

A Network Optimization Study of Logistics for Enhancing Emergency Preparedness in Asia-Pacific

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Abstract : The combination of factors such as temperamental climate change, rampant urbanization of risk exposed areas, political and social instabilities, is posing an alarming base for the further growth of number and magnitude of humanitarian crises worldwide. Given the unique features of humanitarian supply chain such as unpredictability of demand in space, time, and geography, spike in the number of requests for relief items in the first days after the calamity, uncertain state of logistics infrastructures, large volumes of unsolicited low-priority items, a proactive approach towards design of disaster response operations is needed to achieve high agility in mobilization of emergency supplies in the immediate aftermath of the event. This paper is an attempt in that direction, and it provides decision makers with crucial strategic insights for a more effective network design for disaster response. Decision sciences and ICT are integrated to analyse the robustness and resilience of a prepositioned network of emergency strategic stockpiles for a real-life case about Indonesia, one of the most vulnerable countries in Asia-Pacific, with the model being built upon a rich set of quantitative data. At this aim, a network optimization approach was implemented, with several what-if scenarios being accurately developed and tested. Findings of this study are able to support decision makers facing challenges related with disaster relief chains resilience, particularly about optimal configuration of supply chain facilities and optimal flows across the nodes, while considering the network structure from an end-to-end in-country distribution perspective.

Keywords : disaster preparedness, humanitarian logistics, network optimization, resilience

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