

Resilient and sustainable infrastructure systems: a comparative analysis of post-disaster shelter coordination, stakeholder participation, and training

Sustainable infrastructure that is used and maintained by communities over time, and is resilient to hazards, is sorely needed in developing countries where natural disasters cause disproportionate damages and mortality as well as impede development efforts. Shelter is universally recognized as a foundational element of disaster recovery; and while its ability to provide protection from the elements is a core function, it also affords broader social and economic benefits. Unfortunately, conventional approaches in post-disaster shelter reconstruction focus primarily on rapid and recognizable results over long-term outcomes, perpetuating pre-existing vulnerabilities and failing to provide acceptable standards of service. There exists a need to better understand how shelter recovery processes used by stakeholders lead to eventual infrastructure system outcomes. This research longitudinally analyzed 19 humanitarian shelter projects following Typhoon Haiyan (Yolanda) in the Philippines over a three-year period, seeking to answer the overarching research question of “what combinations of coordination, stakeholder participation and training across project delivery phases lead to resilient and sustainable community infrastructure systems?” A multi-method approach consisting of case study methods and fuzzy set qualitative comparative analysis (fsQCA) was used to analyze the impact of a combination of project processes in leading to infrastructural outcomes. This research:

- identified key factors influencing inter-organizational coordination in post-disaster contexts;
- identified types of household participation that arise in shelter projects and analyzed their impact on project outcomes;
- identified methods of construction training used in shelter projects and their impact on household knowledge acquisition; and
- analyzed combinations of coordination, participation and training across the planning, design and construction phases of shelter projects that led to infrastructure resilience and sustainability, in isolation and combination.

The results contribute to understanding of shelter processes and organizing structures necessary for resilient and sustainable systems, building theory of reconstruction process pathways. Practically, findings can aid practitioners identify more effective modalities of delivering shelter assistance in post-disaster humanitarian response.

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