation.

ADDITIONAL RISKS



Respondents indicated that some residential neighborhoods resort to using open wells due to a lack of sanitation services and infrastructure. More broadly, the municipality is affected by drying up wells as well as the poor maintenance of wells, which have made it increasingly difficult for people to access clean drinking water. The municipality has a limited capacity to maintain wells and to dig new groundwater wells, which has further exacerbated water shortages.

The municipality lacks the capacity to facilitate proper garbage disposal services. As a result, residents have resorted to burning garbage in open pits, often located in the middle of residential neighborhoods, which can affect residents' respiratory health and overall well-being. This is exacerbated by the lack of properly maintained landfills.

their impact is magnified by broader environmental changes as well as environmental degradation.

Table 2.0 Risk Analysis Matrix for Ghat Municipality

RISK	LIKELIHOOD	IMPACT	EXPLANATION
FLOOD	High	High	Flooding recently affected Ghat. Given the increasing frequency of extreme weather events, it is considered a high risk.
DESERTIFICATION	Medium	High	With recent increasing temperatures, more frequent heatwaves, and the resulting effects, desertification is considered to be a medium risk, with a high risk impact.
WATER CONTAMINATION	Medium	Medium	Given an array of challenges with open wells and water resource management, water contamination is a prevailing risk. However, the municipality can still adopt certain measures to mitigate its impacts.
HEATWAVE	Medium	Medium	The increasing frequency and strength of heatwaves are contributing to accelerating desertification in some areas of Ghat.

GHAT

RECENT EXPOSURE

The municipality of Ghat recently experienced the effects of an extreme weather event. On August 16, 2024, heavy rains in the towns of Ghat and Tahala caused significant flooding resulting in notable damage to civilian infrastructure and disruptions to public services.

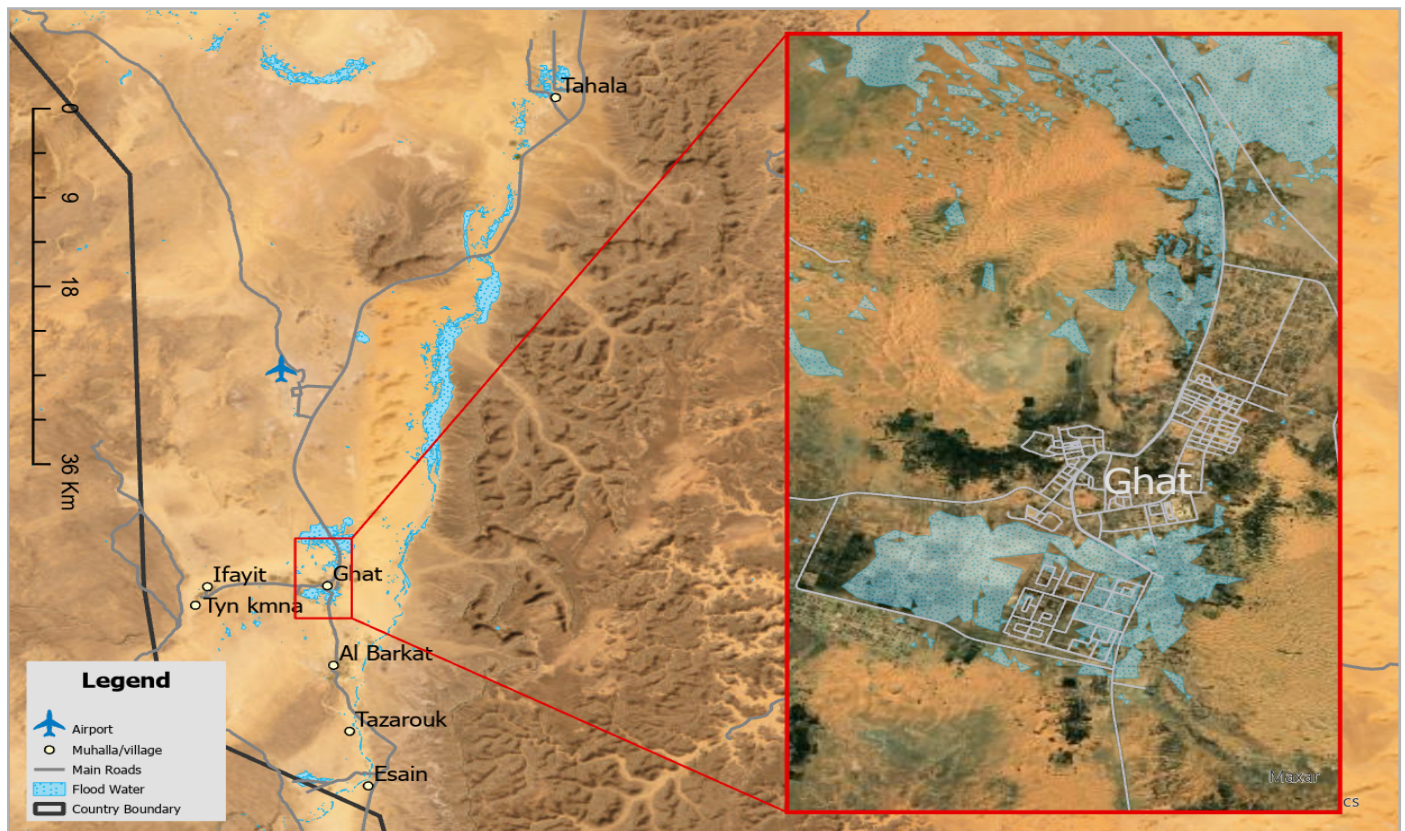
As of August 23, 2024, IOM estimated that over 7,000 individuals were displaced in the region of Ghat. Among those displaced, there are

4,346 Libyans who are sheltering in camps, informal temporary accommodation (e.g. tents near the flooded home), one school and with host families. Also among those displaced there are 2,745 migrants from Niger (1,325 individuals), Mali (573 individuals), Egypt (451 individuals), Nigeria (126 individuals), Sudan (125 individuals), Burkina Faso (80 individuals) and Ghana (65 individuals) who are being accommodated

by relatives and friends in neighborhoods that have not been affected by the floods.

According to field reports in the immediate aftermath of the floods, the main road linking the towns of Albarkat and Issein was cut off and there were rolling power outages in the area. This event further underscored the serious risk that flooding poses in Ghat.

Map 4.0 Illustration of 2024 Flooding in Ghat municipality



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EMERGENCY PREPAREDNESS

Ghat municipality has a limited capacity to respond to emergency situations, as it does not have any designated agencies that provide assistance and the National Safety Authority does not have the capacity to mobilize resources in the municipality. There are no evacuation centers in the region that residents can retreat to during sudden onset disasters. As such, respondents generally describe the level of emergency preparedness in Ghat as severely limited.

While there are voluntary civil protection forces, they are similarly described as having a severely limited capacity, as they lack appropriate equipment and even, a designated workspace, which further

constrains their capacity to respond to emergencies as well as to undertake relevant monitoring activities.

In addition to the civil protection forces, a crisis committee was established in the municipality ostensibly to advise on emergency responses. However, it also has a limited capacity and primarily relies upon civil society organizations to mobilize resources in emergency situations.

Notably, there is no meteorological entity in the Ghat region that can monitor and report weather forecasts. Instead, residents principally rely upon social media sites for information from external sources.

Against this background, some residents of the municipality participate in an informal early warning system and seek to disseminate information through informal channels. This is particularly the case near the valleys, where residents require warning of imminent flooding and other sudden onset disasters. These warnings are primarily transmitted through phone calls or in-person. Residents are occasionally also alerted through social media sites, and when networks are interrupted, ambulances can be deployed with loud speakers to relay emergency instructions. This early warning system relies primarily on volunteers in the municipality.

Funded by the European Union, the Displacement Tracking Matrix (DTM) in Libya tracks and monitors population movements in order to collate, analyze and share information to support the humanitarian community with the needed demographic baselines to coordinate evidence-based interventions.

To consult all DTM reports, datasets, static and interactive maps and dashboards, please visit:

Funding for this report was provided by the International Organization for Migration (IOM) Migration Resource Allocation Committee (MiRAC).

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Project funded by the European Union

