

The Food Safety Continuum

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Farm-to-Fork Food Safety



Farm-to-Fork Food Safety

What does that *mean*?

Farm-to-Fork Food Safety

What does that *mean*?

WHO is responsible for it?

Farm-to-Fork Food Safety

What does that *mean*?

WHO is responsible for it?

HOW is it accomplished?

Who is Responsible???



Who is Responsible??

- “Big Agriculture”?



Who is Responsible??

- “Big Agriculture”?
- **“Factory” Farms?**



Who is Responsible??

- “Big Agriculture”?
- “Factory” Farms?
- **The Food Industry**



Who is Responsible??

- “Big Agriculture”?
- “Factory” Farms?
- The Food Industry
- **Imported Products?**



Who is Responsible??

- “Big Agriculture”?
- “Factory” Farms?
- The Food Industry
- Imported Products?
- **Retailers**

Who is Responsible??

- “Big Agriculture”?
- “Factory” Farms?
- The Food Industry
- Imported Products?
- Retailers
- **Consumers?**

Who is Responsible??

- “Big Agriculture”?
- “Factory” Farms?
- The Food Industry
- Imported Products?
- Retailers
- Consumers?
- **The “Government”?**

Global Impacts on Food Safety



“Macrochanges”

- Globalization of food trade
- An increasing global population
- Climate change
- Diminishing agricultural land availability
- Urbanization
- Global economic shifts
- New Food Safety Legislation and Regulations
- Instant communication

Implications of Macrochanges

- Increased Importation of foods and ingredients

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- Need for Harmonization/Equivalency

Implications of Macrochanges

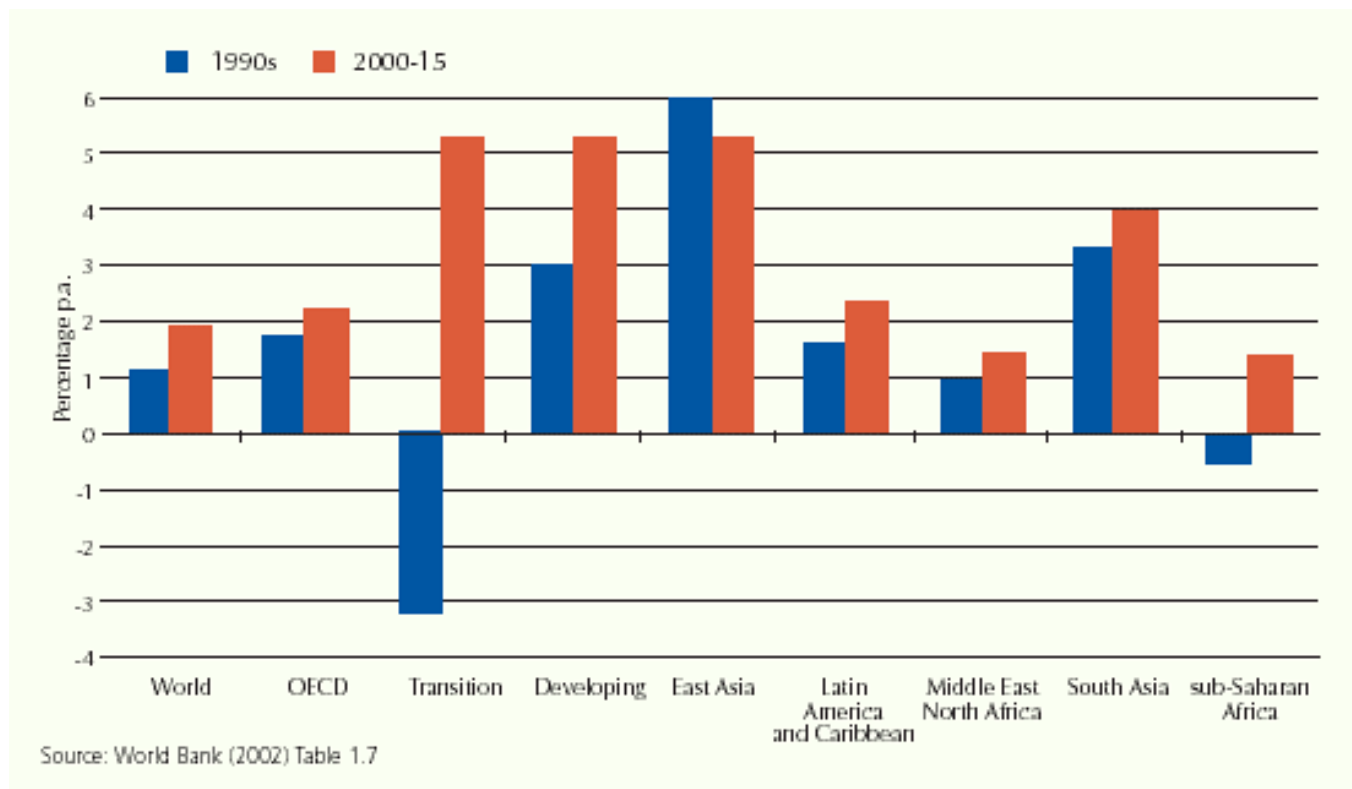
- Increased Importation of foods and ingredients
- Need for Harmonization/Equivalency
- **Increased need for biotechnology**

Implications of Macrochanges

- Increased Importation of foods and ingredients
- Calls for Harmonization/Equivalency
- Increased need for biotechnology
- Higher prices, increased chance of fraud

Growth rates of per capita GDP

1990s & 2000-15



Source: World agriculture:towards 2015/2030, An FAO perspective, 2003

Increased Income and Consumer Expectations

- Lower Income economies
 - Staple Foods

Increased Income and Consumer Expectations

- Lower Income economies
- Middle Income economies
 - fresh fruits & vegetables
 - seafood & meat
 - processed foods

Increased Income and Consumer Expectations

- Lower Income economies
- Middle Income economies
- **High Income economies**
 - wider variety of foods, particular higher quality
 - fresher, more natural foods: such as fresh fruits & vegs
 - less severely processed (less heat- or freeze-damaged),
 - less preservatives, or are even free from "artificial" additives;
 - less salt, less sugar or fat);
 - labor-saving [semi] prepared
 - ready for consumption & with a sufficient shelf-life);

Changes Affecting Food Safety in North America

Changes

- Social Changes
- Technological changes
- Scientific changes and understanding
- Awareness of issues
- Food business
- Laws and regulations

Social Changes

- Human Demographics and Behavior

Changes in Society

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 - Age

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 - Increased reliance on medicines

Changes in Society

- Human Demographics and Behavior
 - Age
 - Increased reliance on medicines
 - Chronic conditions leading to other health issues(eg obesity)

Changes in Society

**20%-25% of the
Population is At Risk**



Changes in the U.S. Population

- 17% of population is 60 or older*
 - 4% of the population is 80 or older
- 64% of the adult population is overweight
- 5% of infants and young children and 2% of adults have food allergies
- 44% of the non-institutionalized population reports taking one or more prescription medications during the last month

Changes

- Social Changes
- Technological changes

Technological Changes

- New Processing technologies
 - New technologies
 - Aseptic
 - High Pressure
 - Irradiation
 - Cool Plasma
 - Micro/macrowave



Technological Changes

- New Processing technologies
- New Ingredients
 - Nanoparticles
 - Many ingredients being sourced **ONLY** from abroad

Technological Changes

- New Processing technologies
- New Ingredients
- New Foods and Formulations
 - “Clean” labels
 - Reduced sodium
 - Reduced added sugars
 - Inclusion of bioactive components

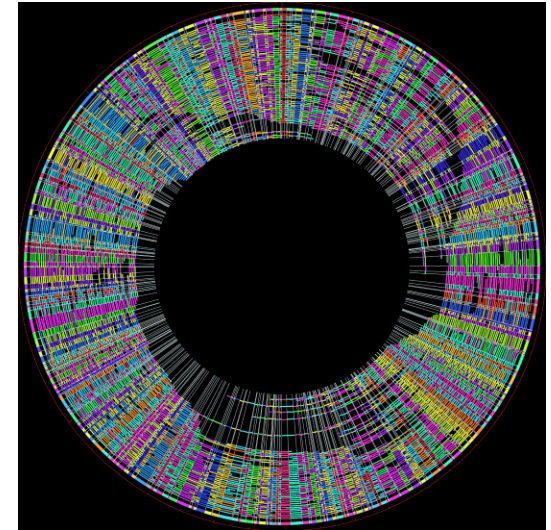
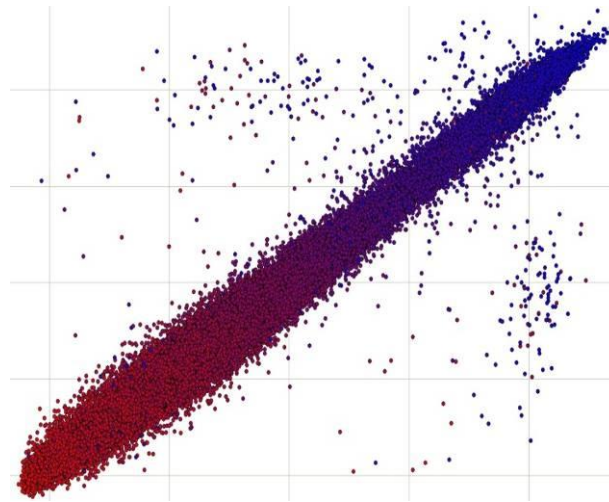
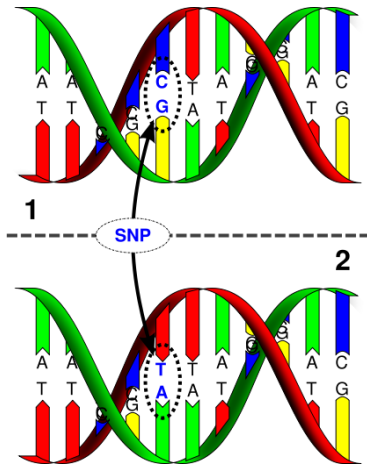
Changes

- Social Changes
- Technological changes
- Scientific changes and understanding

Scientific Knowledge and Understanding

- New Epidemiological tools
- New Foodborne Pathogens
- Pathogenicity/Virulence
 - Identification of virulence factors; What turns virulence genes “off” or “on”
- Growth and Survival in “Extreme” Environments
 - Microbial adaptation and change
- New Molecular Tools
- Better Attribution

Microarray and other next-generation genomic applications



- **Applied research on a genomic continuum:**
 - **Single Nucleotide Polymorphism (SNP) Panels**
 - **Custom Microarray Whole Genome Genotyping**
 - **Optical Map Gazing for Unique Chromosome Architecture**

Next-Generation Sequencing

A high-throughput sequencing method that parallelize the sequencing process, producing thousands or millions of sequences at once.

Over the past five years, so called “Next-Generation” sequencing technologies have made accessible data capable of answering questions fundamental to our understanding of life and the factors that govern human health. The combination of the vast increase in data generated, coupled with plummeting costs required to generate these data, has rendered this technology a tractable, general purpose tool for a variety of applications.



Next-Generation sequencing can be used to address different facets of outbreak response:

- Have we seen this isolate before? (Compare to reference isolates)
- Do these clinical isolates form a cluster (i.e. is it outbreak or background)? (Compare to reference and other outbreak isolates)
- Is there a link between food/environmental and clinical isolates? (Compare to reference, clinical, and food/environmental isolates)

Same PFGE Pattern (but we suspect that not everything is related)

This region contains isolates where we are comfortable that PFGE will differentiate unrelated isolates

Different PFGE Patterns (but we suspect they may be related)

Changes

- Social Changes
- Technological changes
- Scientific changes and understanding
- Awareness of issues

Awareness of Issues

- Information

Google

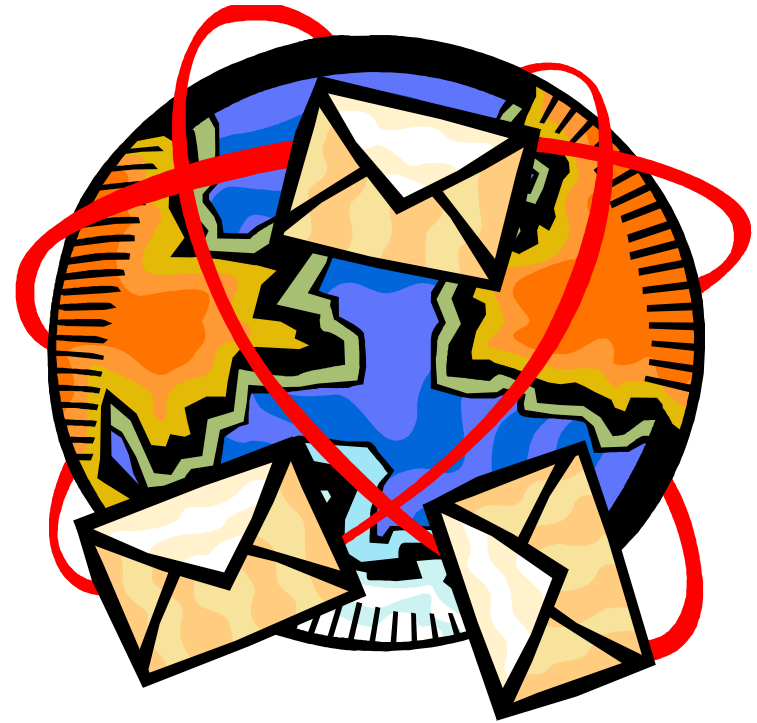
Awareness of Issues

- Information
- Connections
 - Social media



Awareness of Issues

- Information
- Connections
- Communications



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- **Food business**

Trends in the Food Business

- Growth of Private Label

US private label market could double in five to six years, predicts PLM boss

By Elaine WATSON , 13-Sep-2012



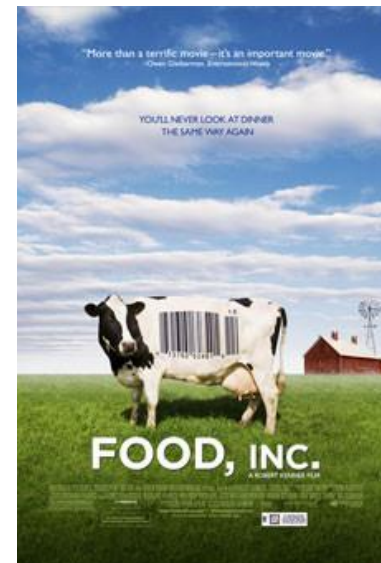
Trends in the Food Business

- Growth of Private Label
- Private Standards



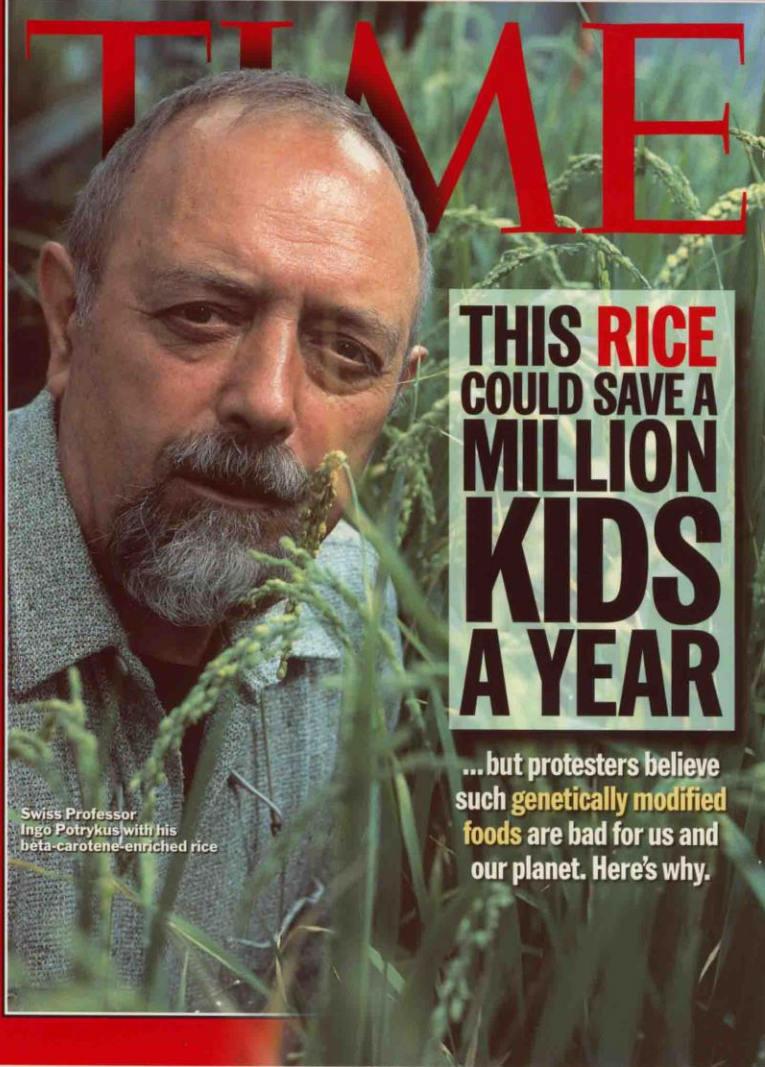
Trends in the Food Business

- Growth of Private Label
- Private Standards
- Consumer pressure on social/political issues



JULY 31, 2000 \$3.50

www.time.com AOL Keyword: TIME



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AND HEALTH

Trends in the Food Business

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- **Expanding litigation**
 - Defendant (eg. Retailer)

Trends in the Food Business

- Growth of Private Label
- Private Standards
- Consumer pressure on social/political issues
- Expanding litigation
 - Defendant (eg. Retailer)
 - Supplier
 - Broker
 - Auditor
 - Etc, etc. etc.

Trends in the Food Business

- Growth of Private Label
- Private Standards
- Consumer pressure on social/political issues
- **Expanding litigation**
 - Defendant
 - Plaintiffs
 - Victims
 - Private citizens
 - Government entities

Changes

- Social Changes
- Technological changes
- Scientific changes and understanding
- Awareness of issues
- Food business
- **Laws and regulations**

Changes in Laws and Regulations

- National
 - China
 - New Zealand
 - Canada
 - United States
 - Food Safety Modernization Act

Changes in Laws and Regulations

- National
- Local/regional
 - Proposition 65 in California
 - Vermont GMO Labeling
 - Etc.

Farm-to-Fork Food Safety

What does that *mean*?

WHO is responsible for it?

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EVERYBODY!

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- “Factory” Farms
- The Food Industry
- Imported Products
- Retailers
- Consumers
- The “Government”

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Focus on Retail

- Changes in the industry
 - Consolidations

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 - Private label (BRANDING).

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- What can Retail do to Help?
 - Implement an aggressive food safety program in-house
 - FMI Resources

Focus on Retail

- What can Retail do to Help?
 - Implement an aggressive food safety program in-house.
 - Insist on food safety from suppliers
 - Audits
 - Review of supplier practices
 - Review of supplier history

Focus on Retail

- What can Retail do to Help?
 - Implement an aggressive food safety program in-house.
 - Insist on food safety from suppliers
 - Focus on TRUE food safety issues.
 - Microbiological Safety!
 - Avoid focus on non-science “science”

Focus on Retail

- What can Retail do to Help?
 - Implement an aggressive food safety program in-house.
 - Insist on food safety from suppliers
 - Focus on TRUE food safety issues.
 - Support education
 - Get involved!
 - FMI
 - Partnership for Food Safety Education
 - University partnerships

Focus on Retail

- What can Retail do to Help?
 - Implement an aggressive food safety program in-house.
 - Insist on food safety from suppliers
 - Focus on TRUE food safety issues.
 - Support education
 - Move away from supplier/customer model to the “partner” model. Private labels are YOUR labels.

Summary

- Food safety is not THEIR problem

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Summary

- Food safety is not THEIR problem
- Food safety is a true continuum in which requires all involved to be vigilant
- The food system will need to be flexible, innovative, and cooperative while at the same time being aggressive.
- Food retailers have both the power and responsibility to promote safety back down the supply chain.

Thank you!

