PALESTINE SHELTER CLUSTER
Coordinating Humanitarian Shelter and Settlements

OCCUPIED PALESTINIAN TERRITORY - Gaza Strip

Distribution points located in areas identified as having flooded between November 2019 and March 2025

For Humanitarian Use Only
Production date: 15 December 2025

Estimated population in makeshift sites at risk of losing access to a flooded distribution point. (% of the total makeshift population).

North Gaza
1,000 (6%)

Gaza
24,000 (31%)

Deir al Balah
96,000 (46%)

Khan Younis
391,000 (53%)

Rafah
500 (5%)

0 3 6 12 Km

Distribution points in risk of flood
Distribution points not in risk of flood
Flood Risk Zone (100 m Buffer)
Affected Population Zone (200 m Buffer)
Flood incidents points

Flooded area during 2019-2025

Area flooded one year
Area flooded two years
Area flooded three years
Area flooded four years
Area flooded five years
Area flooded six years

0 1.5 3 6 Km

Estimated Total Population Affected by Flooding within 200 m of Affected Distribution Points in Humanitarian Neighborhoods

0
1 – 8,000
8,001 – 25,000
25,001 – 100,000
100,001 – 235,000

Administrative Boundaries

Governorate boundary
Humanitarian Neighborhood boundary
Yellow Line

Admin Boundaries: OCHA Data Hub
Flood Incidents Locations: Site Management Cluster 5 October
Disruption Points Locations: Shelter Cluster
Flood extent: Derived from Sentinel-1 SAR
Satellite Imagery: SkySat Collect - 18 November 2025

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

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This study aims to assess the impact of seasonal flooding in Gaza Governorate on Shelter Cluster distribution points located within humanitarian neighborhoods.

The maps presented above include the following layers:

1- Flood risk historical layer:

For the period 2019–2025 using Sentinel-1 SAR data, which is highly suitable for flood detection given its ability to operate in all weather conditions, during both day and night, and without being affected by cloud cover.

The analytical approach relies on comparing seasonal changes in radar backscatter between the summer (dry period) and winter (wet period). Significant decreases in backscatter during winter are used as indicators of standing water and potential flood events.

2-Flood incidents points

Flood incident points were provided by SMC and used to validate the extracted flood extent derived from the Sentinel-1 analysis. These points were spatially intersected with the historical flood layer to verify flood occurrence and accuracy.

3- Flood Risk Zone (100 m buffer)

Based on the IOM and ACACIA WATER methodology, flood risk is classified according to distance from previously identified flooding hotspots. Areas located closer to mapped flood points are considered at higher risk of flooding. Distances are classified into multiple zones (e.g. 0–50 m, 50–100 m, and beyond 100 m), with flood risk decreasing as distance from the flooding hotspots increases. This distance-based approach reflects the higher likelihood of direct flood impacts in proximity to historically flood-prone areas.

4- Affected Population Zone (200 m buffer)

According to guidance from the Shelter Cluster, the flood impact radius varies depending on terrain, elevation, and shelter density. Following a site-by-site review to estimate the most realistic affected area based on actual on-ground conditions, an average impact distance of 200 meters was determined.

Based on this assessment, a 200-meter buffer was created around each affected distribution point to represent the potentially impacted population zone.

5- Active Distribution Points (Shelter Cluster)

Active distribution points provided by the Shelter Cluster were spatially analyzed and classified based on their location within or outside the 100-meter flood risk buffer, identifying whether they are considered at risk or not.

6. Estimated Population in Makeshift Sites

The population layer displayed on the main map was generated based on an assessment of people living in makeshift sites, identified using the most recent available satellite imagery. Population estimates were calculated by analyzing tent density for each governorate and deriving the total estimated population per governorate.

The estimated population in makeshift sites at risk of losing access to flooded distribution points was calculated by:

- Clipping makeshift sites located within the 200-meter affected population zone.
- Calculating the proportion of affected population by dividing the population within the 200-meter zone by the total makeshift site population per governorate.

Population figures were derived from Site Shifts extent data using SkySat Collect imagery (18 November 2025, © 2025 Planet Labs PBC).

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Limitations:

The flood risk layer generated using Sentinel-1 SAR data provides an indicative representation of surface water presence during the analysis period. While useful for identifying general spatial patterns associated with potential flooding, the layer is subject to several methodological and data-related constraints outlined below:

1. **Resolution of Imagery:** The spatial resolution of 10 meters may not capture smaller-scale floods or accurately depict flood boundaries in areas with fine-scale topography or infrastructure.
2. **Atmospheric Interference**: While Sentinel-1 SAR is designed to operate in all weather conditions, there can still be intermittent atmospheric disturbances or issues related to satellite overpasses that may impact data quality or interpretation.
3. **Surface Water Identification:** The methodology identifies surface water presence but cannot differentiate between floodwater, stagnant water, or water associated with temporary drainage issues, making it less reliable for flood depth or duration estimates.
4. **Coastal and Low-Lying Areas:** Coastal zones or areas with complex terrain may not be accurately represented due to the inherent limitations of the radar's ability to distinguish between water and other land types in these regions.
5. **Topographic factors not included:** Digital Elevation Model (DEM) and slope data were not used as analytical inputs in the flood detection process, aside from a minimal masking step to reduce coastal misclassification. Consequently, elevation, slope, drainage pathways, and terrain-driven water flow were not explicitly accounted for, and the analysis does not represent a hydrological or terrain-based flood model. Flood risk was inferred solely from satellite-derived surface water signals.

Interpretation

Given these constraints, the flood layer should be treated as descriptive and interpreted in conjunction with ground-based observations, local knowledge, and additional data sources for a comprehensive understanding of flood risk.