What Should We Expect of the Food System

Food and Nutrition Board - Food Forum Workshop:
Healthy People, Healthy Planet: Building a More Sustainable, Resilient, Equitable and Nourishing Food System

Patrick J. Stover, Ph.D.
Vice Chancellor, Texas A&M AgriLife
Dean, Texas A&M College of Agriculture and Life Sciences
Director, Texas A&M AgriLife Research

TEXAS A&M AGRILIFE

Disclosures

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Speakers Bureau:	None
Stock Shareholder:	TIAA

Greatest Challenges of Our Time

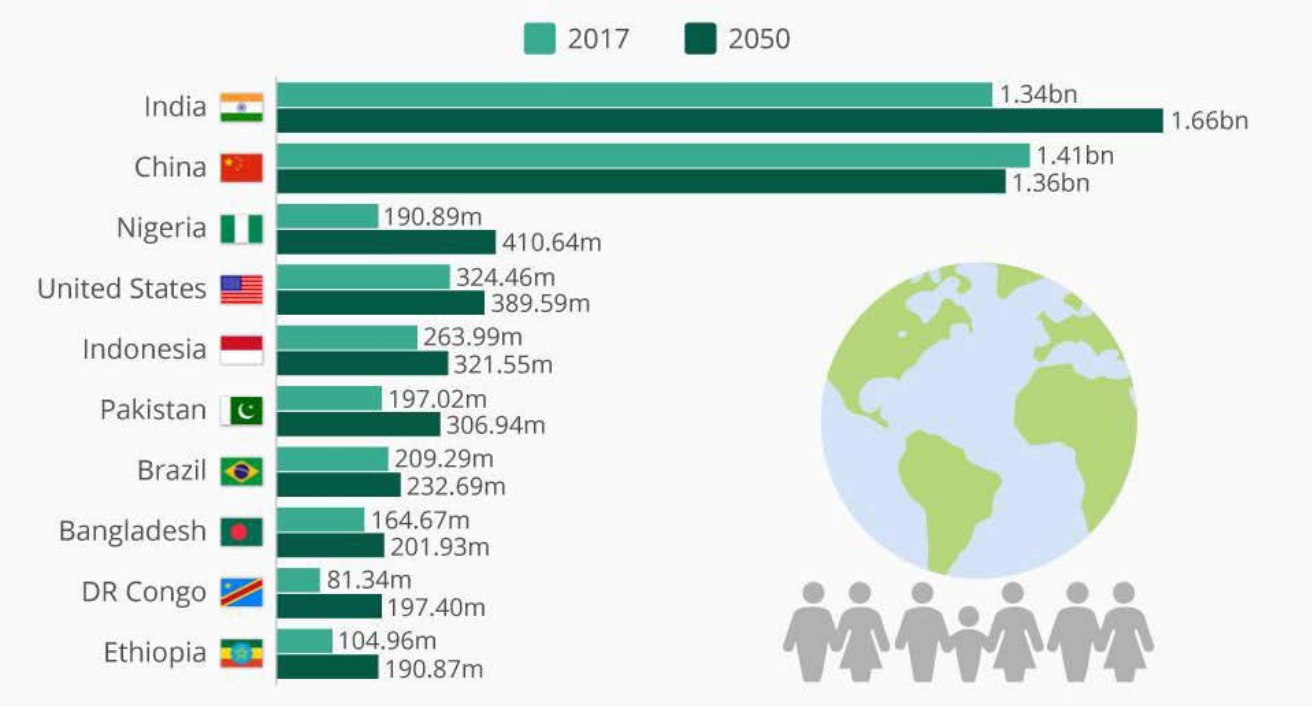
FOOD

PEOPLE

ECONOMICS

ENVIRONMENT

Greatest Challenges of Our Time: Population Growth and Farmland

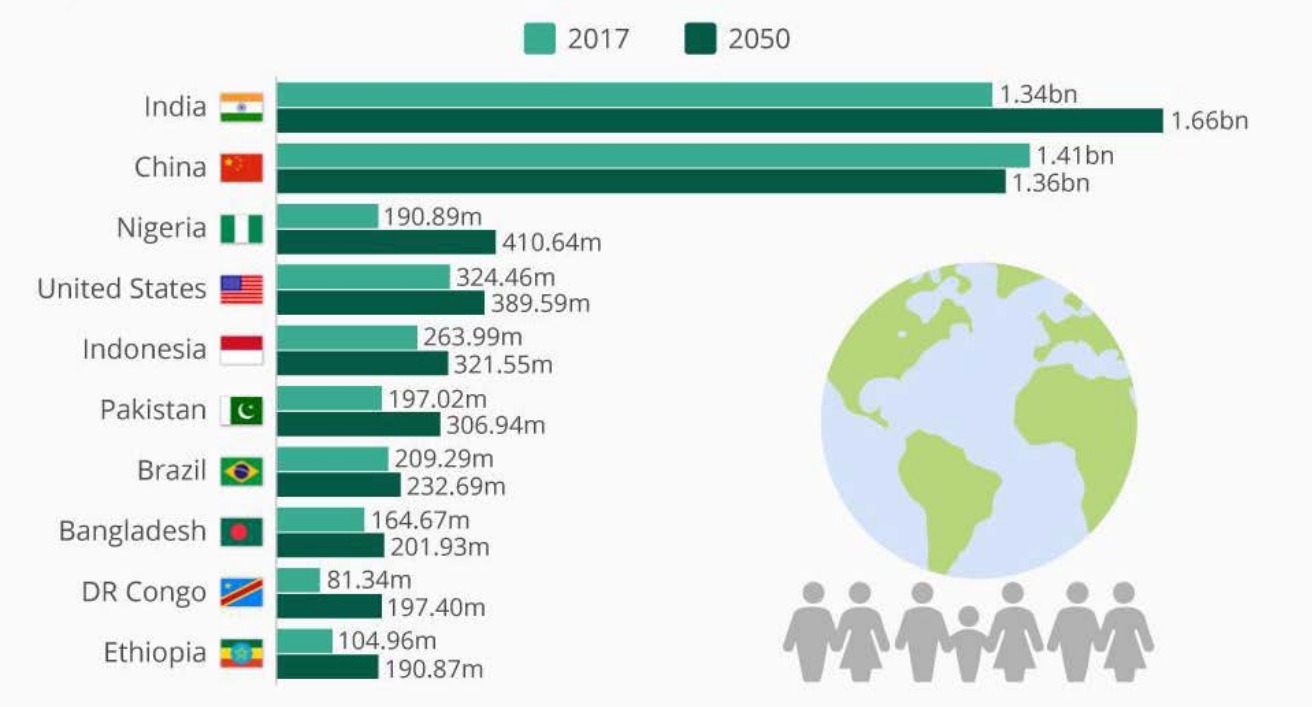


https://www.forbes.com/sites/niallmccarthy/2017/06/22/the-worlds-most-populous-nations-in-2050-infographic/#726189339f60

The U.S. loses about 175 acres of farmland every hour, mostly due to the expansion of urban and suburban areas.

American Farmland Trust

Greatest Challenges of Our Time: Population Growth and Nutrition



https://www.forbes.com/sites/niallmccarthy/2017/06/22/the-worlds-most-populous-nations-in-2050-infographic/#726189339f60

Worldwide:

2019 - 690 M malnourished people

2030 - 840 M malnourished people
- 2 billion food insecure

In the United States:

50% of all adults suffer from pre-diabetes or diabetes.

The treatment of diabetes alone is 160 billion/year, more than the annual budget of many key federal agencies

NEW EXPECTATIONS:
Agriculture and Food Systems

Historical Expectations

Produce

> Food
> Fiber
> Fuel

New Expectations

Nourish and Sustain

> Food for life-long health
> Our environment
> Agriculture in a way that is economically viable

Greatest Challenges of Our Time: The Future of Food

We can engineer the food supply with unprecedented capability.

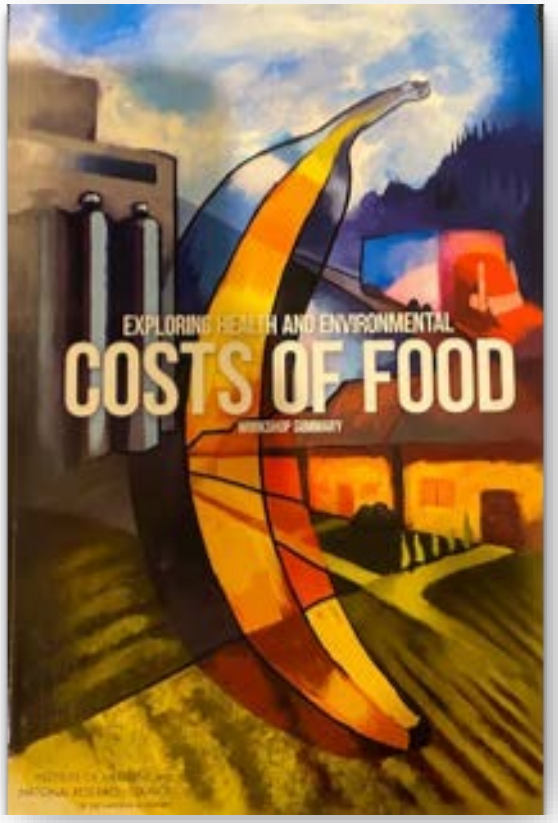
What do we want it to achieve?

- Avoid nutrient deficiency
- Optimize function
- Prevent/manage chronic disease
- Lower environmental footprint
- Ensure economic sustainability
- Support diversity in the food supply
- Be affordable & accessible
- Lower health care costs
- ……

NEW EXPECTATIONS:
Agriculture and Food Systems

"Human Nutrition Research—The Committee directs ARS to provide to the Committee not later than 180 days after the enactment of this Act a *report on the connection between how to advance science, policy, and practice for how healthier food enhances overall health, reduces obesity and related co-morbidity, and could lower health care costs*."

NEW EXPECTATIONS:
Economics, Agriculture and Food Systems

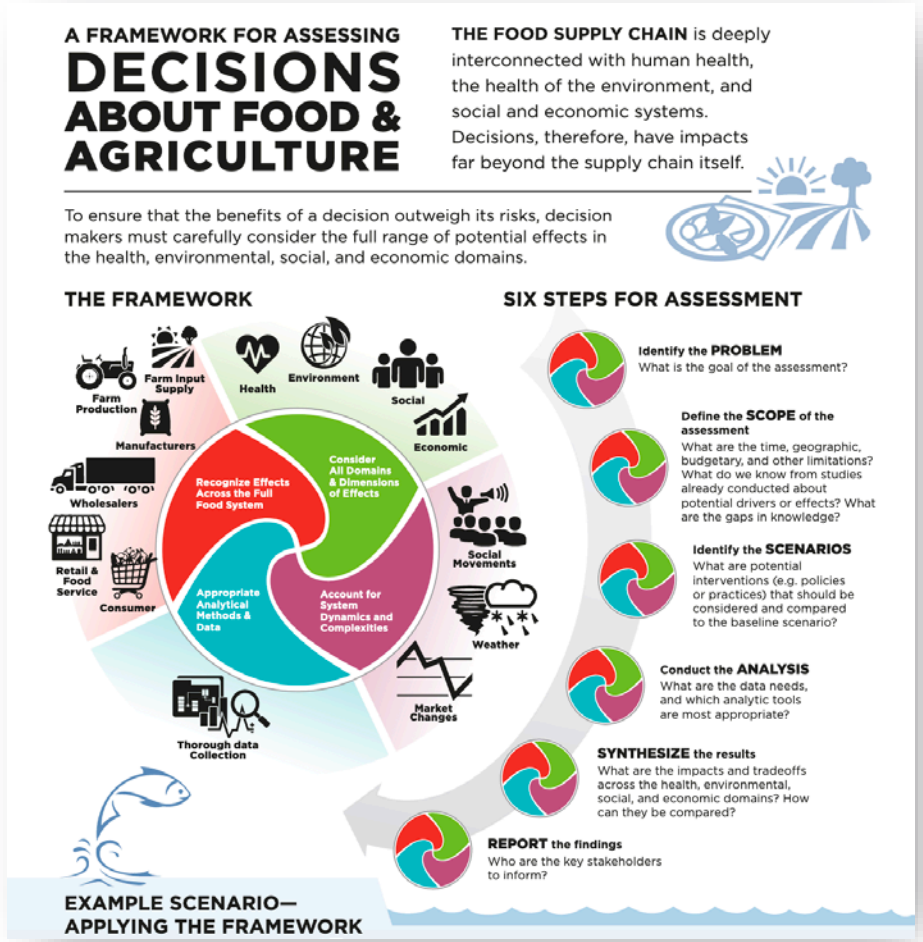


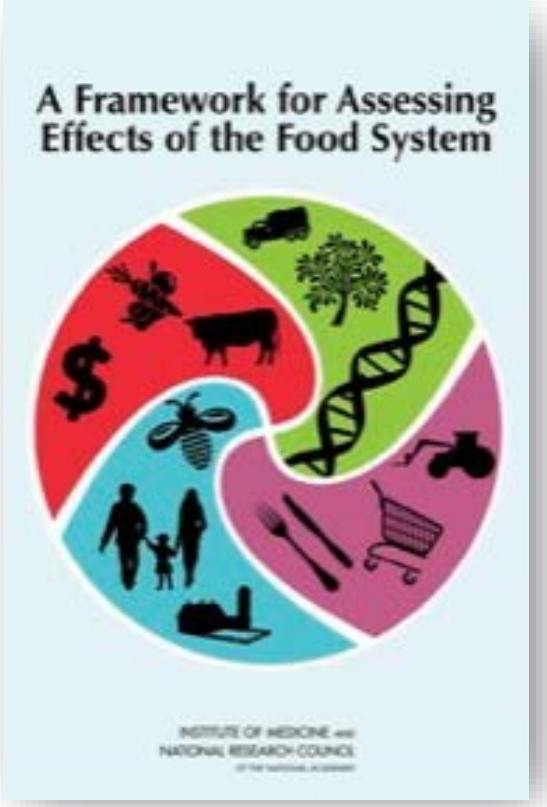
2012

Page 1 – Workshop summary:

"The US Food System provides many benefits, not the least of which is a safe, nutritious and consistent food supply. However, the same system creates significant environmental, public health, and other costs that generally are not recognized and not accounted for in the retail price of food."

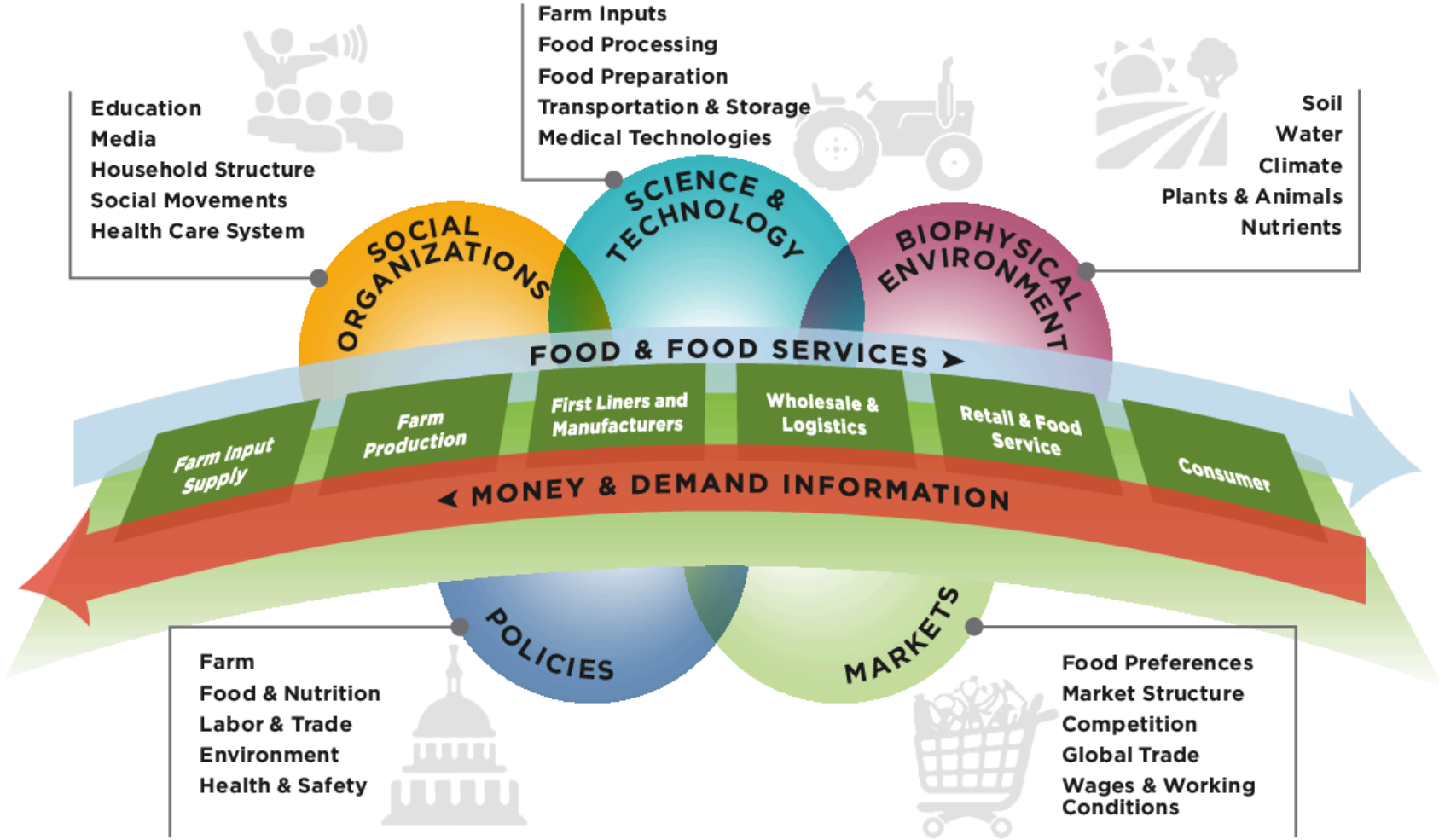
Food, Agriculture and Health are Interconnected Systems



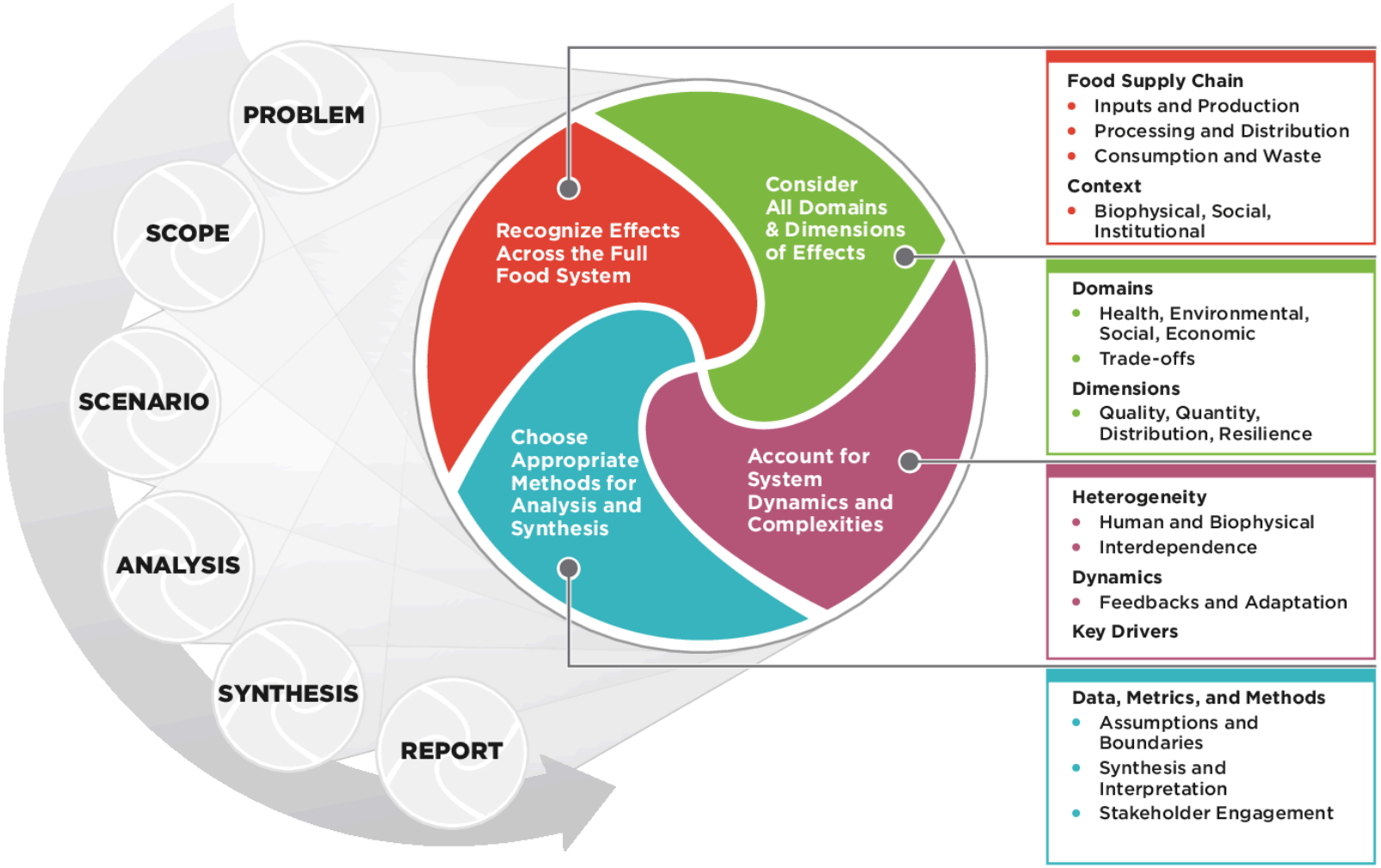


2015

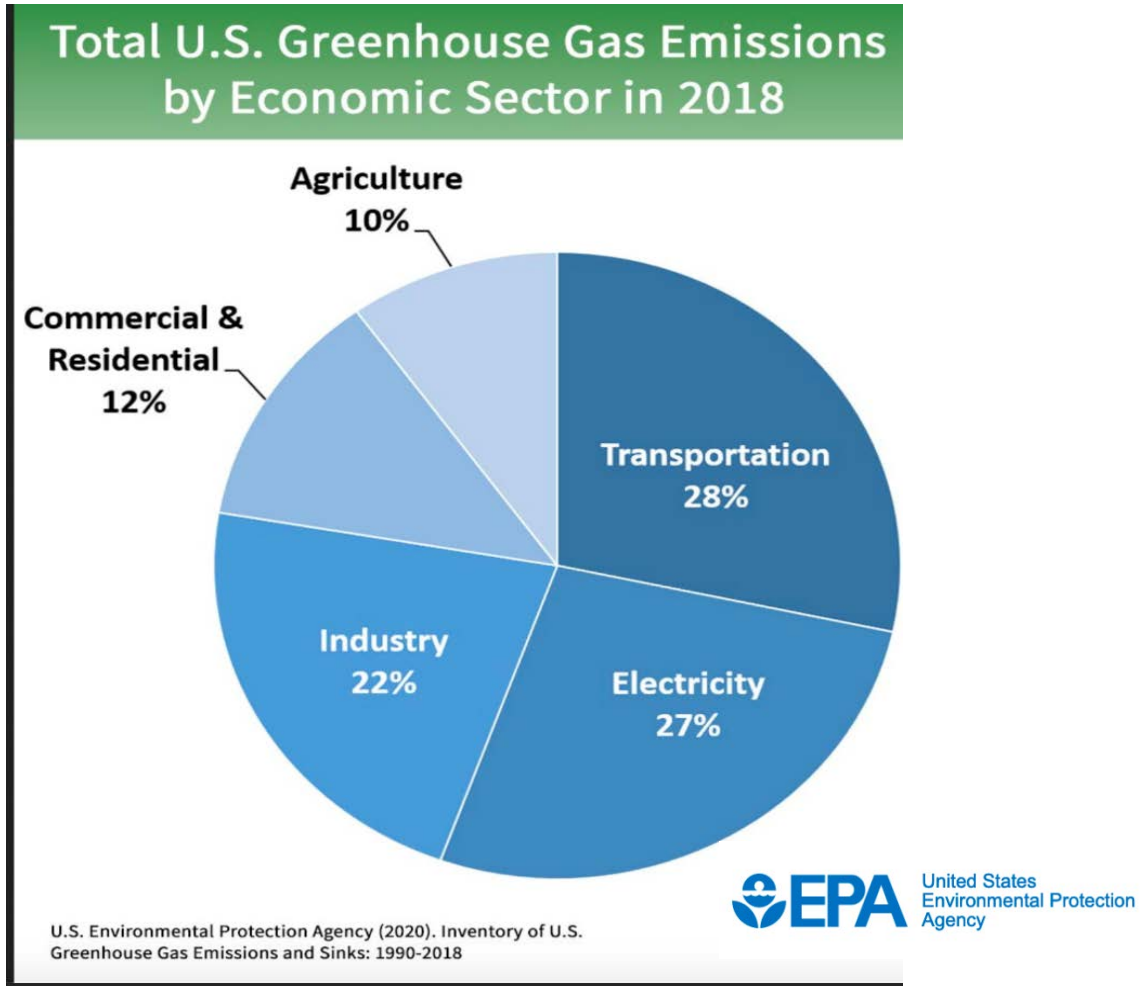
The Food System is a Complex Dynamic Adaptive System



Consider: Entire Supply Chain, Key Outcomes, Dynamics and Heterogeneity, Data/Metrics/Measures/Methods



NEW EXPECTATIONS:
Environmental Footprint, Agriculture and Food Systems



https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

"A mere two percent increase in the carbon content of the planet's soils could offset 100 percent of all greenhouse gas emissions going into the atmosphere."

Rattan Lal, Ohio State
2020 World Food Prize Laurate

NEW EXPECTATIONS
Environmental Footprint, Agriculture and Food Systems

NEW EXPECTATIONS:
Environmental Footprint, Agriculture and Food Systems

Land and Crop management

- Stop overapplication of nitrogen-based fertilizer
- Drain water from wetlands to reduce methane
- Apply rock (silicate) weathering croplands (Nature, 2020, 883:242)
- Reduce nitrogen fertilizers through biological nitrogen fixation

Livestock

- Improve productivity through feed/forage & genetics
- Probiotics

Manure

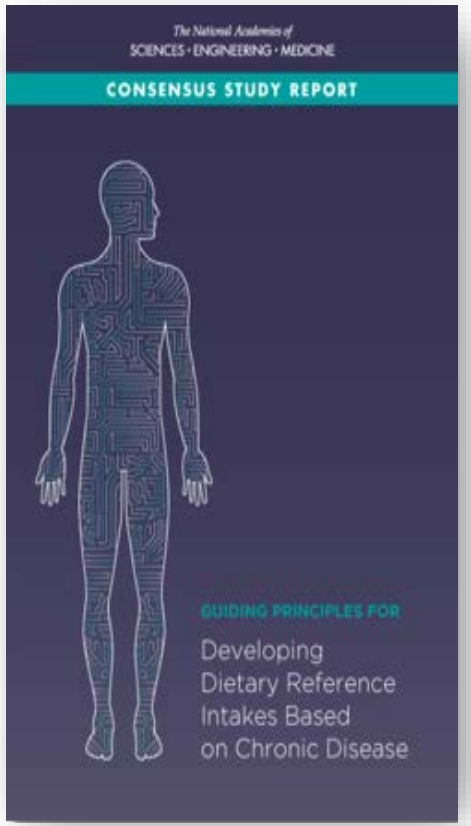
- Methane capture, recycle to other uses

EPA: Fifth Assessment Report of the Intergovernmental Panel on Climate Change

NEW EXPECTATIONS:
Environmental Resiliency, Agriculture and Food Systems

Agriculture's URBAN FOOTPRINT

NEW EXPECTATIONS:
Health, Agriculture and Food Systems

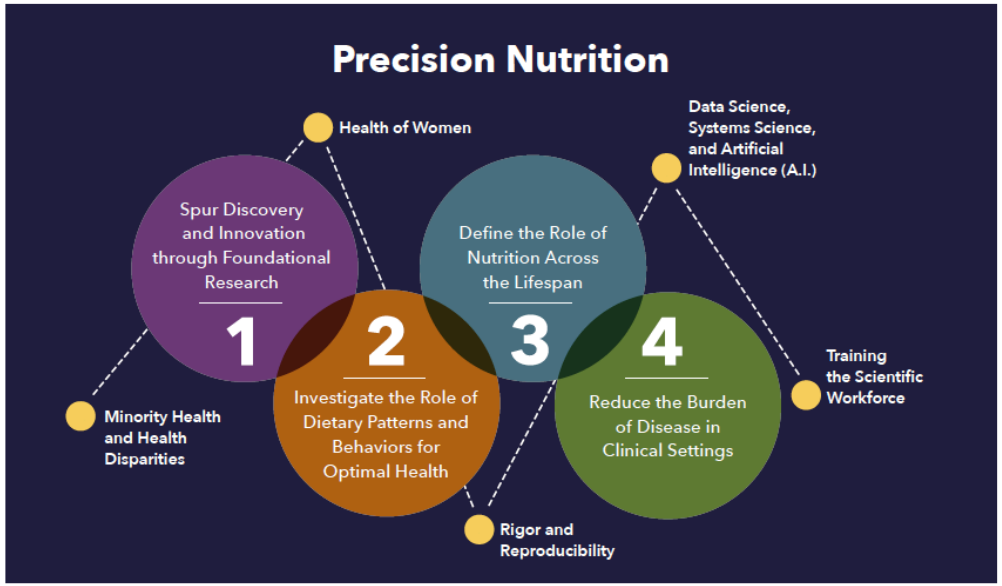


2017

- Few chronic diseases are affected by:
  - single nutrients
  - single pathways
- Therefore, we must:
  - Consider systems/networks over pathways
  - Establish system readouts as biomarkers (integrative biomarkers)
  - Consider DRIs as ranges in lieu of point estimates
  - Understand biomarkers of aging – system decay
  - **Gain consensus on methods, metrics and standards of evidence**

NEW EXPECTATIONS:
Nutrition, Health and Heterogeneity, Agriculture and Food Systems

NIH 2020 USDA



This Plan is organized around a central unifying vision of Precision Nutrition research. Progress in each of the four Strategic Goals, as well as the five Cross-Cutting Research Areas, are essential to achieve this vision.

Food and Nutrition Translation

USDA plays a pivotal role in providing Americans with safe, nutritious, and wholesome foods. This means supplying foods, both fresh and processed, that are of the highest quality and that provide adequate nutrition supporting the entire population life span. This task must address challenges to reduce foodborne illnesses; understand the drivers of poor diets and nutritional choices; provide better access to nutritious foods in low-income households; and reduce the overall cost of foods through more efficient processing, packaging, and repurposing to minimize food waste.

NEW EXPECTATIONS:
Economics, Agriculture and Food Systems

Internalizing the economic externalities:

The Food system accounts for:

- 10% of US employment
- *5.4 % GDP (2017)*
- *Farms account for 1% GDP (2017)*

Incentives needed for:

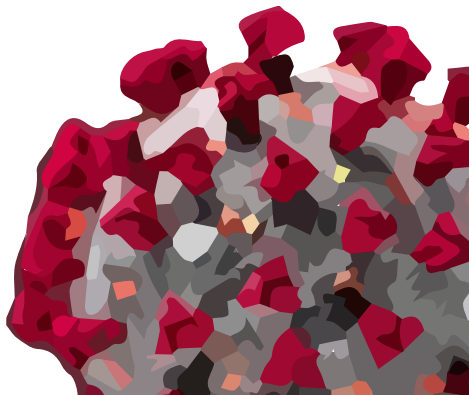
- Addressing the environmental and human health effects of the food system
- New markets for farmers and ranchers for carbon sequestration to become carbon neutral or positive

NEW EXPECTATIONS
COVID-19 and Food System Vulnerabilities

Board on Agriculture and Natural Resources of the National Academies of Science, Engineering, and Medicine

A.G. Kawamura, former Secretary of the California Department of Food and Agriculture (2003-2010)
Tom Vilsack, former United States Secretary of Agriculture (2009 - 2017)

- COVID-19 spotlighted production and distribution vulnerabilities; "system is not broken"; all-in-all performed well
- Food and agriculture system was not as resilient as it should be to a national crisis
- Had no food shortage but food/ag system couldn't effectively pivot to retail and other distribution due to dedicated processing and lack of storage on retail/food bank end
- Resiliency and efficiency are not mutually exclusive; learn to pivot quicker
- Need plans in place; scenario planning like FEMA and DoD
- COVID-19 and climate are threats; country knew pandemic was possible but not prepared; climate change is coming, need to be prepared; gov needs to facilitate market to incentivize or directly fund climate change fighting management practices…
- Vilsack spoke of exciting times in ag – "will have foods designed for individual's DNA"
- Those will diet-related chronic disease are most vulnerable to morbidity and mortality
- All effects disproportionately affected underserved minority populations.



NEW EXPECTATIONS
Agriculture and Food Systems

The Mandate is Clear…

The Pathway is Not

NEW EXPECTATIONS
Agriculture and Food Systems

Healthy People, Healthy Planet:

Session 1: Vulnerabilities of the Food System

Session 2: Resilience of the Food System

Session 3: Transformation of the Food System

Thank you!