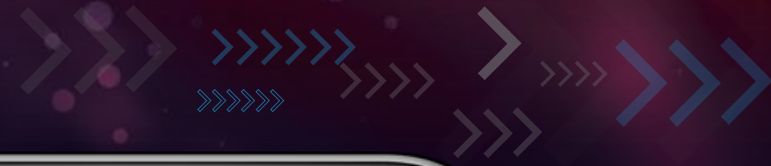


RESPONSIVE



# The Promise of Health Through Agriculture



INSTITUTE FOR ADVANCING  
HEALTH THROUGH AGRICULTURE

Patrick J. Stover, Ph.D.  
Professor and Director



IHA.TAMU.EDU

# Disclosures

## AFFILIATION/FINANCIAL INTERESTS

(prior 12 months)

## ORGANIZATION

Grants/Research Support:

NIH:  
T32-DK007158  
R37DK58144; ODS Supplement  
HD059120

Scientific Advisory Board/Memberships:

Marabou Foundation, National Academy of Sciences,  
American Society for Nutrition, ICAAS Scientific  
Advisory Board; NIH Nutrition Strategic Plan Thought  
Leader Panel: Chair

Speakers Bureau:

None

Stock Shareholder:

TIAA

# RESPONSIVE

## WWII and Revolutionized Agriculture and the Food Supply

### Men in tanks must eat quickly and well

Actual meat meals from the new 5-in-1 Rations carried by U. S. Armored Forces operating in enemy territory

When U. S. tanks smash their way through enemy lines our men are often in the thick of fighting for days at a time. That's when food is a No. 1 mission—when time lost preparing meals can turn victory to defeat. Yet, even during active fighting U. S. soldiers get three well-balanced meals, their pound of nourishing meat per man per day—through this new 5-in-1 ration. Developed by U. S. Army Quartermaster Corps for mechanized

units, landing parties, all mobile operations—this ration is mainly composed of canned and dehydrated foods. Armour and Company, largest producer of canned meats in America, is supplying millions of cans of meat for Army rations. And Armour, with the other packers, is also providing millions of pounds of fresh meat and dairy products every day for America's war needs.

That's why civilians must get along on less meat... why every loyal American will work only his fair share. By limiting the amount of meat you eat, you'll be doing your part to help keep our fighters better fed—and maintain the strength of our nation at home.



**Breakfast**  
 Bacon (canned/dehydrated)  
 Spiced Whole Wheat Cereal  
 Softened Fruit  
 Coffee (canned)  
 Syrup  
 Sugar and Canned Milk  
 Cigarettes

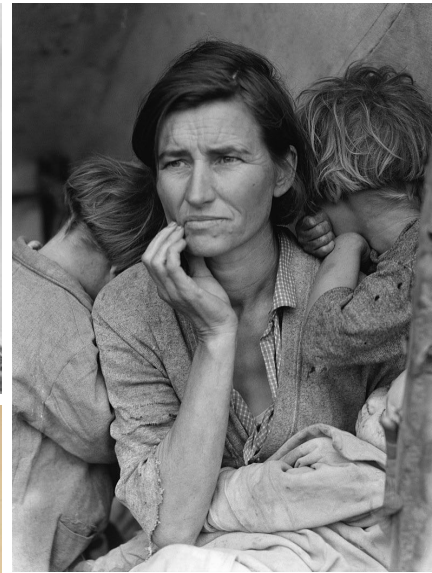
**Dinner**  
 Bean Soup (dehydrated)  
 Canned Beef Hash  
 Canned Potatoes  
 Peas  
 Fruit (dehydrated)  
 Hard Candy  
 Ham Cakes (instant packets)  
 Sugar

**Supper**  
 Meat and Vegetable Soup  
 Potatoes  
 Canned Bean (dehydrated)  
 Canned  
 Sugar and Canned Milk

**3 Hearty Meals for 5 Men**  
 This new 5-in-1 ration in a single package feeds five men for one day. It's a nutritious, well-balanced, amazingly complete ration. Three different meals give variety in taste — provide each man 4000 calories daily. Unit 3 (meals shown above) contains: Canned ham, beef hash and eggs; table wine... dehydrated tomato juice (canned), hard candy, peas, green peas (canned), instant whole wheat cereal, rice... canned peas... evaporated milk... canned milk... instant... army spread (preserved ham)... soluble coffee... instant juice powder... sugar, salt... hard candy... cigarettes.

For finest quality and better value for Armour's Brand Products: Star Canned Meats • Star Ham and Bacon • Star Beef, Veal and Lamb • Star Sausage • Crockham Turkey and Dairy Products.

**Armour and Company**



Food should be:  
 Abundant  
 Affordable  
 Accessible

Hunger  
 Food Insecurity

TEXAS A&M  
**AGRI LIFE**

INSTITUTE FOR ADVANCING  
 HEALTH THROUGH AGRICULTURE

# New Expectations: *Agriculture and Food Systems*



Historical  
Expectations

## Produce

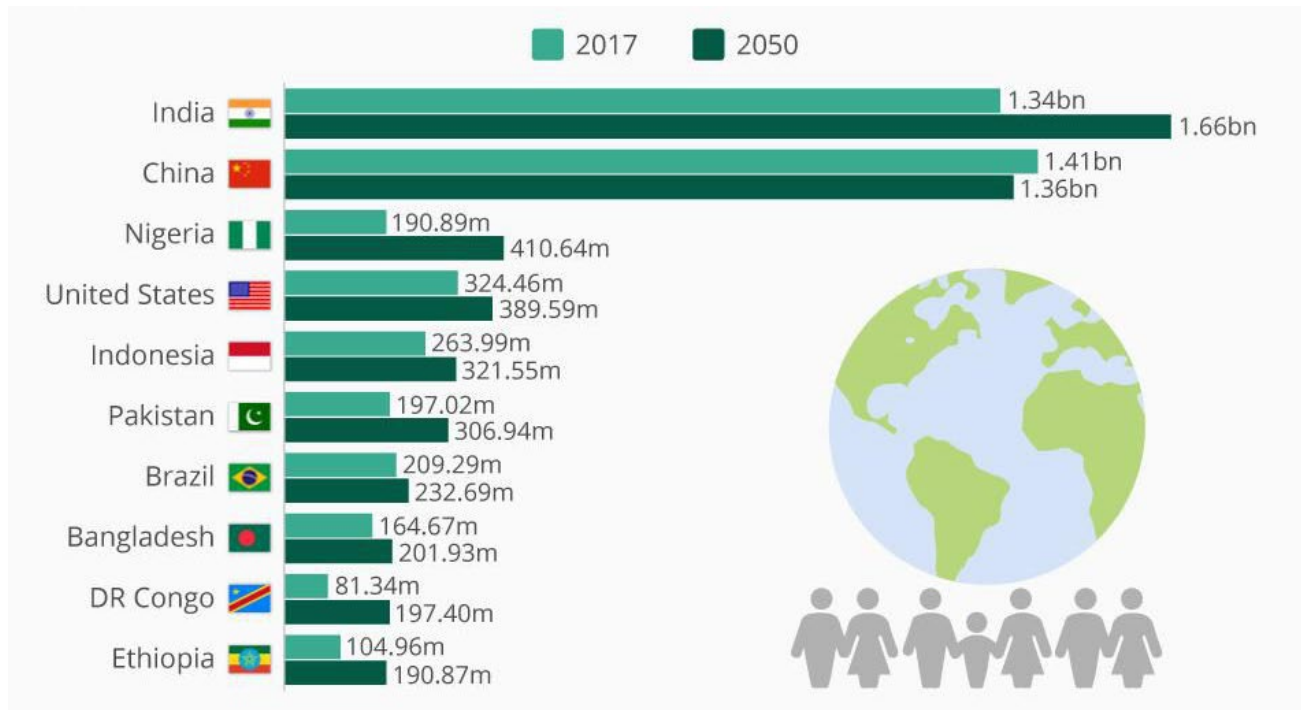
- Food
- Fiber
- Fuel

New  
Expectations

## Nourish and Sustain

- Food for life-long health
- Protect and sustain our environment
- Ensure agriculture is economically viable

# Greatest Challenges of Our Time: *Population Growth and Farmland*

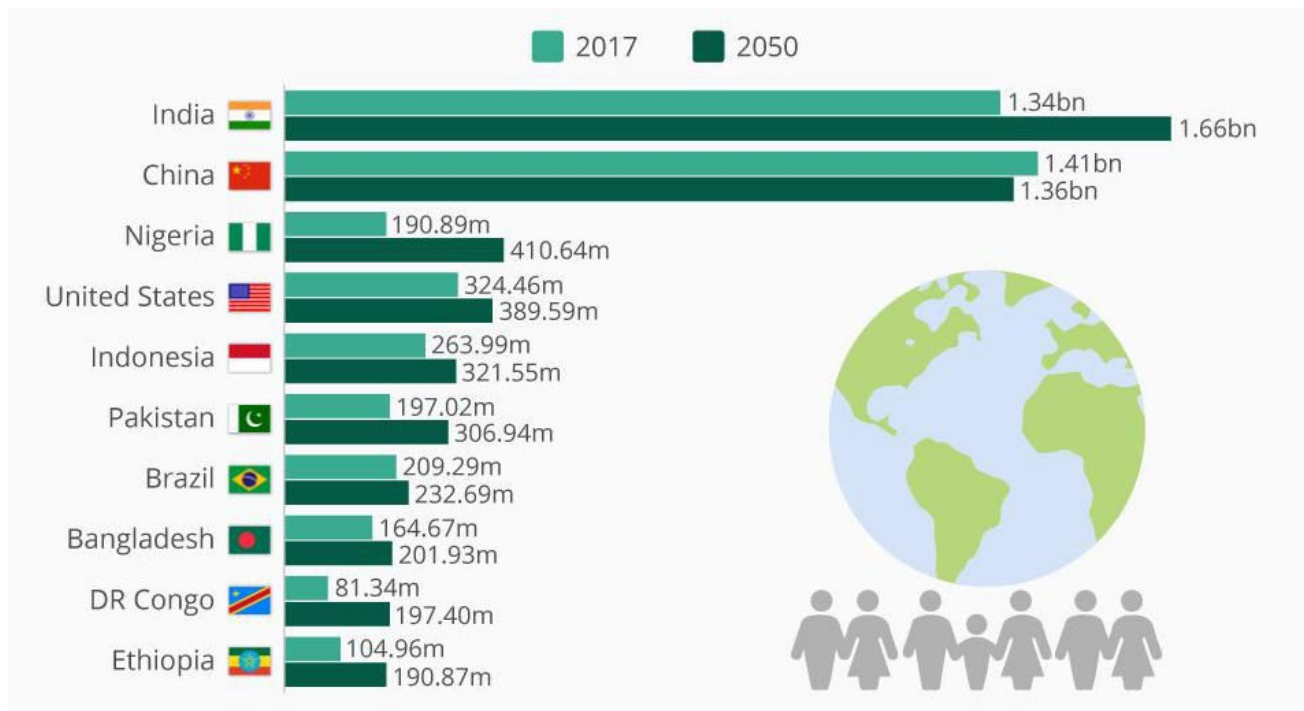


The U.S. loses about 175 acres of farmland every hour, mostly due to the expansion of urban and suburban areas.

*American Farmland Trust*

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

# Greatest Challenges of Our Time: Population Growth and Food/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

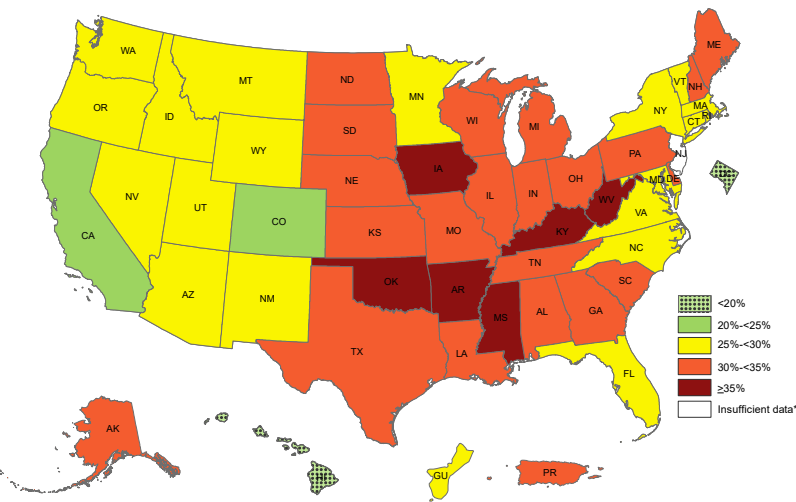
## *In the United States:*

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

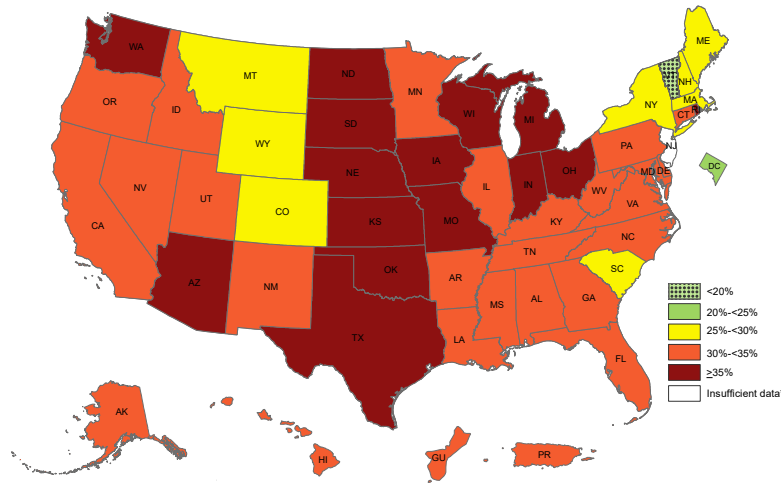
The treatment of diabetes alone is **160 billion/year**, more than the annual budget of many key federal agencies

# Equity Analysis

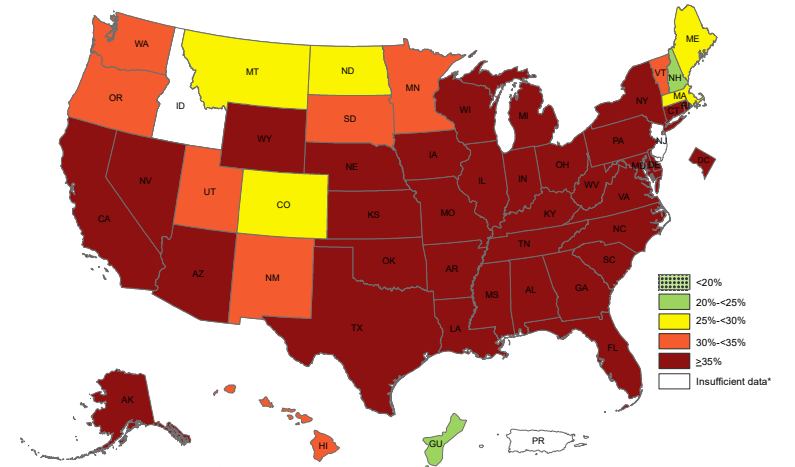
*Obesity Epidemic Disproportionately Affects Minority Groups*



White



Hispanic



Non-Hispanic Black

# New Expectations: *Agriculture & Food Systems: Human Health*

The screenshot shows the CONGRESS.GOV website interface. At the top, there is a navigation bar with the CONGRESS.GOV logo, 'Advanced Searches', 'Browse', 'Search Tools', and 'Sign In'. Below this is a search bar with 'Committee Reports' selected and a search icon. The search results show a breadcrumb trail: Home > Committee Reports > 116th Congress > H. Rept. 116-107. There are also links for 'Print', 'Subscribe', 'Share/Save', and 'Give Feedback'. The main heading is 'H. Rept. 116-107 - AGRICULTURE, RURAL DEVELOPMENT, FOOD AND DRUG ADMINISTRATION, AND RELATED AGENCIES APPROPRIATIONS BILL, 2020' with the subtext '116th Congress (2019-2020)'. At the bottom of the snippet, there is a red button labeled 'COMMITTEE REPORT' and a link 'Show Overview'.

“Human Nutrition Research—

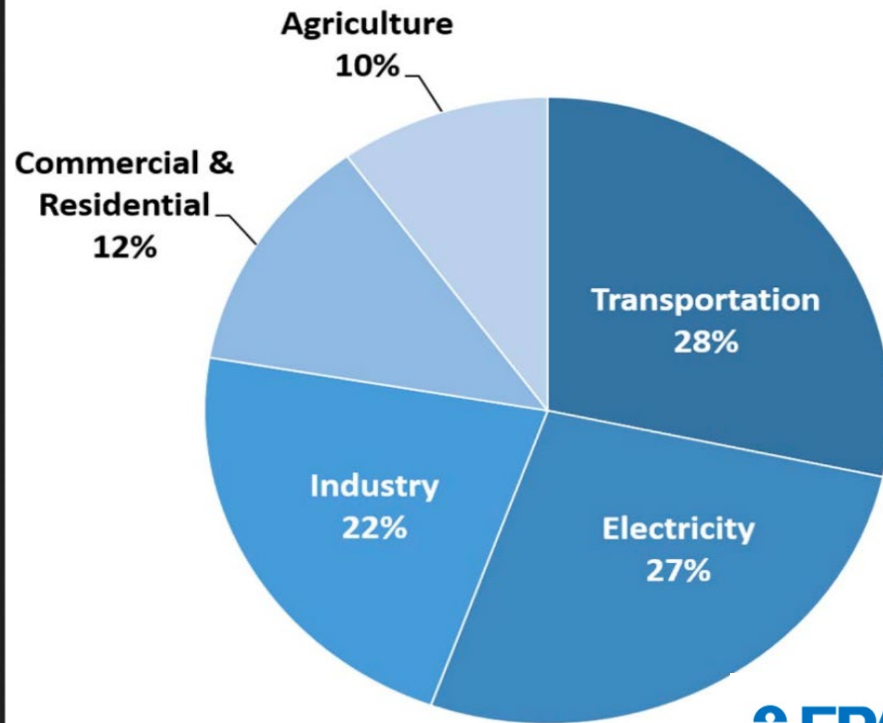
The Committee directs USDA-ARS to provide to the Committee not later than 180 days after the enactment of this Act a report on the connection between how to advance science, policy, and practice for how healthier food enhances overall health, reduces obesity and related co-morbidity, and could lower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



# New Expectations:

## Agriculture & Food Systems: Environmental Health

Total U.S. Greenhouse Gas Emissions  
by Economic Sector in 2018



U.S. Environmental Protection Agency (2020). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018



*"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 Laureate

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

# New Expectations:

## *Agriculture & Food Systems: Environmental Resiliency*



# New Expectations:

## *Agriculture & Food Systems: Economic Health*

### The Agriculture and Food system accounts for:

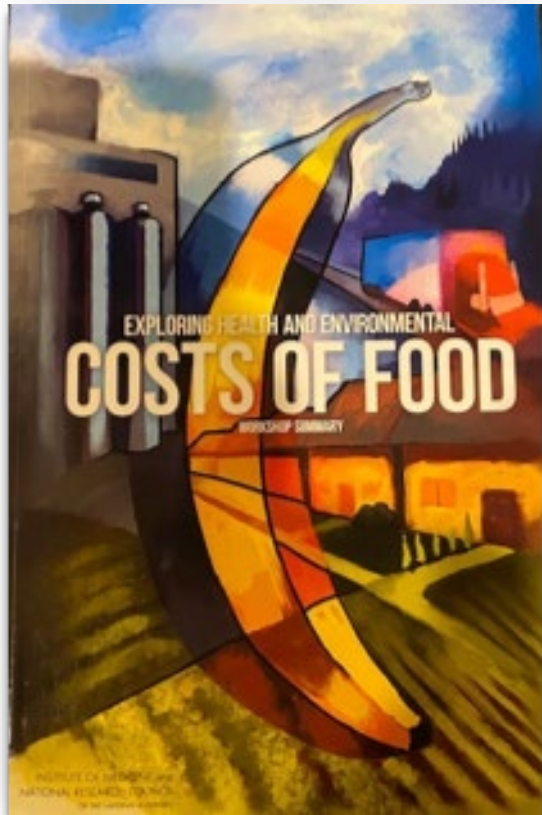
- 29% of US employment
- 7.0 % GDP – 182.91 billion in exports
- Farms account for 1% GDP
  - 2021 - From the Sixth Annual Feeding the Economy Report

### Policy incentives needed for:

- Addressing the environmental and human health effects of the food system
  - E.g. New markets for farmers and ranchers for carbon sequestration

# New Expectations:

## Agriculture & Food Systems: Economic Health



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”

# Going Forward

*New Expectations of Food & Agriculture*

TEXAS A&M  
AGRI LIFE

INSTITUTE FOR ADVANCING  
HEALTH THROUGH AGRICULTURE



**FOOD**

**PEOPLE**

**ECONOMICS**

**ENVIRONMENT**



# Food, Agriculture and Health are Interconnected Systems

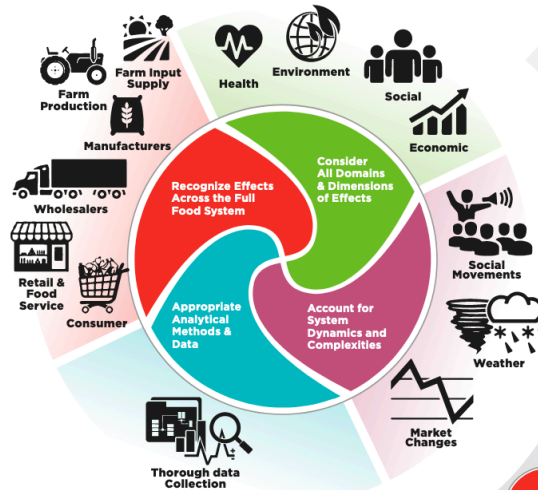
## A FRAMEWORK FOR ASSESSING DECISIONS ABOUT FOOD & AGRICULTURE

THE FOOD SUPPLY CHAIN is deeply interconnected with human health, the health of the environment, and social and economic systems. Decisions, therefore, have impacts far beyond the supply chain itself.

To ensure that the benefits of a decision outweigh its risks, decision makers must carefully consider the full range of potential effects in the health, environmental, social, and economic domains.



### THE FRAMEWORK



### SIX STEPS FOR ASSESSMENT

- Identify the PROBLEM**  
What is the goal of the assessment?
- Define the SCOPE of the assessment**  
What are the time, geographic, budgetary, and other limitations? What do we know from studies already conducted about potential drivers or effects? What are the gaps in knowledge?
- Identify the SCENARIOS**  
What are potential interventions (e.g. policies or practices) that should be considered and compared to the baseline scenario?
- Conduct the ANALYSIS**  
What are the data needs, and which analytic tools are most appropriate?
- SYNTHESIZE the results**  
What are the impacts and tradeoffs across the health, environmental, social, and economic domains? How can they be compared?
- REPORT the findings**  
Who are the key stakeholders to inform?

### EXAMPLE SCENARIO—APPLYING THE FRAMEWORK

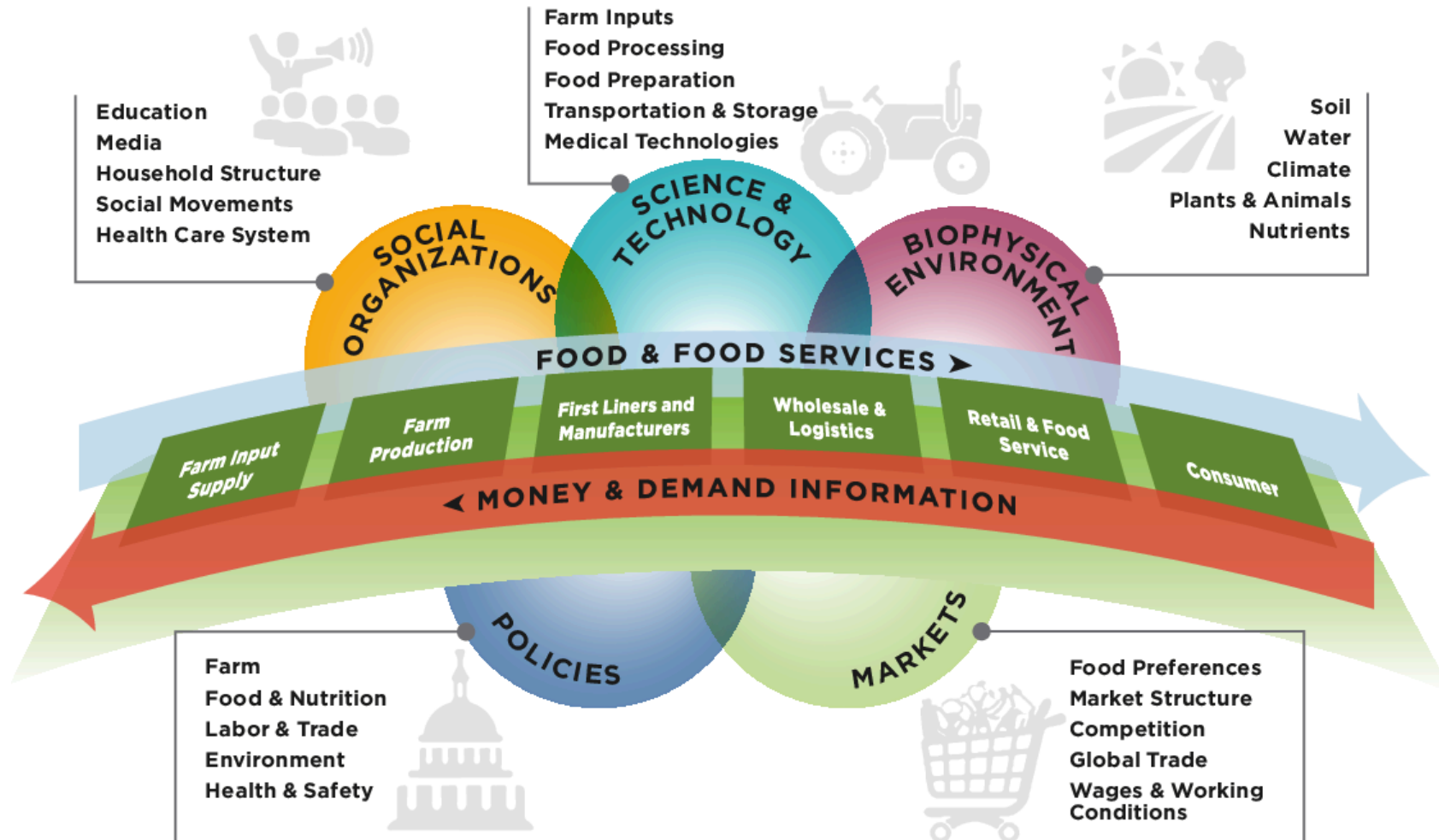
## A Framework for Assessing Effects of the Food System



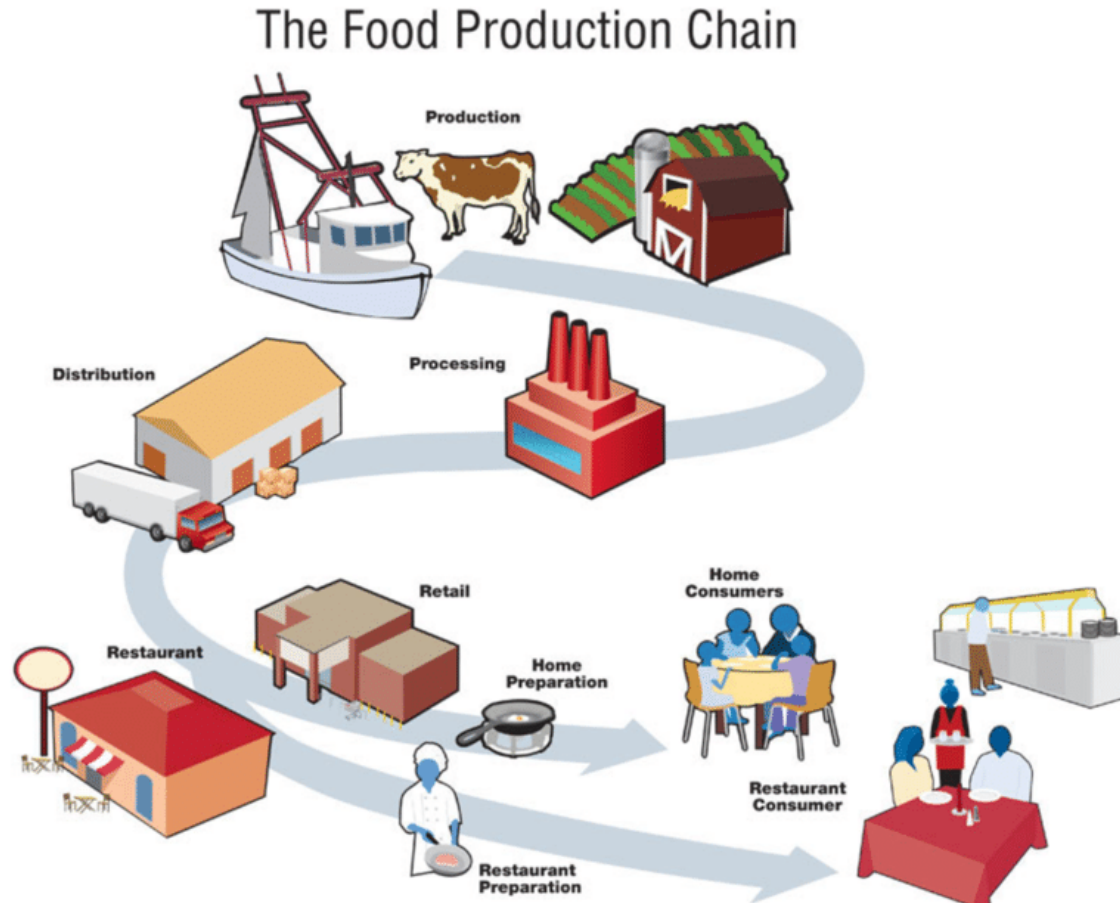
INSTITUTE OF MEDICINE AND  
NATIONAL RESEARCH COUNCIL  
OF THE NATIONAL ACADEMIES

2015

# The Food System is a Complex Dynamic Adaptive System



# Texas A&M Institute for Advancing Health through Agriculture Vision: *A Food System Focused on Health*

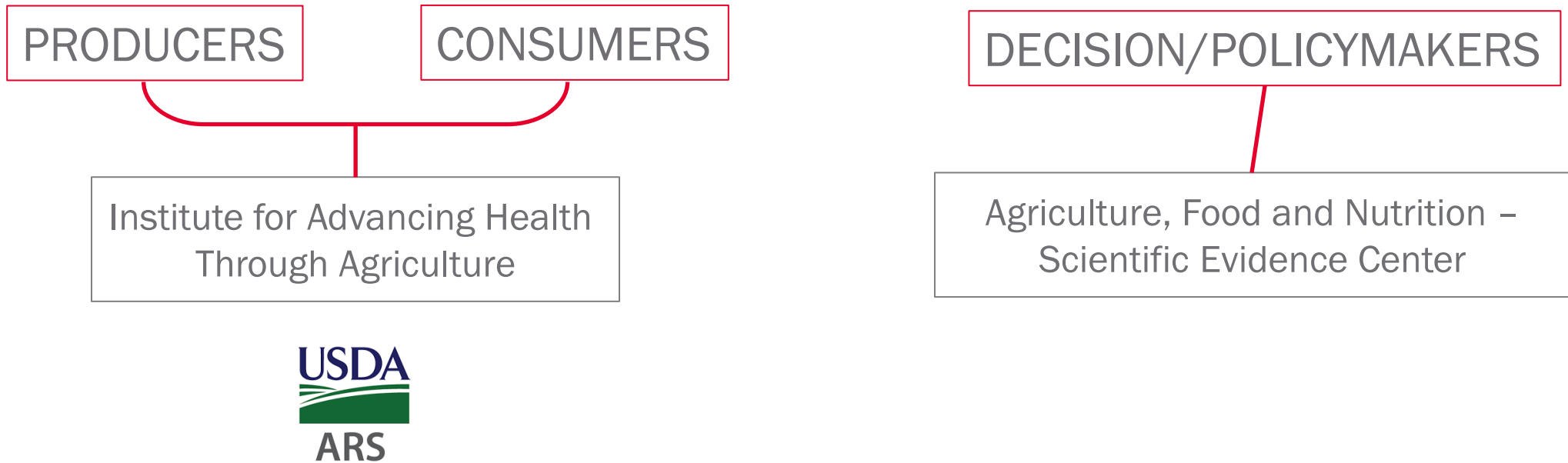


**Agriculture** as the solution to diet-related chronic disease in a way that considers the environment and economy



# The Vision in Action:

*Two Initiatives to Support the Shift in Focus*



# Announced IHA Leadership Recruitment

- Leadership announced on Feb. 7
- Generated over 217 million impressions
- Coverage included feature opinion piece in Dallas Morning News
- #AgforHealth generated thousands of impressions and engagement

**POLITICO**

**yahoo!finance**

**AP** Associated Press

**RFD TV**

**FarmProgress.**

The Eagle

## The Aggie Food Moon Shot



TEXAS A&M  
**AGRILIFE**

INSTITUTE FOR ADVANCING  
HEALTH THROUGH AGRICULTURE

# Texas A&M Food Moonshot

## Agriculture is the Solution

**The Institute for Advancing Health Through Agriculture, IHA**, will be recognized by leading U.S. and global scientists, producers, and policymakers as the premier center of excellence in research, and in the design and development of technologies that accelerate evidence-informed agriculture and food systems that nurture human health, sustain environmental resources, and ensure the economic viability of agriculture and national security. **The IHA serves producers and consumers.**

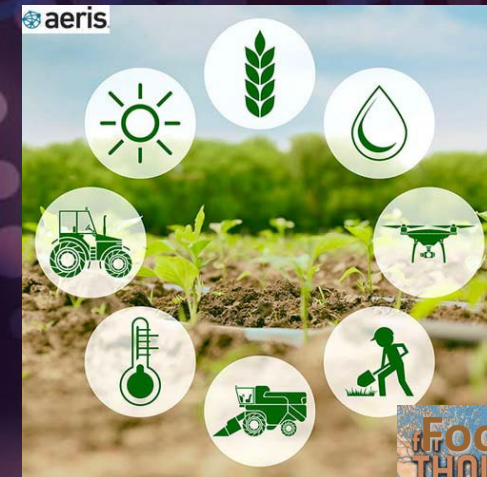
**The Agriculture, Food and Nutrition Scientific Evidence Center** will be recognized globally as an objective and authoritative source for retrieving, synthesizing, and evaluating scientific evidence on agriculture, natural resources, and food systems, including impact of interventions or exposures on the human, agricultural, environmental, and economic health of populations. **The evidence center will serve decision makers.**

# TEXAS A&M AGRI LIFE

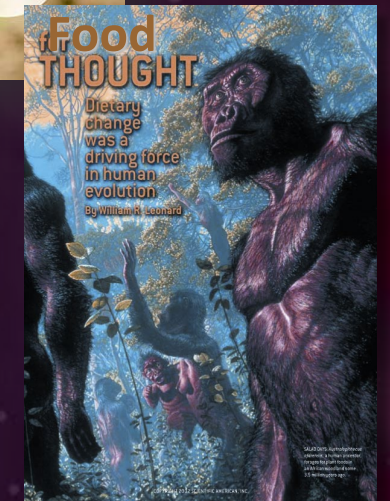
## INSTITUTE FOR ADVANCING HEALTH THROUGH AGRICULTURE

The Texas A&M AgriLife Institute for Advancing Health Through Agriculture, IHA, is the world's first academic institute to bring together **precision nutrition**, **responsive agriculture**, and **social and behavioral research** to reduce diet-related chronic disease and lower health care costs in a way that supports producers and the environment.

### Responsive Agriculture



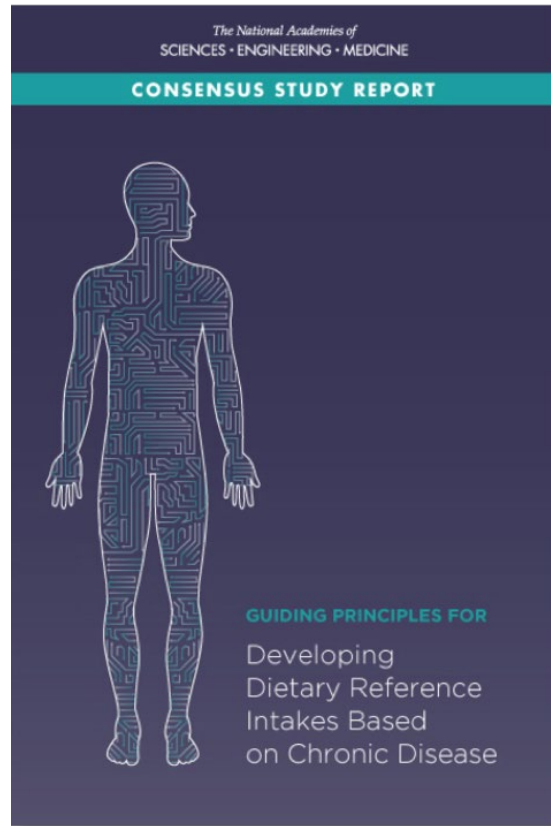
### Healthy Living



### Precision Nutrition

# Chronic Disease Endpoints:

*Nutrient Deficiency Endpoints* → *Chronic Disease Endpoints*



- Diseases of nutrient deficiencies have a single cause and manifest similarly in most people in populations
- Diet-related chronic diseases are complex in their etiology with many interacting risk factors (Nutrition, sleep, exercise, genetics, etc) that exhibit great heterogeneity in populations
- Few chronic diseases are affected by:
  - single nutrients
  - single pathways

# RESPONSIVE

NIH

2020-2022

USDA

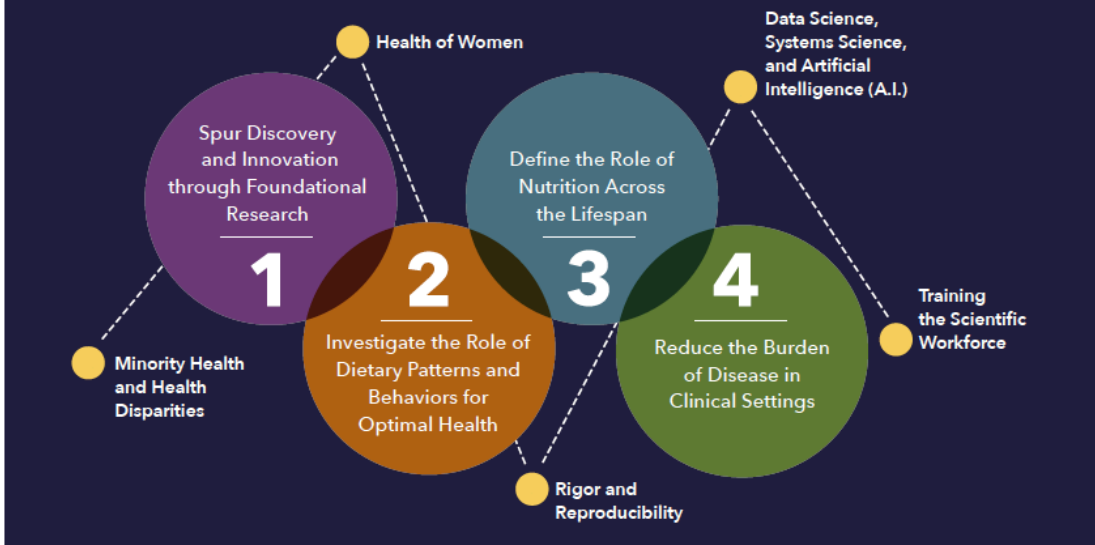


NIH National Institutes of Health  
Turning Discovery Into Health

## 2020-2030 Strategic Plan for NIH Nutrition Research

A Report of the NIH Nutrition Research Task Force

### Precision Nutrition



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.

## USDA Announces Actions on Nutrition Security

*Secretary Vilsack to Give Speech Highlighting the U.S. Department of Agriculture's Robust Efforts to Tackle Nutrition Insecurity*

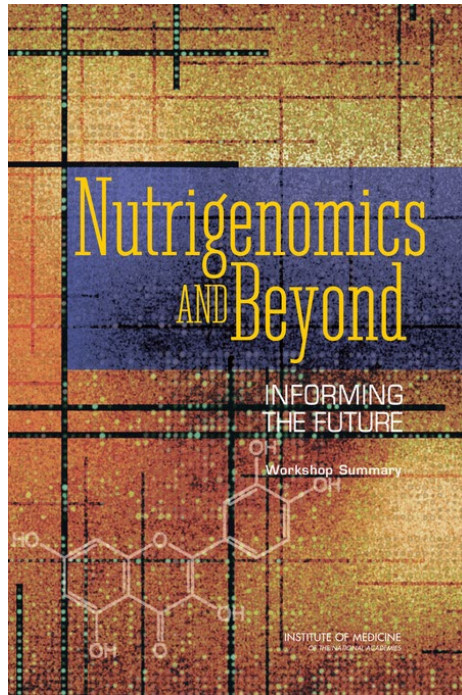
“USDA's commitment to advancing nutrition security, and the consistent access to safe, nutritious food that supports optimal health and well-being for all Americans”

- **Meaningful Nutrition Support** throughout life
- **Healthy Food:** healthy, safe, affordable food
- **Collaborative Action:** Developing, translating and enacting nutrition science
- **Equitable Systems:** Prioritizing equity

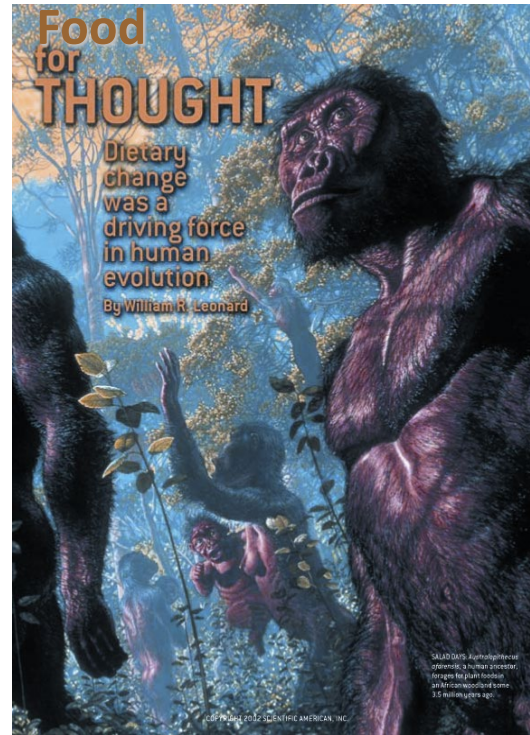


INSTITUTE FOR ADVANCING  
HEALTH THROUGH AGRICULTURE

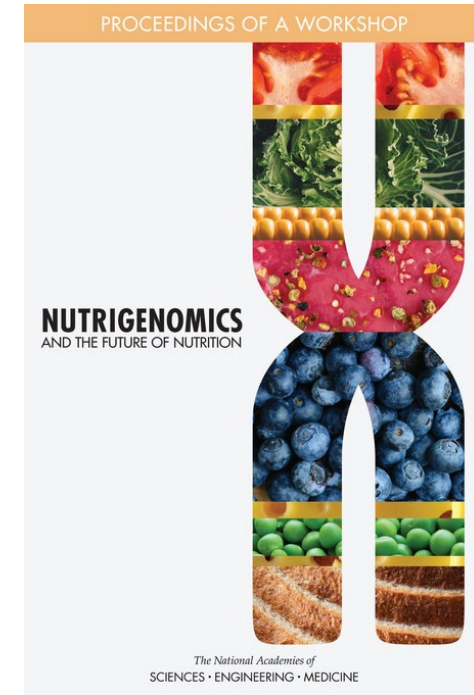
# Precision Nutrition: *The Biological Premise*



2007

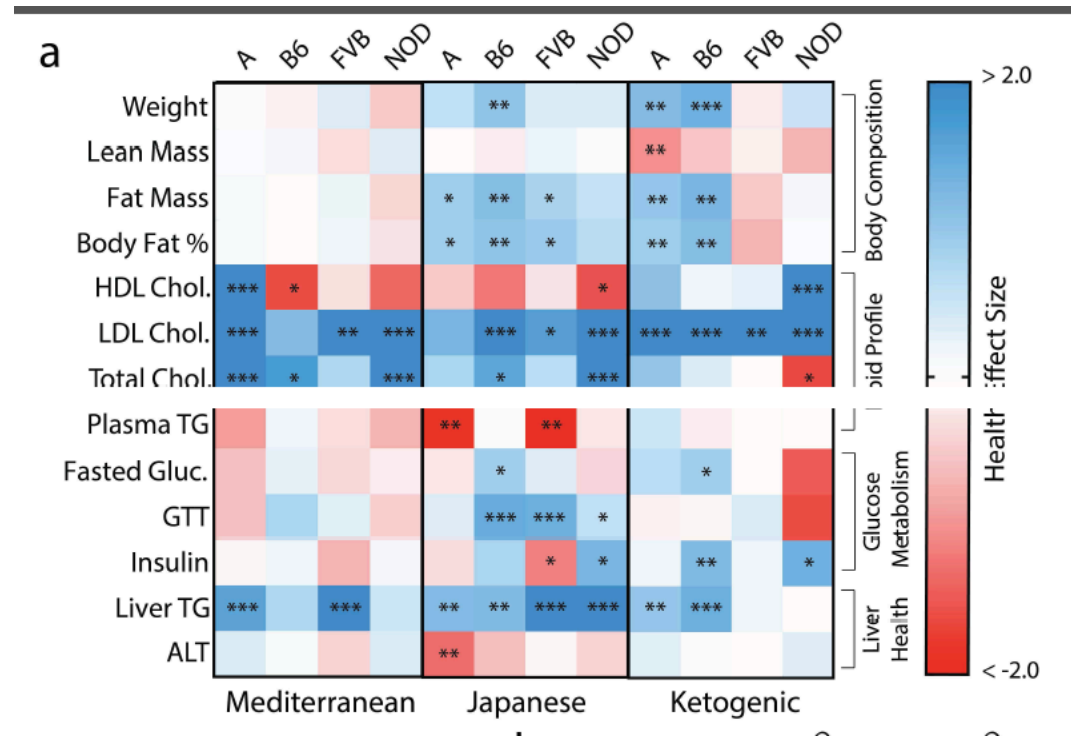
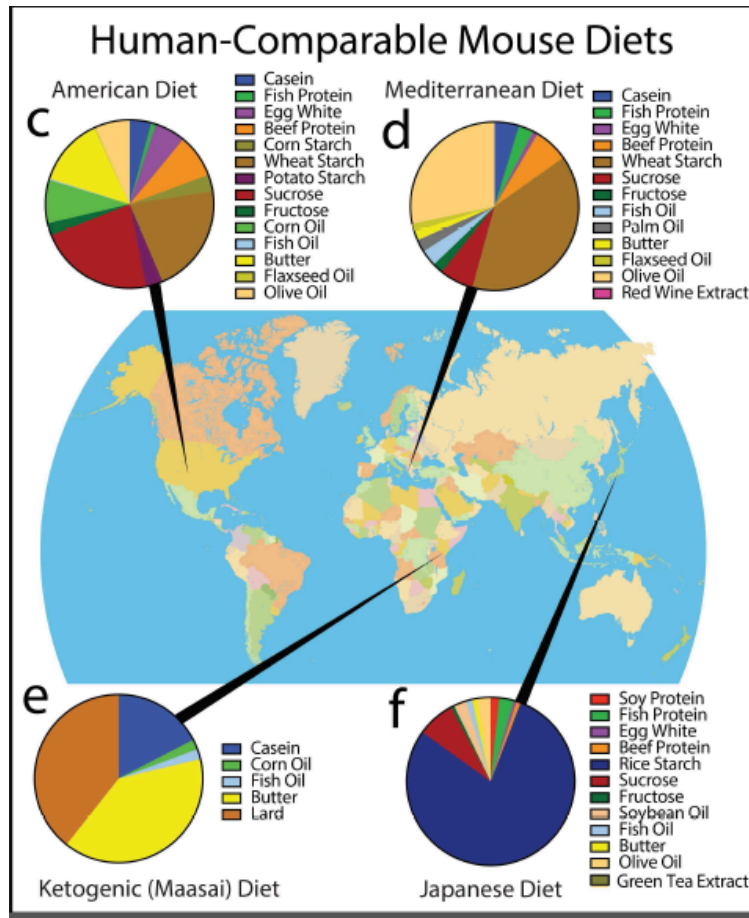


Scientific American November 13, 2002 William R. Leonard



2018

# Precision Nutrition: The WHY



William T. Barrington<sup>1,2</sup>, Phillip Wulfridge<sup>3</sup>, Ann E. Wells<sup>9</sup>, Carolina Mantilla Rojas<sup>1</sup>, Selene Y.F. Howe<sup>1</sup>, Amie Perry<sup>4</sup>, Kunjie Hua<sup>5</sup>, Michael A. Pellizzon<sup>10</sup>, Kasper D. Hansen<sup>3,6,7</sup>, Brynn H. Voy<sup>9</sup>, Brian J. Bennett<sup>5</sup>, Daniel Pomp<sup>5</sup>, Andrew P. Feinberg<sup>3</sup>, David W. Threadgill<sup>1,4,8\*</sup>



# New Expectations of Food & Agriculture

*The How?*

TEXAS A&M  
AGRI LIFE

INSTITUTE FOR ADVANCING  
HEALTH THROUGH AGRICULTURE

The Science and Mandate for Precision Nutrition is Clear...

...The Pathway to Connect Precision Nutrition and Nutrition Security is not.



## Questions:

How do we define nutrition security?

What does precision nutrition and nutrition security mean for food production?

Food and health equity is needed in underserved communities, how do we affect change within cultural contexts?

How can we establish greater public trust in science?

# The Vision in Action:

*Two Initiatives to Support the Shift in Focus*



# Texas A&M Agriculture, Food & Nutrition Evidence Center *Announcement*

November 10, 2021

Texas A&M University System Chancellor John Sharp, along with government and business leaders from Fort Worth and across Texas, announced plans today to build a new research campus and collaborative innovation hub in downtown Fort Worth.



# New Expectations:

## *The Role of Evidence in Achieving New Expectations*

### Why is Evidence Important in Agriculture?

- Clarity on the strength-of-the-science
- Differentiates Science from Preferences, Beliefs and Values
- Common Evidentiary Standards Across Multiple Outcomes
  - Assess synergies and tradeoffs (Human, Environmental and Economic Health)
- Promotes Public Trust
  - Transparency

# 2022 AAAS Annual Meeting



Agriculture & Food: Achieving the New  
Expectations with Evidence-Based  
Science

February, 2022

TEXAS A&M  
AGRI LIFE

INSTITUTE FOR ADVANCING  
HEALTH THROUGH AGRICULTURE

# Nutrition and Public Trust



## The American Journal of CLINICAL NUTRITION



Issues More Content ▾ Submit ▾ About ▾ Purchase Advertise ▾

All The American Jc ▾



Advanced  
Search



Volume 109, Issue 1

January 2019

## Best practices in nutrition science to earn and keep the public's trust **FREE**

Cutberto Garza, Patrick J Stover, Sarah D Ohlhorst ✉, Martha S Field, Robert Steinbrook, Sylvia Rowe, Catherine Woteki, Eric Campbell

*The American Journal of Clinical Nutrition*, Volume 109, Issue 1, January 2019, Pages 225–243,

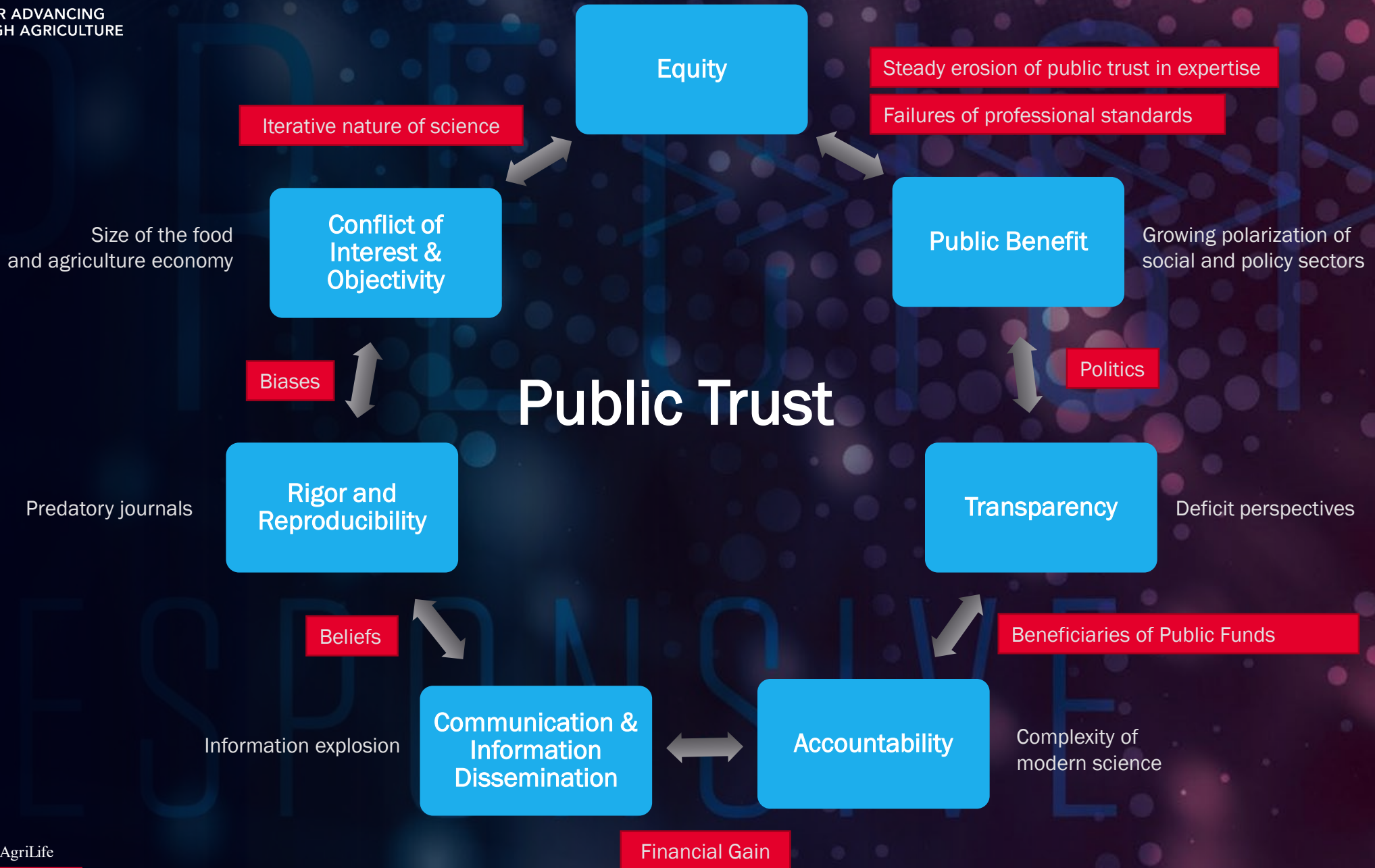
<https://doi.org/10.1093/ajcn/nqy337>

**Published:** 18 January 2019 **Article history** ▾

TEXAS A&M  
AGRI LIFE

INSTITUTE FOR ADVANCING  
HEALTH THROUGH AGRICULTURE

Failures of scientific and ethical standards





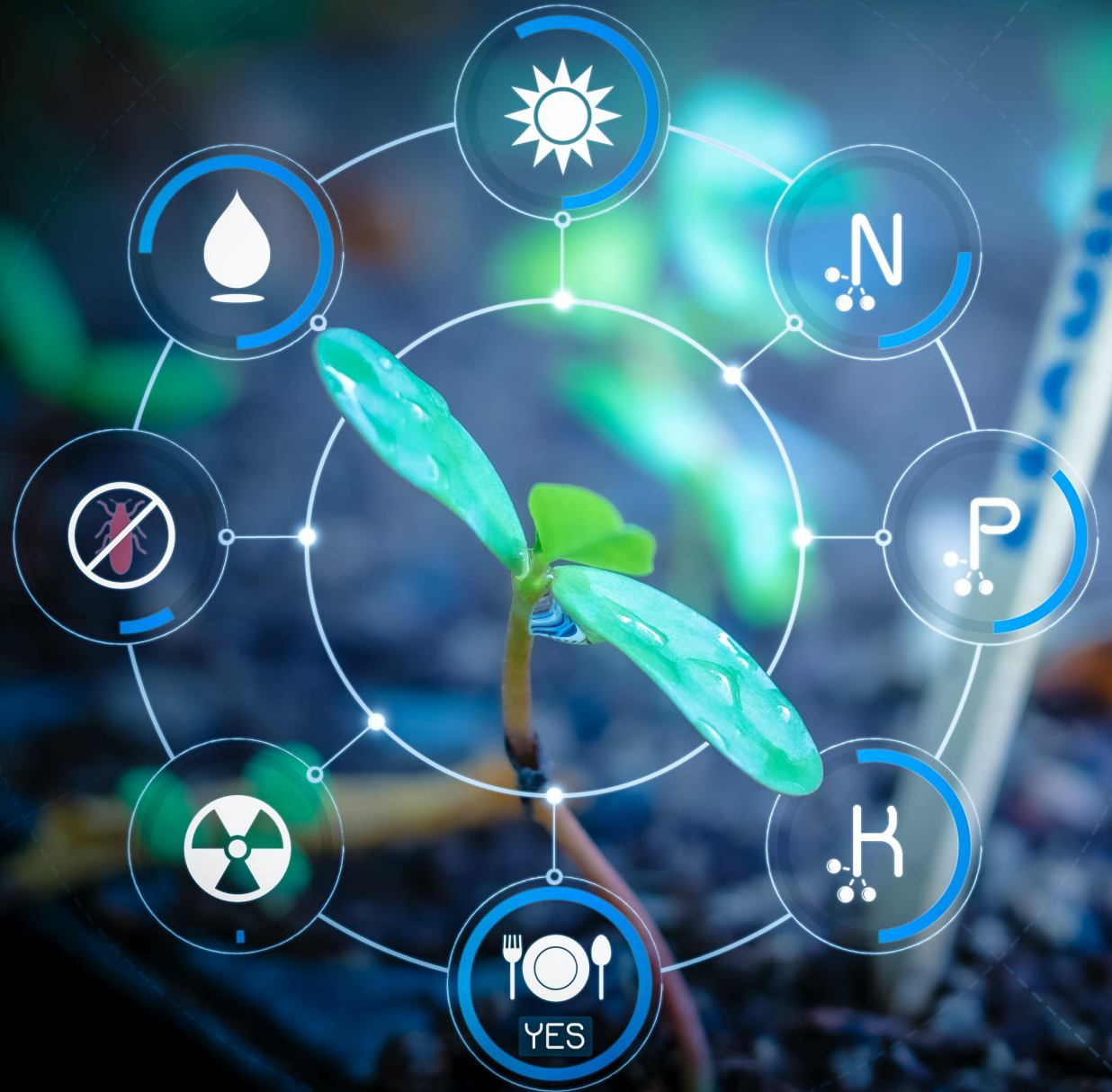
INSTITUTE FOR ADVANCING  
HEALTH THROUGH AGRICULTURE

## We can dream – Technology

- ❖ We have the unprecedented ability to manage and engineer agriculture, food and the environment to achieve whatever goals we can imagine

## We must work together

- ❖ Everyone needs a seat at the table





Thank you!