



Food Technology Innovations on the Horizon

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Presentation Outline

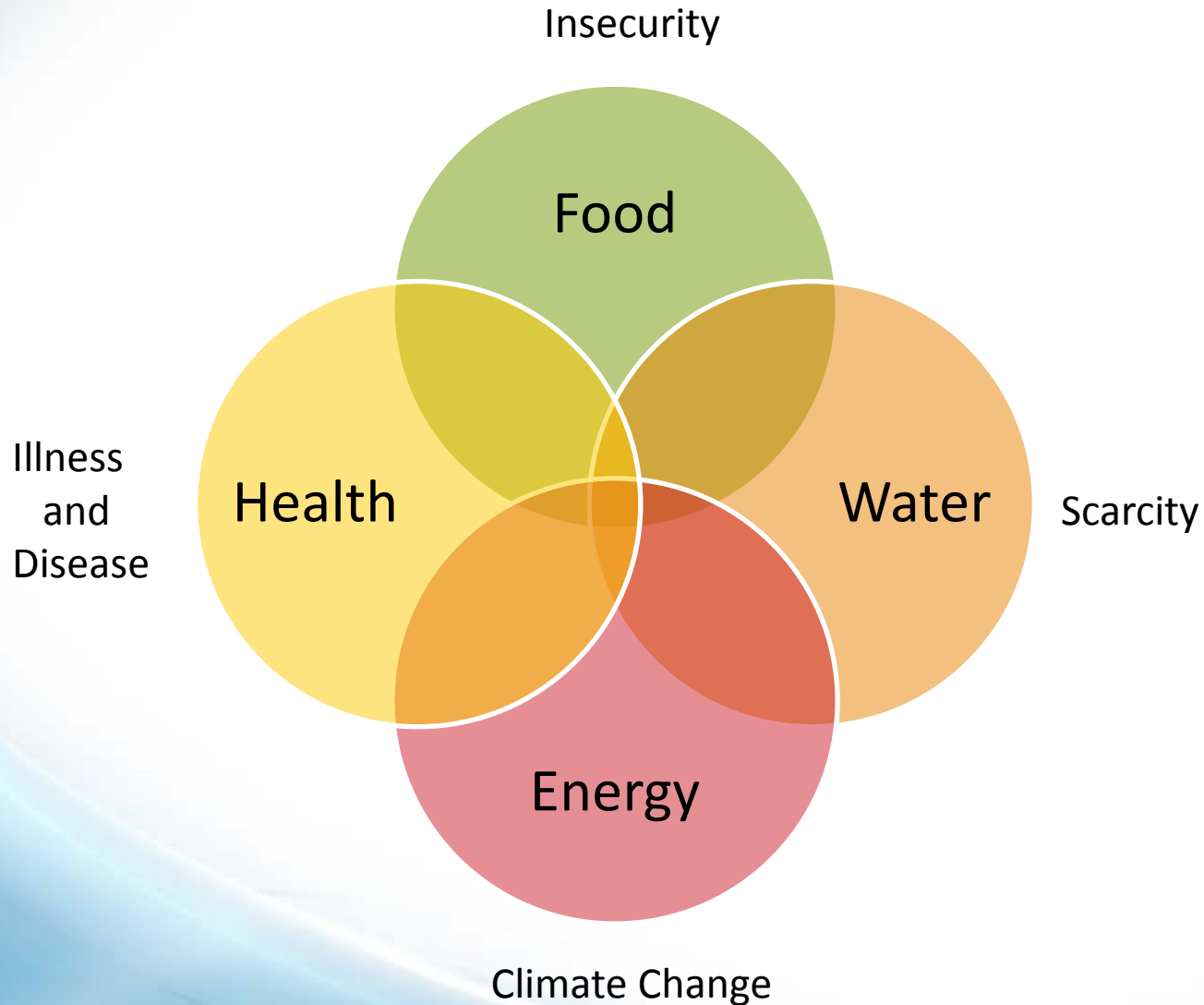
- Consumers of the future
 - Conscious consumers
 - Individualized Needs
 - Citizen science
- Foods of the future
 - Globalized supply chains
 - Complexity of constituents
 - Revolutionary versus evolutionary
- Traceability of the future
 - System of systems
 - Ubiquitous
 - Smart versus artificially intelligent



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Consumers of the Future: Conscious Consumers



Consumers of the Future: Individualized Needs





Consumers of the Future: Citizen Science

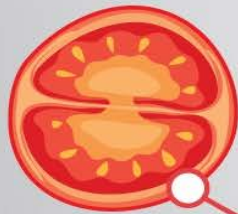
- Social media
- Celebrity science
- Beliefs versus facts versus wishful thinking
- Most importantly, **empowered to impact change!**



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Foods of the Future: A Global Supply Chain



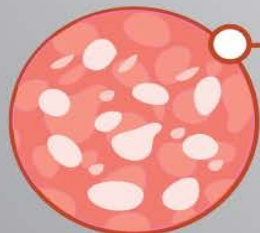
Tomatoes

While the U.S. produces the most tomatoes, Mexico accounts for **71%** of tomato imports, and Canada accounts for **27%**.



Anchovies

56% of our anchovies are produced in Peru, while pizza anchovies come from Argentina, Croatia, Spain, and Italy.



Beef

2.5 billion pounds of beef were exported this year to top markets like Canada, Japan, Mexico, South Korea, and Hong Kong.



Cheese

14% of the raw buffalo milk used for mozzarella is made in Italy while **86%** of buffalo milk is produced in Asia.



Mushrooms

China produces **47%** of our mushrooms across the globe, followed by the U.S which produces only **11%**.



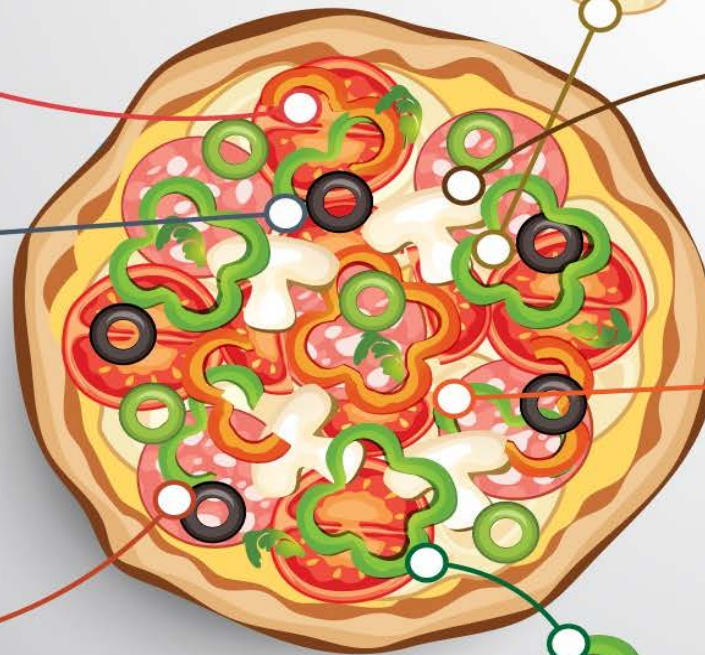
Spices

11.5% of India's spices are exported to United Arab Emirates, the U.S., the EU, and Malaysia.



Peppers

95% of unprocessed peppers are exported through India, China, and the U.S.



Global Supply Chain Complexity



bleached wheat flour
malted barley flour
thiamine
riboflavin
Niacin
folic acid
reduced iron
Water
corn syrup
sesame seeds
soybean oil
Yeast
Salt
calcium sulfate
calcium carbonate
calcium silicate

soy flour
baking soda
wheat gluten
calcium propionate
enzyme
mono- and diglycerides
diacetyl
tartaric acid esters
ethanol
sorbitol
polysorbate 20
potassium propionate
sodium stearoyl lactylate
corn starch
ammonium chloride
ammonium sulfate
calcium peroxide
ascorbic acid
azodicarbonamide

Milk
milkfat
Water
cream
sodium citrate
salt
sodium phosphate
sorbic acid
artificial color



cheese culture
acetic acid
soy lecithin
Enzymes
starch



Cucumbers
water
Vinegar
Salt
calcium chloride
Alum
natural flavorings
polysorbate 80
turmeric



USDA inspected beef

Soybean oil
pickles
distilled vinegar
water
egg yolks
HF corn syrup
sugar

onion powder
corn syrup
spice
spice extractives
salt
xanthan gum

mustard flour
prop. glycol alginate
sodium benzoate
potassium sorbate

mustard bran
garlic powder
hydrolyzed proteins
caramel color
paprika

Turmeric
calcium disodium EDTA



lettuce



dehydrated onions

Grill Seasoning
Salt
Pepper

cottonseed oil
soybean oil



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Globalizing the Cheeseburger

Vinegar

Argentina
Australia
Austria
Belgium
Brazil
Canada
China
Chile
Colombia
Denmark
Dom. Rep
France
Germany
Greece
Hong Kong
Israel
Italy



Japan
S. Korea
Lebanon
Peru
Poland
Portugal
Serbia
Philippines
Russia
S. Africa
Singapore
Spain
Sweden
Turkey
Taiwan
U.K.

Garlic Powder

Brazil
Canada
China
Germany
India
Israel
Japan
S. Korea
Mexico



Tomatoes

Belgium
Canada
Colombia
Costa Rica
Dom. Rep.
Guatemala
Israel
Morocco
Mexico
Netherlands
New Zealand
Poland
Spain

Beef

Australia
Canada
Chile
Costa Rica
Honduras
Japan
Mexico
Nicaragua
New Zealand
Uruguay



Wheat Gluten

Australia
Belgium
Canada
China
Czech Rep.
France
Germany
Kazakhstan
Lithuania
Netherlands
Poland
Russia
Switzerland
Thailand
U.K.

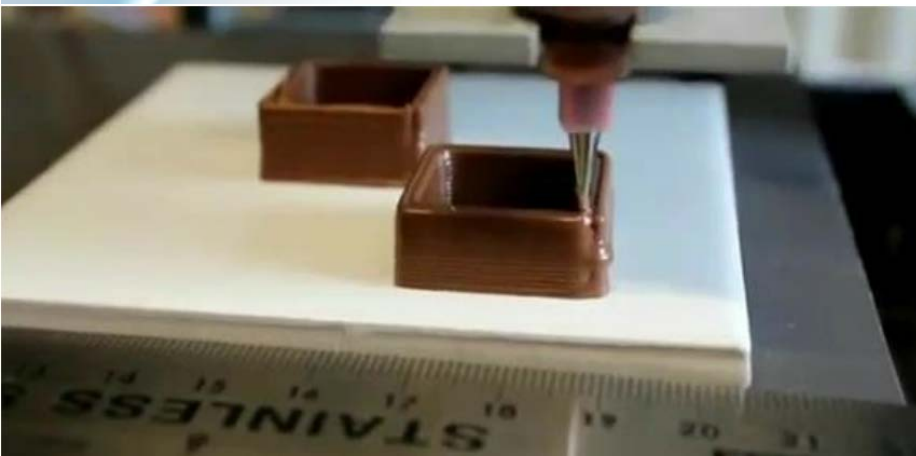
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Foods of the Future: Revolutionary versus Evolutionary



What are the...
... food safety implications?
... regulatory implications?
... economic implications?





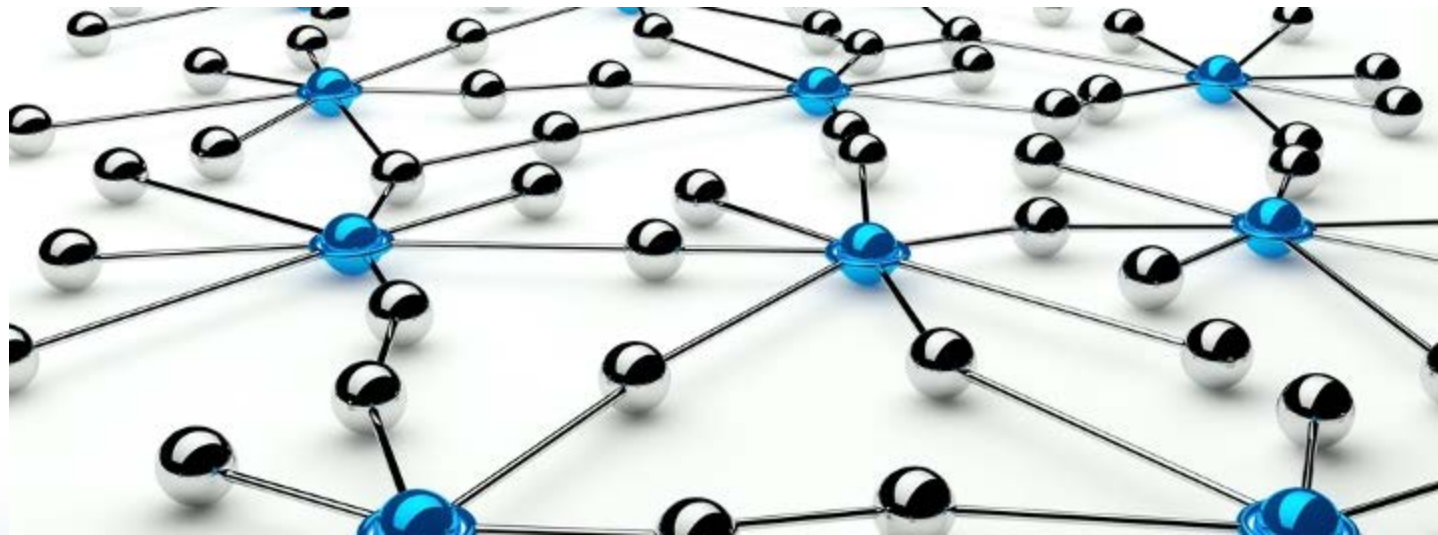
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Traceability of the Future: System of Systems



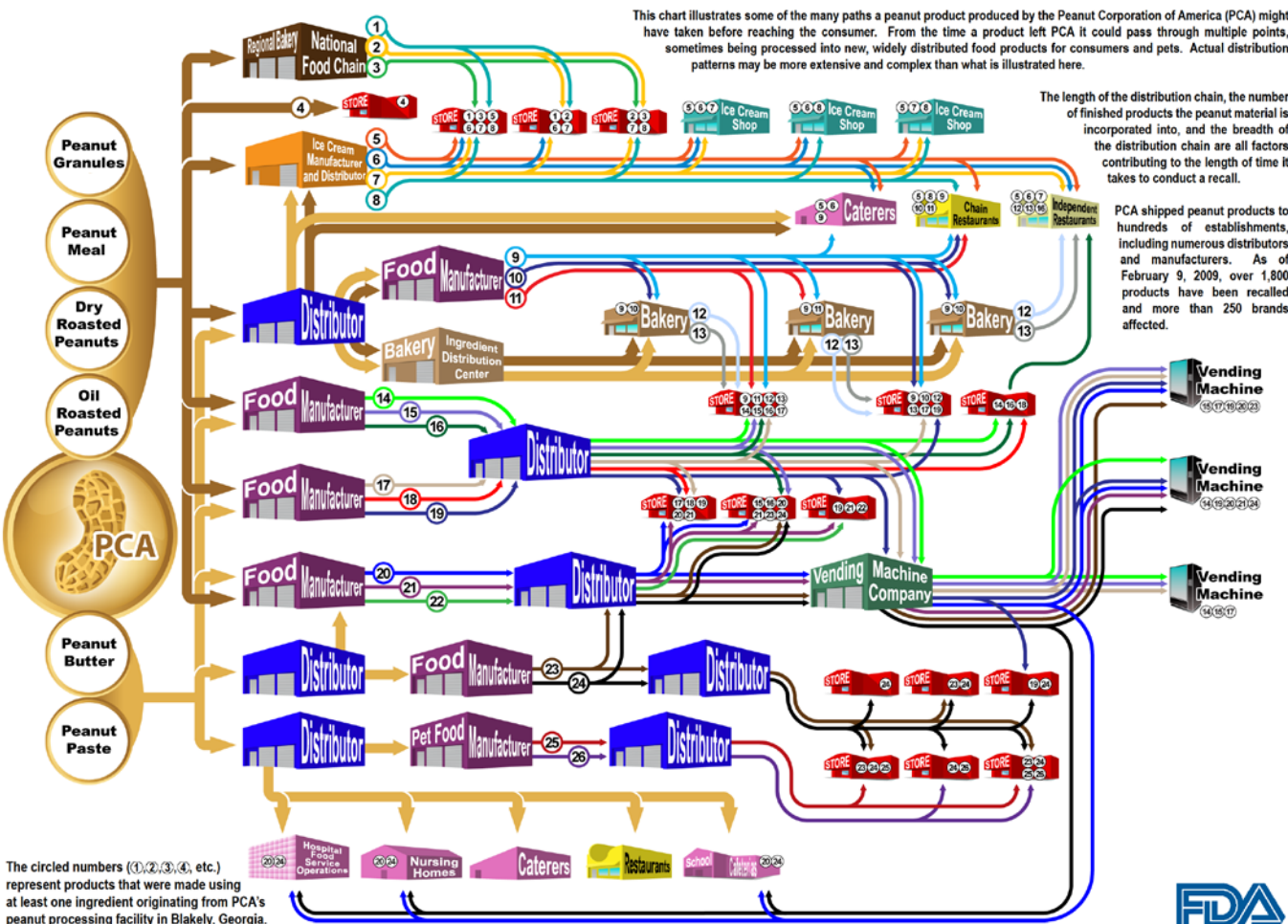
Typical Food Supply Chain



Traceability of the Future: System of Systems



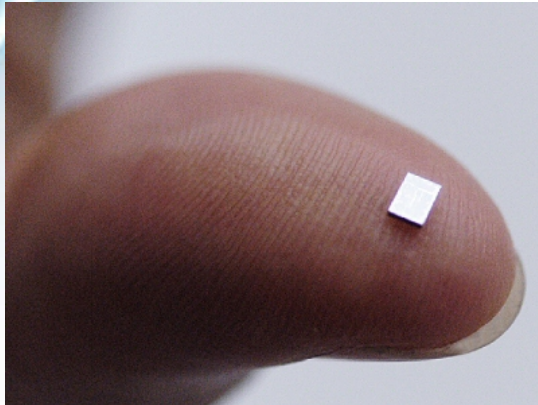
Simplified Peanut Product Distribution Pattern From Peanut Corporation of America (PCA) to Point of Sale



Traceability of the Future: System of Systems

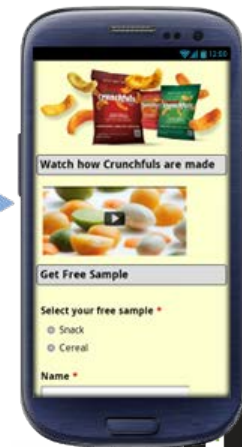


Traceability of the Future: Ubiquitous



Rich Media
Full Screen Content

Mobile Landing Page





Traceability of the Future: Smart versus AI

- DNA tracking
- Molecular tracking
- Radio-isotope tracking
- Most importantly, **data versus understanding!**

Conclusion

- A list of cliché's
 - “the future is coming”
 - “nothing is permanent but change”
 - “surprise is inevitable, being unprepared is not”

- Drivers of innovations
 - Regulatory roadmaps
 - Industry innovations
 - Technology transformations

- Future of Traceability
 - In a revolutionary phase
 - Much more than keeping track of foods
 - Collaborative ubiquitous artificially intelligent system of systems

IFT's Global Food Traceability Center



Science of Food Traceability



- Journal of Food Science special issue: Making Traceability Work
<http://www.ift.org/gftc.aspx>





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