A Mutual Catastrophe Insurance Framework for the Prepositioning of Strategic Reserves

Research objective:
Systematically organize the logistical and financial functions of providing emergency response while ensuring an efficient horizontal collaboration

Mutual catastrophe insurance framework

Claims are covered by:
- Insurance contract from the prepositioning network
- Emergency outsourcing

Role of deductibles and limits:
- Control the inventory levels in the prepositioning network
- Maximize the benefits of risk pooling in the network

Insurance coverage

Premiums allocation

The insurance framework is modeled as a multi-stage stochastic program and solved using Benders Decomposition

Insights

Insurance against hurricanes for a portfolio of 18 Caribbean countries

Requirements for a successful collaboration:
- Financial capital
- Logistical capacities
- Managerial expertise
- Umbrella organization

Catastrophic risk

Prepositioning network

Horizontal collaboration = risk pooling benefits

High impact disasters have a very high catastrophic risk

Prepositioning capacity planning

Insurance contract:
- Coverage deductible
- Coverage limit
- Yearly premiums

Management of surplus capital

Framework components

Cramer-Lundberg model