

Introduction to Food Safety and Security

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Key concepts, objectives, and practical measures for protecting the food supply chain.

1. Definitions

Term	Meaning
Food Safety	Assurance that food will not cause harm to the consumer when prepared and eaten according to its intended use. Focuses on hazards that can arise at any point from production to consumption.
Food Security	State in which all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences. Emphasizes availability, access, utilization, and stability.
Food Quality	Attributes that determine the value of food to the consumer (taste, texture, appearance, nutritional content). Quality is linked to safety but is not synonymous with it.

2. Why Food Safety & Security Matter

- **Public Health** – Foodborne illnesses affect 600 million people worldwide each year, causing 420,000 deaths.
 - **Economic Impact** – Outbreaks can cost producers, retailers, and governments billions in recalls, medical care, and lost productivity.
 - **Social Stability** – Food insecurity fuels migration, civil unrest, and long-term poverty.
 - **Trade & Regulation** – International markets require compliance with safety standards (e.g., Codex Alimentarius, EU Food Law, USDA FSIS).
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3. Core Components of Food Safety

Hazard Type	Examples	Typical Control Measures

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Biological	Bacteria (Salmonella, Listeria), viruses (Norovirus), parasites (Trichinella)	Pasteurization, HACCP critical limits, proper cooking temperatures, sanitation
Chemical	Pesticide residues, cleaning agents, heavy metals, allergens	Good Agricultural Practices (GAP), proper labeling, residue monitoring, allergen segregation
Physical	Metal fragments, glass shards, stones, bone fragments	Metal detectors, sieving, visual inspection, equipment maintenance

3.1 HACCP (Hazard Analysis & Critical Control Points)

1. **Conduct a hazard analysis** – Identify all potential hazards.
2. **Determine Critical Control Points (CCPs)** – Steps where control can be applied.
3. **Set critical limits** – Acceptable thresholds (e.g., 75°C for 30s).
4. **Establish monitoring procedures** – Frequency, method, responsible person.
5. **Define corrective actions** – What to do when a limit is exceeded.
6. **Verification** – Audits, validation studies, microbiological testing.
7. **Record keeping** – Documentation of all steps for traceability.

3.2 Good Practices

- **GMP (Good Manufacturing Practices)** – Facility design, personnel hygiene, equipment cleaning.
- **GAP (Good Agricultural Practices)** – Soil management, water quality, pesticide application.
- **GHP (Good Hygiene Practices)** – Hand washing, protective clothing, pest control.

4. Core Components of Food Security

Pillar	Description	Key Indicators
Availability	Physical presence of sufficient food supplies.	Production volumes, import/export balances.
Access	Economic and physical ability to obtain food.	Household income, food price index, market distance.

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Pillar	Description	Key Indicators
Utilization	Proper biological use of food (nutrition, health).	Dietary diversity, prevalence of malnutrition, water/sanitation.
Stability	Resilience of the system over time and shocks.	