7 Factors Impacting Food Safety over Next 7 Years

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Director, Integrated Food Systems Leadership
Food Security

“When all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life”.

World Health Organization
North American and World Population

NORTH AMERICAN POPULATION

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2050</td>
<td>435 million</td>
</tr>
<tr>
<td>2100</td>
<td>500 million</td>
</tr>
</tbody>
</table>

WORLD POPULATION

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2050</td>
<td>9.8 billion</td>
</tr>
<tr>
<td>2100</td>
<td>11.2 billion</td>
</tr>
</tbody>
</table>

Sources: World Population Prospects The 2017 Revision, United Nations and The Washington Post
Food Security

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World Health Organization
Food Safety

SYSTEM RELIABILITY
Reducing Exposure To Natural Hazards/Errors/Failures

- Regular incidents
- Standard processes exist to keep food safe
- Regulation exists
- Globally recognized
Global Burden of Foodborne Illness

AFRICA
91 million cases
137,000 deaths

SOUTHEAST ASIA
150 million cases
175,000 deaths

AMERICAS
77 million cases
9,000 deaths

GLOBAL
600 million cases
420,000 deaths

Courtesy of WHO Estimates of the Global Burden of Foodborne Diseases, WHO 2015
Food Safety Today

Global food system

5 foci
Listeriosis
Campylobacter
E. coli
Salmonella
Botulism

WHO

Paper-based records

Reactive

Regulation

Hygiene

FDA Recalls
5 yr low

Gottlieb, Feb 7, 2019
What got us here…

Won’t get us there
Factors Impacting the Global Food Safety

Environment

Technology

Labor

Consumers

Policy

Media

Logistics

Image Credits: World Population Prospects The 2017 Revision, United Nations; http://www.a2bwl.com.au; Pete Souza
Factors Impacting the Global Food Safety

Environment

Extreme Weather Events
Global Warming

Most studies now project adverse impacts on crop yields due to climate change (3°C warmer world)

>80% of all major internationally reported disasters are climate related

Crop yield impact of climate change

Image Credits: World Population Prospects The 2017 Revision, United Nations; World Resources Institute
Factors Impacting the Global Food Safety

- Biotechnology
- Digitalization

**Core transformative technologies supporting innovation in traceability initiatives**

**Changing the shape of demand**
- Alternative proteins: Agriculture’s impact on freshwater withdrawal could reduce by 7%-12%.
- Food-sensing technologies for food safety, quality, and traceability: Reduce food waste by 5%-7%.
- Nutrigenetics for personalized nutrition: Reduce total global overweight population by 1%-2%.

**Promoting value-chain linkages**
- Mobile service delivery: Increase farmer income by 3%-6% and reduce food loss by 2%-5%.
- Big data and advanced analytics: For insurance, farmer income could increase by up to 2%.
- Internet of things: For real-time supply chain transparency and traceability: Reduce food loss by 1%-4%.
- Blockchain-enabled traceability: Reduce food loss by 1%-2%.

**Creating effective production systems**
- Precision agriculture for input and water-use optimization: Reduce agriculture’s impact on water use by 2%-5%.
- Microbiome technologies to enhance crop resilience: Increase farmer income by 2%-3% and reduce food loss by 1%-2%.
- Off-grid renewable energy generation and storage: Increase farmer yields by 4%-7% and reduce agriculture’s impact on freshwater withdrawal by 4%-8%.
- Gene-editing for multitrait seed improvements: Increase farmer income by 1%-2%.
- Biological-based crop protection and micronutrients for soil management: Increase yields by up to 1% and reduce agriculture’s greenhouse-gas emissions by up to 1%.

**Global Forum for Food and Agriculture**
**Communiqué 2019**

“Agriculture Goes Digital – Smart Solutions for Future Farming”

- electronic phytosanitary certification data, to facilitate agri-food trade and regulatory cooperation
- strengthen animal health and animal welfare, foster prudent and responsible use of antimicrobials
- improve resilience to crises, outbreaks of diseases
- improve consumer guidance
- reduce food loss and waste

Image Credits: World Population Prospects The 2017 Revision, United Nations; World Economic Forum, 2019
Factors Impacting the Global Food Safety

Image Credits: http://www.a2bwl.com; FAO; FSANZ Strawberry Tampering Report to Government; World Economic Forum, 2019
Factors Impacting the Global Food Safety

Consumers in rich countries waste almost as much food as the entire net food production of sub-Saharan Africa each year. 

Food Waste Responsibility

Image Credits: World Vision; World Food Programme; UW Provision; FDA
Factors Impacting the Global Food Safety

Unemployment Dips To 3.7 Percent

Labor

Unemployment Training

Image Credits: World Population Prospects The 2017 Revision, United Nations; World Resources Institute; NPR; Civil Eats; Food Institute Blog; USA Today; Walleigh
Factors Impacting the Global Food Safety

New food safety regulations in Canada, EU, China, Aus/NZ

Image Credits: Pete Souza; Food Safety News; Codex Alimentarius; NutraIngredients; Washington Post; Roll Call; Southern Poverty Law Center
Factors Impacting the Global Food Safety

Environment
- Extreme Weather Events
- Global Warming

Labor
- Unemployment
- Training

Policy
- FSMA
- Immigration

Technology
- Biotechnology
- Digitalization

Consumers
- Food Waste
- Responsibility

Media
- Fake News

Logistics
- Food Loss
- Traceability

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Factors Impacting the Global Food Safety

Shifting global pressures and their interrelationships will drive change in food system practices.

We need to begin sowing the seeds of interdisciplinary food system collaboration to assure we are all ready.

Image Credits: World Population Prospects The 2017 Revision, United Nations
Integrated Food System Competency

Farm to Fork

Image Credit: https://www.tyentusa.com/blog/health-tips-lifestyle-hacks/
Growing Leaders to Feed the Future

Fostering leadership, collaboration, and innovation across the food system