

## Supply Chain Management Overview of Food Defense

*A specific type of supply chain disruption occurs when products are attacked with the intent of causing harm to a target or company. This disruption is an intentional act designed to create public health concerns, economic losses, or terror-related impacts on a product, company, or country. In the food industry, this is known as food defense. Food defense includes measures to comply with laws, regulations, standards, and certifications. To illustrate the application of these principles, this primer focuses on food defense prevention. To provide an example of an application, this supplement on food defense prevention was created.*<sup>1,2</sup>

**Keywords:** "food defense," "supply chain management," "food fraud," "food terrorism," "FSMA-IA," "GFSI," and "food safety management system."

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### Relevance to Supply Chain Management

This content supplements the Michigan State University (MSU) Introduction to Supply Chain Management Course (SCM303) coursepack, building on the **Risk Management** module. That module addresses supply chain disruptions beyond natural events (e.g., weather or disasters) to include **intentional acts of harm** (food defense threats) or **economic manipulation** (food fraud vulnerabilities). Intentional attacks may target specific **companies, brands, product categories, countries, or regions**.

### Key Definitions

- **Food defense (General):** the protection of the food supply chain from an intentional act that has intent to cause damage related to **economic, public health, terror, or fear**. [1-4]
- **Food defense (GFSI):** "The process to ensure the security of food, food ingredients, feed or food packaging from all forms of intentional malicious attack including ideologically motivated attack leading to contamination or unsafe product." [1]
- **Food defense (FDA, general):** "is the effort to protect food from acts of intentional adulteration or tampering." [4]

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<sup>2</sup> **Goal and Audience:** This is a brief supplemental reading to provide a general overview of the topic for "Introduction to Supply Chain Management" (SCM 303) within the Department of Supply Chain Management, College of Business at Michigan State University. This course and content are required for all MSU Business College undergraduate students.

- 27 • **Food defense (FSMA-IA):** “The FDA Food Safety Modernization Act (FSMA) final rule is aimed at  
 28 preventing intentional adulteration from acts intended to cause wide-scale harm to public health,  
 29 including acts of terrorism targeting the food supply. Such acts, while not likely to occur, could cause  
 30 illness, death, and economic disruption of the food supply absent mitigation strategies.” [5]

### 31 Industry Standards & Regulations

32 The general industry-wide-required **Food Safety Management System (FSMS)** such as is endorsed by the  
 33 Global Food Safety Initiative (GFSI) – implemented through food safety standards such as **BRC, FSSC**  
 34 **22000, SQF, IFS,** and others – focuses on **all types** of intentional harms that could cause any problems for  
 35 the companies from **any type** of attacker. This could include:

- 36 • **Terrorist attacks**
- 37 • **Malicious tampering**
- 38 • **Sabotage**
- 39 • **Disgruntled employee actions**
- 40 • **Cyberattacks**
- 41 • **Vandalism**

42 In many instances – or some would consider most instances – buyers require their suppliers to be fully  
 43 compliant with all aspects of GFSI requirements, including addressing all types of food defense threats.<sup>3</sup>  
 44 GFSI does not have a definition of food terrorism; instead, it refers to ‘ideologically motivated.’

### 45 Food Terrorism in Relation to Food Defense

46 In some instances, this threat is classified as food terrorism [6, 7]. In others, the scope is narrowed to  
 47 “wide-scale human health harms” (such as in the FSMA-IA Rule) [5, 8], and in others, it is smaller-scale  
 48 harm (such as mischievous tampering). [1, 4] A less “wide-scale” attack could be targeted against an  
 49 individual person, company, or manufacturing plant facility and have economic (sabotage) or malicious  
 50 intent (seeking to cause illness/death). [9]

51 The scope of protecting the food supply chain from intentional acts for harm is defined either by (A) all  
 52 acts or by (B) acts that have the intent to cause major damage or are considered terrorism. For example,  
 53 the U.S. Food Safety Modernization Act of 2011 (FSMA) published the Intentional Adulteration Final Rule  
 54 (FSMA-IA) that defines the focused regulatory requirements. [5] In the FSMA Intentional Adulteration  
 55 Rule, **Food Defense (FSMA-IA)** is protecting against “wide-scale [human] health harm” [5]– or from the  
 56 FSMA law “hazards that may be intentionally introduced, including by acts of terrorism. [10]

57 Regarding the term **terrorism**, it is defined by many different groups in many different ways. To start, as  
 58 defined in Merriam-Webster: “**terrorism**” is the “systematic use of terror especially as a means of  
 59 coercion,” and the base “**terror**” is “a state of intense or overwhelming fear.” [11] The US FBI defines  
 60 **terrorism** as “Violent, criminal acts committed by individuals and/or groups who are inspired by, or  
 61 associated with, designated terrorist organizations or nations (state-sponsored).” [12] The Terrorism  
 62 Risk Insurance Act of 2002 – Public Law 107-297 states the U.S. Government must certify “to be an act of  
 63 terrorism,” the act must be “dangerous to human life, property or infrastructure,” and “to have been  
 64 committed as part of an effort to coerce U.S. civilians or to influence either policy or conduct of the U.S.  
 65 Government through coercion.”[13] The U.S. Government limits the term to only a “designated terrorist  
 66 organization.”

<sup>3</sup> Alternately, food fraud is an intentional act with the goal of economic gain for the attacker.

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**68 Practical Applications in Supply Chain Management**

69 Food supply chains require risk-based resource-allocation decisions to address potential threats.  
70 Companies must prioritize prevention and mitigation strategies against significant threats while  
71 optimizing resource use.

72 The food supply chain management compliance requirements require a system in place to address and  
73 prevent supply chain disruptions, including food defense threats. For a company the food defense  
74 requirements are defined by laws or regulations (e.g., FSMA-IA, FSMA-FSVP, and sanitary transportation  
75 of food), customer or industry certifications (e.g., ISO 9000, 31000, 22000, 22380, 28000) or food safety  
76 standards (e.g., GFSI), or by internal controls (e.g., general counsel required activities often supporting  
77 other regulations such as the U.S. Sarbanes-Oxley Act of 2007). [1, 5, 14-20] Overall, there are formal  
78 systems implemented to assess and manage all types of intentional acts of harm, including to protect  
79 against terrorism. Regardless of the exact name of the act, the key challenge is resource-allocation  
80 decision-making. For example, what acts or threats are so bad that they must be mitigated, and then how  
81 much mitigation is enough (see the section on supply chain disruption decision-making)?

**82 Key Questions for Decision-Makers:**

- 83 1. Which threats pose the greatest risks to public health or the business?
- 84 2. Which mitigation strategies provide the best protection relative to cost?
- 85 3. How do these threats compare to all other risks?
- 86 4. Which threats are above the risk tolerance of the enterprise (e.g., in terms of Sarbanes-Oxley  
87 Act compliance in COSO-based Enterprise Risk Management)?

**88 Conclusion**

89 Effective supply chain management includes supply chain risk management (SCRM). Effective SCRM  
90 includes controlling supply chain disruptions such as food defense attacks. These systems protect against  
91 various intentional acts that could disrupt food supplies or harm consumers. Compliance with frameworks  
92 like FSMA-IA, GFSI, and ISO standards is essential. The threats should be assessed in terms of the risk  
93 tolerance of the enterprise – legal and regulatory compliance is required.

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96 **Glossary:**<sup>4</sup>

97 **Food Defense**<sup>5</sup> (General) is broadly defined as protection against  
 98 intentional attacks on the food supply chain that have the intent  
 99 to harm, including public health, economic, or terror.

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- 101 • **Agroterrorism/ Agriterrorism** is “the deliberate introduction of an animal or plant disease for the purpose of  
 102 generating fear, causing economic losses, or undermining social stability.” [21]
  - 103 • **Biodefense**: the control or mitigation for bioterrorism that addresses “medical measures to protect people  
 104 against bioterrorism,” including “medicines and vaccinations” (NLM 2016).
  - 105 • **Biosecurity**: defined by the World Health Organization (WHO) as “protecting biological resources from foreign  
 106 or invasive species” (UNOG).
  - 107 • **Biosafety**: to “prevent unintentional exposure to pathogens and toxins, or their accidental release”(UNOG).
  - 108 • **Bioterrorism**: defined by the U.S. FDA as a “threatened or actual terrorist attack on the U.S. food supply and  
 109 other food-related emergencies” (FDA 2002). The U.S. Center for Disease Control (CDC) also defines it as “the  
 110 deliberate release of viruses, bacteria, or other germs (agents) used to cause illness or death in people,  
 111 animals, or plants. ... Biological agents can be spread through the air, through water, or in food” (CDC 2013).  
 112 Examples from the CDC include anthrax, botulism, brucellosis, plague, smallpox, and tularemia (CDC 2013).
  - 113 • **Food Defense (FSMA-IA)**: Protecting against “wide-scale [human] health harm.”
  - 114 • **Food Defense (USDA, home page)**: the protection of food products from contamination or adulteration  
 115 intended to cause public health harm or economic disruption. [22]
  - 116 • **Food Defense (FDA, home page)**: the effort to protect food from acts of intentional adulteration. [4]
  - 117 • **Food Defense (GFSI)**: “The process to ensure the security of food, food ingredients, feed or food packaging  
 118 from all forms of intentional malicious attack including ideologically motivated attack leading to  
 119 contamination or unsafe product.” [Note: GFSI does not use the term terrorism.] [1]
  - 120 • **Food Fraud (General)**: intentional deception for economic gain using food (all types of fraud, from raw  
 121 materials through to finished goods in the marketplace, whether in the legitimate or illegitimate supply chain).
  - 122 • **Food Integrity (EC, FIP)**: product is of the specification defined, such as quality and label claims (EU FIP 2017).
  - 123 • **Food Protection (FDA, 2007)**: Address food safety and food defense (including food fraud/ EMA) (FDA 2007).
  - 124 • **Food Security**: access to a “safe, continuous, and nutritious supply of food” (WHO 2002). IFS Management (a  
 125 GFSI compliance food safety standard formerly known as International Featured Standards) cautions: “A  
 126 misconception of Food Defense is to consider it a synonym of Food Security” (IFS 2012).
  - 127 • **Terrorism, Food (Food Terrorism)**: “an act or threat of deliberate contamination of food for human  
 128 consumption with chemical, biological or radionuclear agents for the purpose of causing injury or death to  
 129 civilian populations and/or disrupting social, economic or political stability” (WHO 2002). [Note: this term was  
 130 published in 2002 and appears only four times on the WHO website, including this citation.]
  - 131 • **Terrorism (FBI)**: is “Violent, criminal acts committed by individuals and/or groups who are inspired by, or  
 132 associated with, designated terrorist organizations or nations (state-sponsored).” [12]
  - 133 • **Terrorism, International (FBI)**: is “Violent, criminal acts committed by individuals and/or groups who are  
 134 inspired by, or associated with, designated foreign terrorist organizations or nations (state-sponsored).” [12]
  - 135 • **Terrorism, Domestic (FBI)**: Violent, criminal acts committed by individuals and/or groups to further ideological  
 136 goals stemming from domestic influences, such as those of a political, religious, social, racial, or environmental  
 137 nature. [12]
  - 138 • **Terrorism (Webster’s Dictionary)**: is the “systematic use of *terror* especially as a means of coercion.”
  - 139 • **Terror** (Webster’s Dictionary): is “a state of intense or overwhelming *fear*.”
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<sup>4</sup> The source and year of publication is noted but not the full citation unless it is used in the main text.

<sup>5</sup> **Food Defence** is an alternate spelling of the food defense term.

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142 *Additional Resources:*

- 143 • Dalziel, GR (2009). Food Defence Incidents, 1950-2008: Chronology of Food Defense Incidents [23]
- 144 • Bashura, Jason P. (2020). Food Defense – Back to Basics, in Building the Future of Food Safety
- 145 Technology [24]
- 146 • Others: Please feel free to add more resources or comment to this shared PDF (v30, 2/15/25):
- 147 <https://drive.google.com/file/d/1cxLA77ESI1-x2Pxll-262jlyiCdzz2EL/view?usp=sharing>

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