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# Goal programming-based post-disaster decision making for integrated relief distribution and early-stage network restoration

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Few published research studies focusing on supply chain disruptions and humanitarian logistics examine the response and recovery phases in post-disaster operations. We present a goal programming-based multiple-objective integrated response and recovery model to investigate strategic supply distribution and early-stage network restoration decisions. The model prescribes equity- or fairness-based compromise solutions for user-desired goals, given limited capacity, budget, and available resources. An experimental study demonstrates how different decision making strategies can be formulated to understand important dimensions of decision making. The efficient frontiers are generated to understand the trade-off between objectives and to analyze capacity-related planning strategies. Hazus-generated regional case studies for two regions, South Carolina and California, demonstrate the applicability of our proposed model in post-disaster operations.

**Keywords:** humanitarian logistics; disaster relief; multiple-objective optimization; goal programming

## 1. Introduction

The recent increase in the number of natural and man-made disasters has generated increased interest by academic, government, and commercial sector researchers. The International Federation of Red Cross and Red Crescent Societies' (IFRC) World Disaster Report (2015) reports that between 2005 and 2014, approximately 6,311 disasters resulted in 0.8 million casualties, affected 1.9 billion people, and caused $1.62 trillion in damages. These significant losses confirm the need for focused research on disaster management.