

Building-Level Damage Assessment

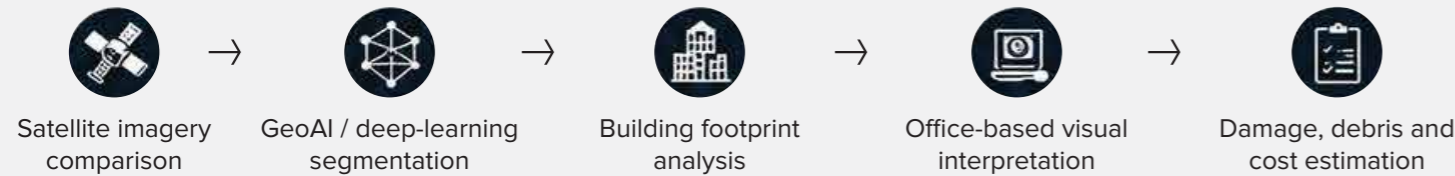
South Lebanon | GeoAI-based Rapid Assessment. June 2026

EXECUTIVE SUMMARY

This building-level damage assessment utilizes a Geospatial Artificial Intelligence (GeoAI)-enabled remote sensing workflow to rapidly detect visible conflict-related damage to buildings across South Lebanon, primarily within the geographic area south of the Litani River, with limited cadastral coverage extending north of the river (as shown in the map). This fact sheet represents the second publication in the series, following the release covering Beirut and Mount Lebanon on 8 June 2026. The assessment was conducted by the United Nations Development Programme (UNDP) and complemented by office-based visual validation performed by UNDP teams. This step involved reviewing GeoAI outputs, minimizing evident false positives, and refining the classification of visible building-level damage where feasible. Furthermore, the assessment methodology, damage classification framework, and rubble volume estimation approach are consistent with those applied in the Beirut and Mount Lebanon assessment within this series, ensuring scientific rigor, methodological consistency, and alignment with national damage assessment standards. The methodology integrates automated deep-learning segmentation models, building footprint datasets, administrative boundary layers, and expert visual interpretation. It relies on very high-resolution optical satellite imagery, comparing a baseline layer dated 23 October 2025 with conflict imagery acquired on 29 April 2026 at the building-footprint level. This approach enables the identification of visible surface-level damage indicators, including roof collapse, structural deformation, and debris accumulation. Debris volume and weight were estimated by combining building footprint areas with floor-count data derived from the Global Human Settlement dataset of the European Commission. Minor damage was excluded from the debris calculations. Debris weight was estimated using low- and high-density material scenarios of 1.69 t/m³ and 2.25 t/m³, based on coefficients adopted by UNDP and ESCWA (2025) and Tamraz, Srour, and Chehab (2012). Preliminary damage costs were calculated by applying graduated damage coefficients to a standardized replacement cost baseline of USD 450 per square meter, accounting for prolonged market inflation. Future publications will incorporate more recent satellite imagery and may expand to include additional areas of interest relevant to this report. The figures presented herein are preliminary and intended for programming purposes, pending validation through field-based assessments.

ASSESSMENT WORKFLOW

23 October 2025 to 29 April 2026



DAMAGE CLASSIFICATION



DESTROYED BUILDINGS (Dark red / %100)
Complete structural collapse.



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



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

CAVEATS

The geographical extent of the analysis is constrained by the coverage of available satellite imagery. As the imagery boundary intersects several cadastral units, results distinguish between fully covered cadasters and those only partially covered within each district, which may affect the completeness and comparability of reported figures. Specifically, coverage varies by district as follows: El Nabatieh (4 fully covered and 15 partially covered out of 52 cadasters), Sour (74 fully covered and 1 partially covered out of 75 cadasters), Bent Jbeil (all 38 cadasters fully covered), Marjaayoun (17 fully covered and 21 partially covered out of 33 cadasters), and Saïda (no fully covered and 5 partially covered out of 77 cadasters).

Validation with the United Nations Department of Safety and Security (UNDSS) and the Lebanese Armed Forces (LAF) was waived due to the extensive level of destruction in the assessed area, as well as the high confidence in the methodology and validation process conducted by UNDP.

This assessment is not cumulative of damages incurred during the 2024 conflict; rather, it reflects conditions starting 23 October 2025 until 29 April 2026 only.

The assessment does not include damage to basements or underground areas, which means the overall level of damage may be underestimated.

Damage to important infrastructure—such as roads, bridges, electricity, water systems, & telecommunications—is not covered in this assessment.

The analysis does not clearly distinguish between different types of buildings (such as residential, commercial, or industries), making it harder to understand how different sectors are affected.

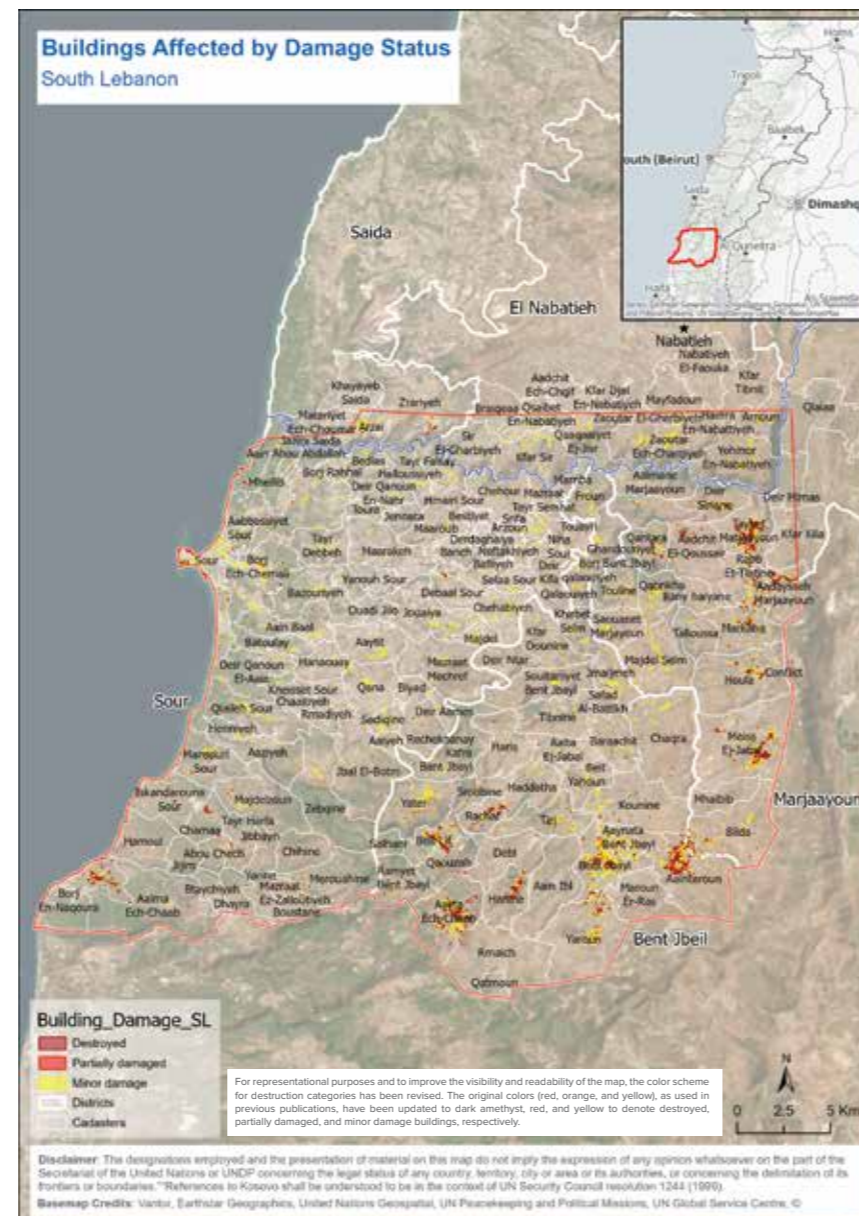
In crowded urban areas, or where buildings are close together, shadows or narrow streets can make it harder to accurately detect and classify damage.

Because the images were taken at specific points in time, some damage, repairs, or changes that happened in between may not be captured.

The assessment reflects conditions at a single moment in time and does not show ongoing damage, debris removal, or reconstruction efforts.

The assessment was validated through office-based visual interpretation only. It was not complemented by field verification or independent ground-truthing at this stage, and results should therefore serve for general understanding of the scale of damages.

DAMAGE SPATIAL DISTRIBUTION



KEY STATISTICS



11,095
Destroyed buildings



2,242
Partially damaged buildings



9,311
Minor damage buildings



3,107,756 m³
Total debris volume



1,384,401,004
Total damage cost

BUILDING/UNITS DAMAGES BY GOVERNORATE

Considering an average of ~150 sqm for a single apartment

| GOVERNORATE | DESTROYED | PARTIALLY DAMAGED | MINOR DAMAGED |
|--------------|--|---|---|
| El Nabatieh | 8,989 Bldgs → 14,357 units | 1,190 Bldgs → 2,476 units | 5,247 Bldgs → 8,384 units |
| South | 2,106 Bldgs → 3,534 units | 1,052 Bldgs → 2,743 units | 4,064 Bldgs → 9,898 units |
| TOTAL | 11,095 Bldgs 17,891 units | 2,242 Bldgs 5,219 units | 9,311 Bldgs 18,282 units |

HOTSPOT CADASTERS

Major cadasters with destroyed buildings include:

El Nabatieh Governorate:

Bent Jbeil caza: Fully covered cadasters: Aaintaroun (1,658 bldgs), Bent Jbayl (1,076 bldgs), Aayta Ech-Chaab (539 bldgs), Beit Lif (371 bldgs), Yaroun (242 bldgs), Aaynata Bent Jbayl (227 bldgs), Hanine (174 bldgs), Rachaf (117 bldgs), Tiri (91 bldgs), Yater (80 bldgs), Chaqra (55 bldgs), Kounine (48 bldgs), Qaouzah (47 bldgs), Beit Yehoun and Ramyet Bent Jbayl (36 bldgs each), Rmaich (34 bldgs), Ghandouriyet Bent Jbayl and Jmajimeh (31 bldgs each), Khirbet Selm and Soultaniyet Bent Jbayl (27 bldgs each), Kfar Dounine (24 bldgs), Haddatha (23 bldgs), Froun (21 bldgs), Maroun Er-Ras (17 bldgs), Aaita Ej-Jabal, Baraachit, Debl and Tibnine (16 bldgs each), Haris (15 bldgs), Kfra Bent Jbayl and Qalaouiyeh (13 bldgs each), Srobbine (11 bldgs), Borj Qalaouiyeh (7 bldgs), Deir Ntar (4 bldgs), Aain lbi and Safad Al-Battikh (3 bldgs each), Salhani (1 bldg).

Marjaayoun caza: Fully covered cadasters: Meiss Ej-Jabal (969 bldgs), Taybet Marjaayoun (824 bldgs), Houla (285 bldgs), Markaba (199 bldgs), Blida (184 bldgs), Deir Siriane (174 bldgs), Rabb Et-Tiatine (163 bldgs), Aadchit El-Goussair and Qantara (116 bldgs each), Majdel Selm and Qabriha (69 bldgs each), Toulina (35 bldgs), Saouanet Marjaayoun (19 bldgs), Talloussa (15 bldgs), Bany Haiyane (6 bldgs), Mhaibib (5 bldgs), and Aalmane Marjaayoun (2 bldgs). Partially covered cadasters: Aadayssheh Marjaayoun (242 bldgs), and Kfar Kila (5 bldgs).

El Nabatieh caza: Fully covered cadasters: Yohmor En-Nabatieh (71 bldgs), Zaoutar Ech-Charqiyeh (69 bldgs), Kfar Sir (37 bldgs), and Sir El-Gharbiyeh (4 bldgs). Partially covered cadasters: Arnoun (45 bldgs), Zaoutar El-Gharbiyeh (38 bldgs), Qsaibet En-Nabatieh (21 bldgs), Qaaqaiyet Ej-Jsir (19 bldgs), Hamra En-Nabatieh and Mayfadoun (8 bldgs each), Braiqeaa (4 bldgs), and Kfar Tibnit (2 bldgs).

South Governorate:

Sour caza: Fully covered cadasters: Borj Ech Chemali (370 bldgs), Borj En-Naqoura (216 bldgs), Aabassiyet Sour (162 bldgs), Sour (80 bldgs), Mansouri Sour (65 bldgs), Qlaileh Sour (50 bldgs), Bazouriyeh (44 bldgs), Jouaiya (39 bldgs), Chamaa (34 bldgs), Qana (32 bldgs), Chehabiyeh and Mazraat Ez-Zalloutiyeh (31 bldgs each), Debaal Sour, Mheilib, Tayr Debbeh and Tayr Falsay (30 bldgs each), Aain Baal, Aaytit, Tayr Harfa and Zebqine (29 bldgs each), Majdelzoun (28 bldgs), Barich, Jbal El-Botm, Majdel and Rmadiyah (25 bldgs each), Aalma Ech-Chaab and Sadiqine (23 bldgs each), Srafa (22 bldgs), Chaatiyeh and Merouahine (21 bldgs each), Bedias (20 bldgs), Halloussiyeh (18 bldgs), Deir Qanoun El-Aain and Hamoul (17 bldgs each), Iskandarouna Sour, Maaroub and Mazraat Mechref (16 bldgs each), Deir Qanoun En-Nahr and Henniyyeh (15 bldgs each), Abou Chech (13 bldgs), Chihine, Deir Aames and Hanaouay (11 bldgs each), Aaziyyeh (10 bldgs), Batoulay (9 bldgs), Arzoun, Derdaghalya, Maarakeh and Rechehnanay (8 bldgs each), Chehour, Ouadi Jilo and Selaa Sour (7 bldgs each), Borj Rahhal, Boustane, Deir Kifa, Dhayra, Toura and Yarine (6 bldgs each), Bafiyeh and Jibbayn (4 bldgs each), Biyad and Jennata (3 bldgs each), Jijim, Nefkahiyyeh and Niha Sour (2 bldgs each), and Aaiyyeh, Bestiyat, Hmairi Sour, Kneisset Sour and Yanouh Sour (1 bldg each). Partially covered cadasters: Aain Abou Abdallah (19 bldgs).

Saïda caza: Partially covered cadasters: Zrariyyeh (65 bldgs), Arzai (62 bldgs), Jazira Saïda (3 bldgs).

DEBRIS ESTIMATION

Minor damage excluded from debris calculations

| Governorate | Volume (m ³) | Low_density weight (t) | High_density weight (t) |
|--------------------------|--------------------------|------------------------|-------------------------|
| El Nabatieh/ Bent Jbeil | 1,513,412 | 2,557,666 | 3,405,176 |
| El Nabatieh/ Marjaayoun | 787,940 | 1,331,618 | 1,772,865 |
| El Nabatieh/ El Nabatieh | 77,538 | 131,039 | 174,460 |
| South/ Sour | 689,603 | 1,165,429 | 1,551,607 |
| South/ Saïda | 39,263 | 66,354 | 88,342 |
| Total (South) | 3,107,756 | 5,252,106 | 6,992,450 |

DAMAGE COSTS

Minor damage excluded from cost calculations

| Governorate | Costs(USD) | Total (USD) |
|--------------------------|--------------------|----------------------|
| El Nabatieh/ Bent Jbeil | 688,113,761 | |
| El Nabatieh/ Marjaayoun | 333,026,375 | 1,053,329,201 |
| El Nabatieh/ El Nabatieh | 32,189,065 | |
| South/ Sour | 315,009,678 | |
| South/ Saïda | 16,062,125 | 331,071,803 |
| Total (South) | | 1,384,401,004 |