AI-Assisted Community Mapping for Post-Conflict Housing Recovery: A Pilot in Harasta, Rural Damascus

Ghada Rifai (USA), Hussein Bachir (Germany) and Salah Hajismail (Türkiye)

Key words: Cadastre; Capacity building; e-Governance; Land management; Participatory mapping, Harasta, Rural Damascus, Urban recovery

SUMMARY

Post-conflict reconstruction in war-affected urban areas often suffers from fragmented data, weak institutional capacity, and limited community involvement. This study presents the design and early outcomes of a pilot project in Harasta, Rural Damascus/ Syria. The pilot project in this heavily damaged city in Rural Damascus integrates artificial intelligence (AI) with participatory surveying to support inclusive housing recovery and land management.

To train an AI-assisted damage classification model, the project combines pre- and post-conflict satellite imagery with community-collected field data, such as georeferenced photos and condition surveys. The model aimed to distinguish building types, assess structural damage and habitability levels, and link each structure to a grid-based geospatial reference aligned with the municipality's cadastral system. This approach enables the systematic mapping of approximately 2,254 buildings identified in official municipal damage records.

To ensure contextual relevance and local ownership, 30 community members and municipal staff were trained to contribute to field validation and to use mobile tools for mapping and data collection. The combined AI and participatory framework will be further used to identify priority areas for recovery by integrating damage typologies with neighborhood-level population density estimates. It will also generate projections for infrastructure rehabilitation needs, including water, electricity, sanitation, and key social facilities.

This paper demonstrates the pilot project in which AI, grounded in local knowledge and participatory practices, can help bridge the gap between top-down assessments and the lived realities of returnee populations. It highlights the framework in which surveyors and land professionals can transform fragile contexts by linking technology with community-driven recovery

efforts. The suggested methodology might be replicable, offering practical guidance for post-conflict cities seeking data-driven, inclusive, and ethical land and housing reconstruction approaches.