Sustaining the Supply Chain

It's often a challenge to get from Point A to Point B in normal circumstances, but after a disaster it can be almost impossible to transport food, water, and clothing from the usual supply points to the people in desperate need. A new mathematical model employs probability and nonlinear programming to design supply chains that have the best chance of functioning after a disaster. For each region or country, the model generates a robust chain of supply and delivery points that can respond to the combination of disruptions in the network and increased needs of the population.

Math also helps medical agencies operate more efficiently during emergencies, such as an infectious outbreak. Fluid dynamics and combinatorial optimization are applied to facility layout and epidemiological models to allocate resources and improve operations while minimizing total infection within dispensing facilities. This helps ensure fast, effective administering of vaccines and other medicines. Furthermore, solution times are fast enough that officials can input up-to-the-minute data specific to their situation and make any necessary redistribution of supplies or staff in real time.

For More Information: *Supply Chain Network Economics: Dynamics of Prices, Flows, and Profits*, Anna Nagurney, 2006.

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