Humanitarian Response in a Disaster Relief Chain: Integrating Risk Mitigation with Procurement and Funding

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Abstract

Humanitarian response to disasters usually involves federal governments, relief providers (NGOs, charities, local governments), and funding agencies. To alleviate flooding caused by hurricanes, for example, governments build structural barriers (levees) and renew them on rupture. Relief providers procure supplies (food, water, shelter, and medical supplies), deliver them to disaster sites, allocate funds for procurement - in-advance and as-needed, and manage uncertain fundraising yield and bridge financing. Integration of disaster risk mitigation with real-time response and fundraising is thus an imperative for a cohesive humanitarian response. We address this by examining the interplay among risk mitigation, levee rupture, procurement operations, and funding, in a 2-stage decision framework that maximizes social surplus. We develop insights that link hurricane uncertainty with capital-cost, procurement, and levee capacity. Our findings address supply procurement and financing, levee capacity and hurricane uncertainty, and implications of levee breach. Instances include: a reduction in funding can, in fact, increase in-advance purchase; in-advance purchase, while unimodal (increases and then decreases) in capital-cost, decreases monotonically in levee-capacity; as-needed purchase is more sensitive (than in-advance purchase) to capital-cost; and relief operations are more viable without a levee than with a rupture-prone levee.

Speaker Profile

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