

# Global Food Infrastructure Vulnerabilities

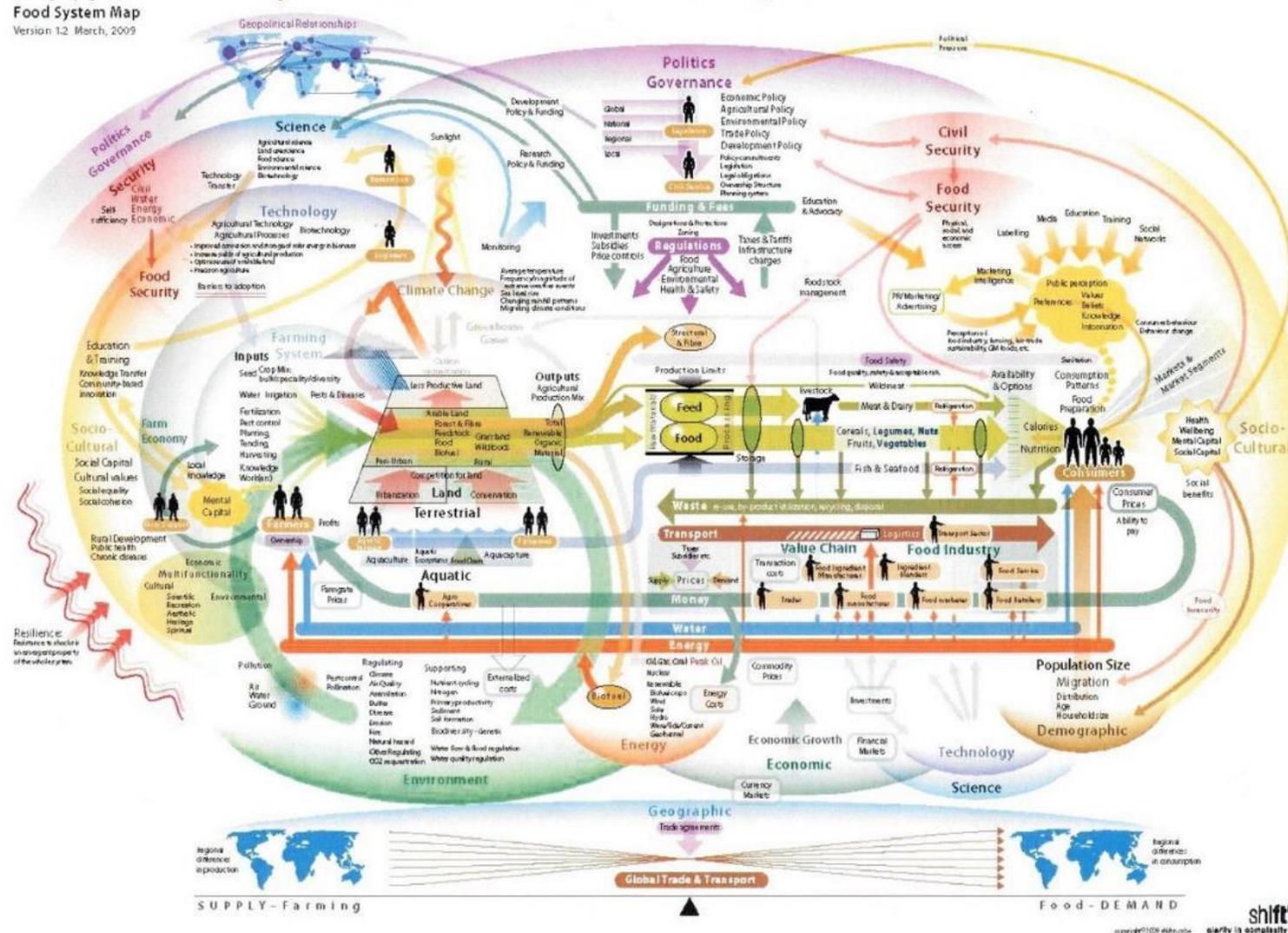


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August 2020

# Vulnerabilities Abound across the Global Food Grid

## The Global Food System



# What are the Most Prevalent Global Food Supply Chain Risks?



- Economically Motivated Adulteration (EMA)
- Loss of a key ingredients supply or a Critical System Node
- Loss of market access for exports due to Trade Issues
- Cyber attacks on facility operations or Transportation systems
- Inputs or Product diversion
- Product theft
- Unexpected Political/Regulatory risks
- Insurance coverage risks
- Infrastructure & Transportation system failures or Port Closures
- Natural hazard events
- Regional or Global Disease outbreaks
- Civil / Political unrest
- Local or Regional Terrorism
- Brand Damage and loss of Customer Confidence
- Loss of Access to Workers and Worker Health
- Loss or theft of Critical Intellectual Property
- Failure of or lack of COOP



# Food Supply Infrastructure Research Needs

## 1. Employee base stability and work environment



Employee Health Identified as a critical Issue for the Food Infrastructure during the 2004-5 Pandemic Planning

- COVID-19 validated this issue

- External community spread was outside the control of the facilities

- Internal work environment created additional risk to employees and, potentially, to the consumer
- Issue rapidly became a Major Local Public Health Challenge

Work environments often require high density of skilled workers working in close proximity

Labor base often has high percentage of immigrants as this is frequently an American work force entry Job for immigrants

Work force public health training and implementation has language, cultural, family/social challenges

Worker PPE now has two functions:

- Protect the product

- Protect the work force.....not actually new but certainly broader in application and function!



# Food Supply Infrastructure Research Needs

## 1. Employee base stability and work environment



- A. How should food processing facilities maintain a healthy work environment and product output?
- B. How will food processing plants operate at 50-60% work force availability and still meet food production needs to sustain domestic food security?
- C. How should facilities manage work force health surveillance?
- D. How should work environments be adapted to limit or eliminate worker infection spread in the facility yet sustain product output?
- E. What standards are needed for work force training and health monitoring?
- F. Work force public health training and implementation has language, cultural, family/social challenges
- G. What adaptations are needed and what standards should be in place for worker PPE that protect the worker from disease spread and protects the product?
- H. What will be the cost to consumers or the impact on domestic food prices from implementation of new work force protection and surveillance within food processing plants?



# Food Supply Infrastructure Research Needs

## 2. Cyber threats to food processors

Cyber based systems are ubiquitous in the food sector

Some work has been done to identify risk and sources of threats but there are no sector standards of cyber security practice and cyber aspects of process controls not yet incorporated into food safety operating standards for food systems

Food infrastructure components across the sector have been targets of cyber attacks from processors to transportation to distribution!

Attacks target all aspects of these operations:

- Operations

- Intellectual Property: formulas, contracts, designs, marketing and planning

- Transportation (Often as a precursor to cargo theft!)

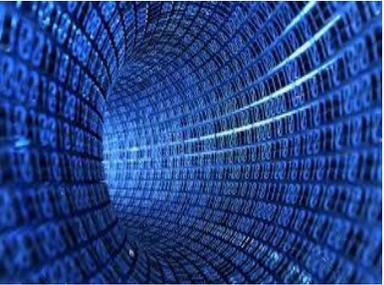
Cost to the sector is unknown as few firms will share actually cyber attack impacts yet the available data show that the food sector is in the top 3-4 targeted sectors each year.

The sophistication of attackers and the poor state of most cyber defense posture across the food industry creates significant strategic risk to the nation!



# Food Supply Infrastructure Research Needs

## 2. Cyber threats to food processors



- A. An assessment of the actual threat across the sector and impacts at the national and global levels are needed
- B. Standards of practice specific to the food sector are needed and will require governmental engagement
- C. The cost of cyber attacks to the sector and consumers must be understood so that the impact of new cyber defense standards can be properly assessed, as well as the potential impact on food prices.
- D. Cyber defense standards must be developed and then they must be incorporated into operating and safety standards for all sector industrial control systems that are components of process controls in food manufacturing.
- E. Metrics for cyber defense posture must be developed to enable industry and government at all levels to accurately monitor and assess the state of cyber defense for the nation's food supply infrastructure!
- F. A new, dedicated cyber threat, reporting and response capability should be developed for the nations food infrastructure from farming operation through processing to retail and food service

# Food Supply Infrastructure Research Needs

## 3. Food product packaging and their impact on supply chains



Covid-19 impact on global system has demonstrated the problems associated with the availability and agility of packaging suppliers to include our dependence upon foreign suppliers

The need to surge retail food production and curtail food service supply systems resulted in packaging supply shortages as suppliers had difficulty responding.

This was exacerbated by disruptions in maritime transportation systems, closing of ports and labor shortages in port facilities.

Shortages in aluminum packaging as materials and production diversion to other critical response products further aggravated the shortages.

Limited production capacity for HDPE plastic pellets impacted the shifts in production from food service channels to food retail.

Food packaging was not seen as a critical strategic resource until Covid-19!

The potential role of food packaging as a fomite is not fully understood.



# Food Supply Infrastructure Research Needs

## 3. Food product packaging and their impact on supply chains



- A. Covid-19 impact on global food supply system must be assessed in detail and new operating and supply standards must be considered for the domestic food infrastructure.
- B. The impact of sudden shifts between food service and retail must be assessed and needs identified as guidance for industry to respond to such shifts.
- C. Food packaging and labeling materials must be identified as a critical infrastructure component and standards need to be developed for prioritization of production, import and transport of packaging materials to meet the needs for sudden, broad national shifts in food production from food service to food retail.
- D. Covid-19 pandemic created shortages in aluminum and plastic packaging, such as films and HDPE, must be studied and alternative sources and materials, as well as their potential surge in sourcing, should be identified to assure the availability of appropriately packaged and labeled food products to the American consumer in future national scale disaster.
- E. The potential role of food packaging as a fomite must be studied and fully understood.



# QUESTIONS?

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