Building-Level Damage Assessment

Beirut and Mount Lebanon | GeoAI-based Rapid Assessment

June 2026

EXECUTIVE SUMMARY

This building-level damage assessment applies a Geospatial Artificial Intelligence (GeoAI)-enabled remote-sensing workflow to rapidly identify visible conflict-related damage to buildings across Beirut and Mount Lebanon. The assessment was conducted by the United Nations Development Programme (UNDP) and complemented by records from the United Nations Department of Safety and Security (UNDSS) and the Lebanese Armed Forces (LAF) to ensure robust multi-source validation. The results were further validated through a comprehensive field verification exercise conducted in collaboration with the National Council for Scientific Research – Lebanon (CNRS-L). In addition, the assessment methodology, damage classification framework, and rubble volume estimation approach were jointly reviewed and validated with CNRS-L to ensure scientific rigor, methodological consistency, and alignment with national damage assessment standards. This fact sheet presents the core findings of the assessment, while the full report provides detailed datasets, methodology, validation procedures, and analytical results

ASSESSMENT WORKFLOW

Feb 2026 to 14 Apr 2026

Satellite imagery comparison → GeoAI / deep-learning segmentation → Building footprint analysis → Office-based visual interpretation → LAF and UNDSS records → CNRS-L field validation → Damage, debris and cost estimation

DAMAGE CLASSIFICATION

DESTROYED BUILDINGS
(Red / %100)
Complete structural collapse.

PARTIALLY DAMAGED BUILDINGS
(Orange / %50)
Compromised load-bearing stability and partial collapse.

MINOR DAMAGE BUILDINGS
(Yellow / %10)
Limited and non-significant damage

TARGETED APARTMENT-LEVEL DAMAGE
(Purple / %50)
Localized apartment impacts that may not be visible in satellite imagery.

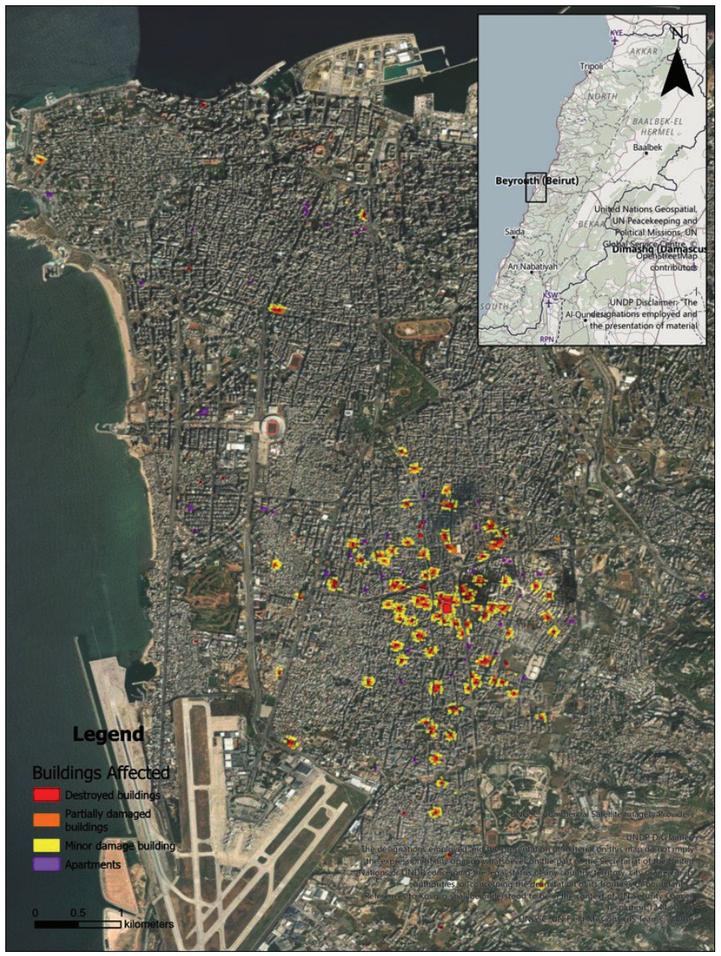
CAVEATS

Debris estimation combines building footprint areas and floor-count information using the Global Human Settlement dataset, validated with LAF and CNRS-L information.

Preliminary damage costs used graduated damage coefficients and a replacement-cost baseline of USD 450/m².

This assessment is based on remote sensing supported by systematic ground inspections.

DAMAGE SPATIAL DISTRIBUTION



KEY STATISTICS

146 Destroyed buildings

264 Partially damaged buildings

54 Apartments (targeted apartment-level damage)

648,942 m³ Total debris volume

USD **365,029,785** Total damage cost

BUILDING/UNITS DAMAGES BY GOVERNORATE

GOVERNORATE	DESTROYED		PARTIALLY DAMAGED		APARTMENTS TARGETED
Aley	7 Bldg	→ 55 units	8 Bldg	→ 216 units	8 Apt
Baabda	133 Bldg	→ 2,967 units	243 Bldg	→ 4,061 units	35 Apt
Beirut	6 Bldg	→ 146 units	13 Bldg	→ 160 units	11 Apt
TOTAL	146 Bldgs	3,168 units	264 Bldgs	4,437 units	54 Apartments

HOTSPOT CADASTERS

Major affected cadasters include:

Haret Hreik, Hadath Beyrouth, Chiyah, Bourj El-Brajneh, Laylaki, Choueifat El-Amrousieh,

Beirut cadasters including Mazraa, Bachoura, Ain el Mreisseh, Moussaytbeh.

DEBRIS ESTIMATION

Minor damage excluded from debris calculations

GOVERNORATE	Volume (m³)	Low_density weight (t)	High_density weight (t)
Aley	20,221	34,173	45,497
Baabda	601,384	1,016,339	1,353,114
Beirut	27,337	46,199	61,508
Total	648,942	1,096,711	1,460,119

DAMAGE COSTS

Area	Costs(USD)
Beirut	USD 15,377,005
Mount Lebanon	USD 349,652,780

Total
USD 365,029,785