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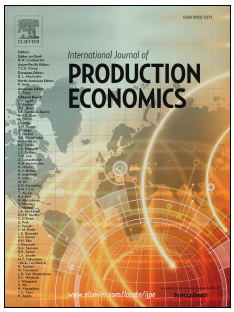

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Dynamic formulation for humanitarian response operations incorporating multiple organisations

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Abstract

Disasters represent a significant challenge for countries globally. Balancing human and material resources during these situations is not a trivial issue, and that is further complicated by the participation of several actors at multiple periods. However, there is an absence of articles considering the importance of deploying only the required organisations for response activities depending on the conditions and the stage of the disaster. This research proposes a dynamic model to support disaster response which incorporates human and material resources from multiple organisations. The multi-modal, multi-commodity optimisation model supports resource allocation and relief distribution decisions through the maximisation of the level of service provided to disaster victims and the minimisation of cost. The model is the first dynamic formulation in the literature with the ability to optimise the number, type and stage of deployment of organisations required according to the circumstances of the emergency. The model has been applied to two major floods that have occurred in Mexico in recent years. Each case was tested using three different scenarios to investigate the ability of the model to handle different conditions. The results of both cases were compared to scenarios with independent participation from each organisation and an instance capturing the