PREPTalks

New perspectives for emergency managers

Discussion Guide
Private Sector Supply Chains and Emergency Management
Dr. Jarrod Goentzel & Dr. Yossi Sheffi

PrepTalks Discussion Guides provide a framework for community leaders to translate insights from the PrepTalk into community planning and outreach. Community leaders can use the PrepTalks materials at meetings, workshops, and conferences to address critical emergency management topics with whole community partners.

Dr. Jarrod Goentzel – Aligning Public and Private Supply Chains for Disaster Response

Dr. Goentzel is founder and director of the Humanitarian Supply Chain Lab in the Massachusetts Institute of Technology (MIT) Centerfor Transportation and Logistics (CTL). His research focuses on meeting human needs in resource-constrained settings through better supply chain management, information systems, and decisionsupport technology.

> *Responses should incorporate and align with the private sector, which has far more capacity to act.*
>
> — Dr. Jarrod Goentzel

Dr. Goentzel leads fieldwork with the public, private, and nonprofitsectors to improve response efforts during emergencies and to strengthen supply chains in vulnerable communities.

In his PrepTalk, Dr. Goentzel demonstrates how the private sector has far more capacity to respond than the public sector, explains the role of emergency managers in supporting private sector supply chain restoration, and shows how analysis of supply chains can help with strategic and tactical preparedness and operational collaboration during a crisis.

Dr. Yossi Sheffi – Private Sector Resilience: It Is All in the Supply Chain

Dr. Sheffi is the Elisha Gray II Professor of Engineering Systems and Director of the MIT CTL. He is an expert in supply chain management and has written five books on supply chain resilience. Under his leadership, the CTL has launched many educational, research, and industry/government outreach programs, including the MIT Global SCALE (Supply Chain and Logistics Excellence) network involving six academic centers around the world.

In his PrepTalk, Dr. Sheffi explains the modes of failure in supply chain networks, explores new ways to think about disruptions, and showcases a General Motors (GM) case study on the complexities of supply chain management.

> *Prior relationships between all elements of public sector and all elements of private sector is crucial. Collaboration, communication is key to effective resilience and effective response.*
>
> — Dr. Yossi Sheffi

FEMA · IAEM International Association of Emergency Managers · NEMA National Emergency Management Association · National Homeland Security Consortium · Center for Homeland Defense and Security, Naval Postgraduate School

Partners for the Discussion

Dr. Goentzel and Dr. Sheffi emphasize the importance of emergency managers proactively building relationships and sharing information with the private sector, including companies that are critical supply nodes and links in supply chains.

Emergency managers, other first responders, donations management leads, and government logistics management staff should view these videos and use this Discussion Guide to better understand private sector assets and processes. Then, engage with private sector companies to build relationships, share information, and prepare to support restoration of critical supply chains.

Discussion Topics

Topic 1: Understanding Private Sector Supply Chains

Connection to Emergency Management

As Dr. Goentzel emphasizes, the capacity of pre-existing private sector networks dwarfs the potential replacement capacity of the public and nonprofit sectors. He cites the findings from a study conducted in the aftermath of Hurricane Sandy that found one grocery distributor provided 36 times the amount of food as provided by the public and nonprofit sectors combined. In addition, Dr. Goentzel explains how private sector management of commodities ensures better readiness, and how restoring private sector capacity stimulates recovery throughout the affected area.

By understanding supply chains and their interdependencies, particularly for community lifelines, emergency managers can maximize remaining capacity and support restoration to save lives and to provide a foundation for recovery.

Emergency managers have two primary roles related to supply chain resilience:

- Develop an awareness of supply chains and their vulnerabilities, and use that information to inform response and recovery planning.
- Foster collaboration with and among supply chain partners to promote actions that make supply chains of critical goods and services more resilient, to include prioritizing restoration of private sector supply chains in response and recovery.

> Supply chain resilience is the ability of a pre-existing demand and supply network to deploy surviving capacity – and/or introduce new capacity – under severe duress. For example, the continued flow of water, food, and fuel while the electric power grid is not operating would be an expression of supply chain resilience.
>
> *Source*: FEMA Supply Chain Resilience Guide

Community Lifelines

The lifeline construct provides numerous benefits to jurisdictions, such as helping prioritize, sequence, and focus response efforts toward maintaining or restoring the most critical services and infrastructure. In the context of supply chain resilience, lifelines provide jurisdictions with a way to understand and examine complex (multifaceted) supply chains that require cross-sector coordination. Lifelines also identify critical focus areas for jurisdictions to consider, as secondary supply chain problems can result from broken lifelines. For example, a break in the power grid can lead to a surge in generator and fuel demand. This in turn impacts local gas prices from surge demand, and/or a shortage in generator supply.

A lifeline enables the continuous operation of government functions and critical business and is essential to human health and safety, or economic security.

Supply Chain Basics

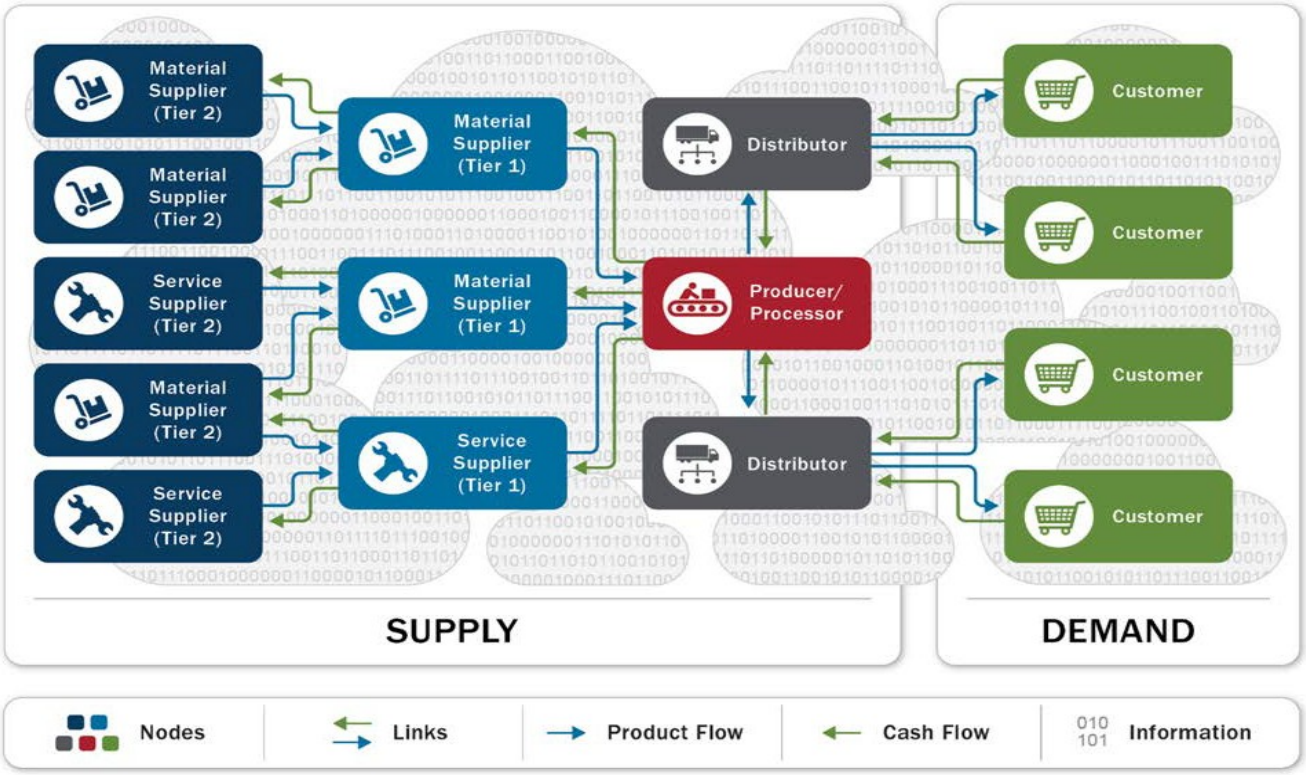
Supply chains involve the movement of products, information, and money. Products flow from supply nodesto demand nodes, while money usually follows the reverse direction. Information sharing occurs among all nodes. People are agents within the nodes and links. Supply chains are often complex, and they can vary significantly from product to product, but all supply chains include the same basic components:

- Supply Nodes: Entities that manufacture, process, store, and/or ship goods and services. Supply nodesgenerally include raw material providers, suppliers, manufacturers, and distributors.
- Demand Nodes: Entities that purchase and/or signal for goods and services from supply nodes. Demandnodes generally include individuals, families, businesses, and governments.

> Last mile is the movement of products along the final stretch of the supply chain to deliver them to their final destination, often covering the movement of the product from the distributor to the demand node.

- Tiers: A common way to group nodes and identify upstream anddownstream relationships within the supply chain. Tier 1 suppliers provide products or services to the producer/processor; Tier 2 suppliers provide products or services to Tier 1 suppliers; Tier 3 suppliers provide products orservices to Tier 2 suppliers. As the tier numbers get higher, the further that supplier is from the producer/processor of the finished product.
- Links: The physical and functional connections between nodes, such as communication, transport avenues (roadways, rail, etc.)or transaction connections. Links can also relate to service infrastructure, such as power.

Sample Supply Chain Schematic



Source: FEMA Supply Chain Resilience Guide

Supply Chain Complexities

Size of Networks. Dr. Sheffi explains that, in modern companies, it can take a massive number of suppliers to create a finishedproduct. He gives the example of a company that has 14,000 Tier 1 suppliers, 300,000 Tier 2 suppliers (suppliers of Tier 1), and that there can be as many as 50 companies, or tiers, in the chain. This means that manufacturers may not know how many and which suppliers are in the full supply chain network. In addition,suppliers can provide materials to multiple companies and, therefore, impact many different end products.

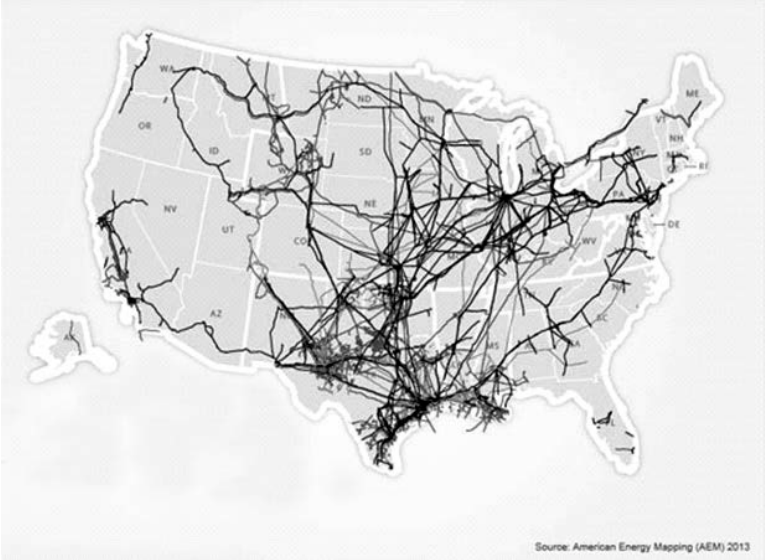
Dependencies and Interdependencies. Dr. Sheffi explains how disruptions in the supply can have a rapidly cascading impact because of supply chain dependencies. The GM case study shows how the number of unavailable parts due to the Fukishima disaster grew from 390 parts (Tier 1 suppliers affected by the disaster) to 6,000 missing parts (Tier 2 and 3suppliers affected by the disaster) in less than two months, resulting in 16 assembly plants ceasing operations. Dr. Goentzel gives the example of how the performance of generators can be dependent on availability of fuel filters.

There are also interdependencies between community lifelines. Dr. Goentzel explains the interdependencies of the fuel sector (part of the Power lifeline) and commodity delivery trucks (part of the Transportation lifeline). Without fuel, the ability to get commodities into the affected area can be significantly limited. In Dr. Goentzel's example, after Hurricane Irma, fuel trucks that typically made up to four daily roundtrip deliveries were only making one or two roundtrips.

> *To make sure that the private sector can provide for various important goods, food, medicine, water, you have to make sure that the fuel trucks, the tanker trucks, can get to the stations.*
>
> — Dr. Jarrod Goentzel

Questions for Discussion

- ❑ Who are the principal private sector suppliers of community lifelines in your community? What is the location of the source of the supply (e.g. distribution centers, origin of fuel supplies)?
- ❑ Who owns/operates the supply and demand nodes? What are the common transportation routes used between supply and demand nodes? How many of these nodes are located in your jurisdiction or your region? To what extent - and how - does your jurisdiction depend on supply nodes outside your region?
- ❑ What are examples of dependencies and interdependencies to be aware of for planning purposes?
- ❑ Map the locations of supply and demand nodes, and the transportation routes/links. Overlay the hazards for your community, including, as Dr. Sheffi recommends, the hazards with low probability, but severe consequences. This mapping exercise will provide a visual aid in planning discussions with the private sector.
- ❑ FUEL EXAMPLE: This national map shows liquid petroleum and natural gas pipelines. Research how fuel reaches your community from these pipelines or from other transportation routes, such as barges. Additional informationon U.S. energy and infrastructure is available fromthe American Geosciences Institute.



Topic 2: Aligning Public Sector Assets and Authorities with Private Sector Capabilities

By understanding private sector capabilities, the public sector can better support the restoration of private sector supply chains and, thereby, more quickly provide life sustaining commodities to the affected population. The public sector often has unique and just-in-time solutions that can support the private sector.

By mapping the community lifeline supply and demand nodes in theirjurisdiction, emergency managers can determine relevant private sector entities to bring to the table for planning, exercises, and post- incident coordination. Once these private sector partners are identified, discussion points to align the public and private sectors can include:

> *FEMA [should] not overlap [private sector resources]. FEMA should provide stuff that private sector cannot supply or doesn't have the capability to supply and to work together.*
>
> — Dr. Yossi Sheffi

- Route Clearances: Prioritizing route clearances to support private sector transportation needs. Include the public works department in your planning discussions with the private sector to develop proceduresfor clearing priority routes.
- Transportation Operators: Determine whether supply chain stakeholders/product transporters are aware of, and enrolled in, local emergency credentialing programs. Ensure that government stand-by contracts do not prevent the private sector access to surge capacity for transportation operators, such as truck drivers.
- Security Needs: Consider route security and escort needs. For example, escorting fuel trucks to service stations could increase service station fuel availability. Local police departments and military units may be sources of security during emergency events.
- Access and Re-entry Requirements: Restricted area access and security at the point of distribution may require additional communication. To prevent denial of entry, personnel stationed at the checkpoints along the route, at barriers, and/or at the facility need to be aware of what is in the shipment and the destination. Planning teams should consider procedures for clearance, checkpoint access, and facility access.
- Legal/Regulatory Requirements: Identify legal/regulatory restrictions that could impede an easy transfer to another distribution location (for example, required licensing to service a given destination, such as with certain pharmaceuticals).
- Stockpiles/Warehoused Goods: Determine a process to invoke government-managed emergency stockpiles for food, water, and healthcare that does not impede the recovery of private sector supply chains. As demonstrated by Dr. Goentzel, by focusing on restoring the private sector, the full capacity of goods to an area can be restored more quickly.

Questions for Discussion

- ❑ After mapping the critical community lifelines in your jurisdiction, work with these important owner/operators to learn more about their supply chains. Encourage a conversation, to include sharing risk information with the private sector and inviting them and their suppliers to the table for planning, exercises, and response coordination. FEMA's National Integration Center and the Private Sector Division and National Business Emergency Operations Center can provide assistance to help jurisdictions better understand the private sector perspective and conduct effective private sector engagement.
- ❑ Discuss ways to establish effective coordination in a disaster, to include integrating the private sector into your emergency support functions and establishing a Business Emergency Operations Center.
- ❑ Review the topics outlined here to ensure public sector assets and authorities are aligned with and support private sector. Discuss how to align public sector memorandum of understanding and stand-by contracts to support rather than compete with the private sector resources.
- ❑ Integrate private sector partners into emergency operation planning activities, such as tabletop and full-scale exercises in order to identify potential problems before disasters occur.
- ❑ Schedule site visits to private sector locations, such as grocery distribution centers and fuel racks to better understand private sector operations.
- ❑ Discuss staffing needs with key private sector nodes and provide personal preparedness resources for your local hazards. Develop an information sharing plan to provide private sector partners with notification of hazard and threat information.

For the companion Facilitator Slides and Resource List for this PrepTalk, visit:
https://www.fema.gov/blog/preptalks-dr-jarrod-goentzel-aligning-public-and-private-supply-chains-disaster-response

https://www.fema.gov/blog/preptalks-dr-yossi-sheffi-private-sector-resilience-it-all-supply-chain