



A Framework for Assessing the Effects of the Food System

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Statement of Task

The expert committee will develop a framework for assessing the health, environmental, and social effects (positive and negative) associated with the ways in which food is grown, processed, distributed, marketed, retailed, and consumed within the U.S. food system

Selected Concerns re: Food System

- **Availability, accessibility, affordability of food**
- **Emissions of greenhouse gases**
- **Antibiotic-resistant bacteria**
- **Quality of water and other natural resources**
- **Prevalence of diet-associated chronic diseases**
- **Global and U.S. food security and malnutrition**
- **Exposure to chemical contaminants**
- **The viability of rural or fishing communities**
- **Workers' quality of life**

In developing the framework, the committee will undertake the following activities:

- 1) Examine available methods, methodologies and data that are needed to undertake comparisons and measure effects.**
- 2) Describe several examples of different configurations of elements within the food system and describe how the framework will be applied, step by step, to compare them.**

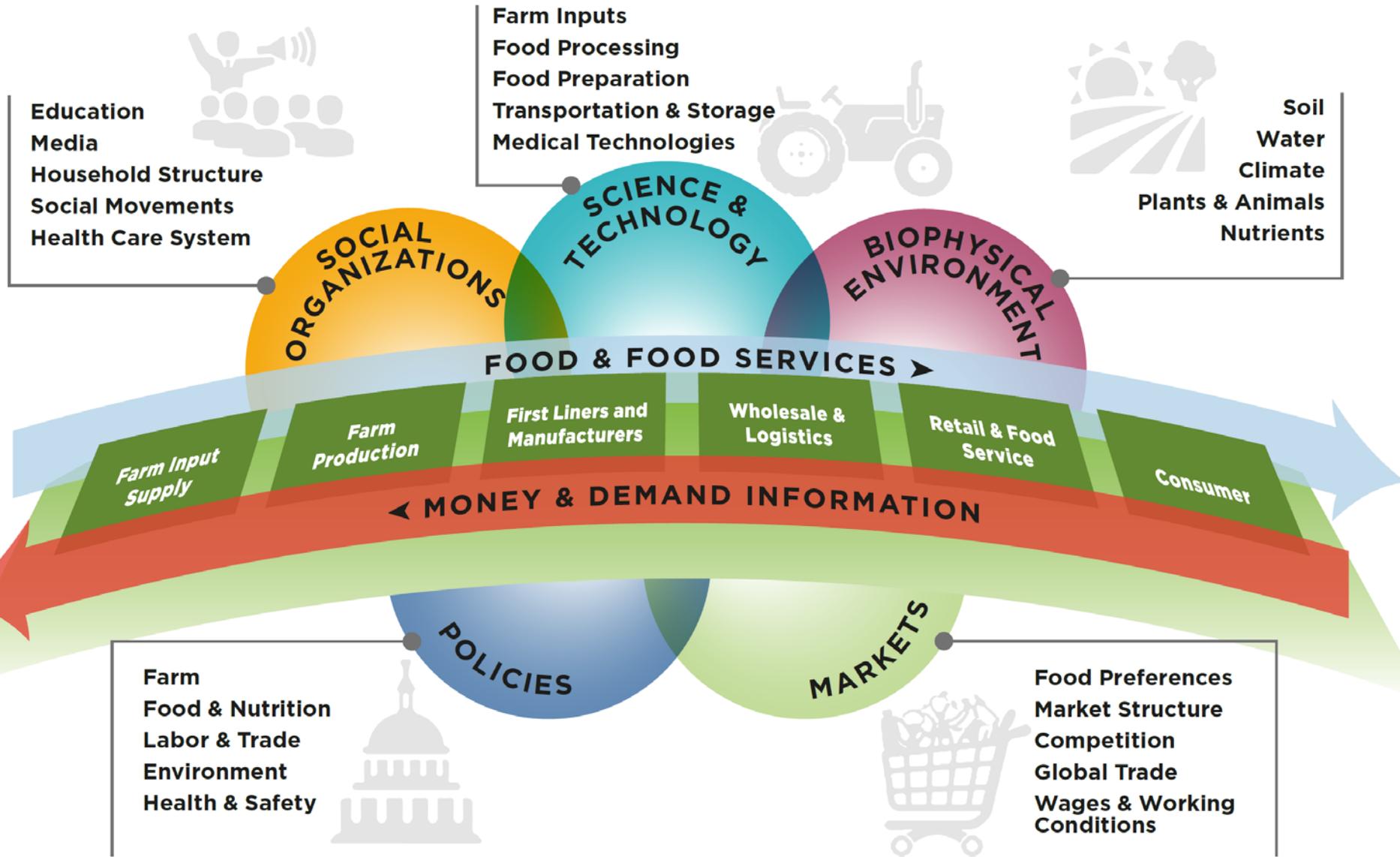
In developing the framework, the committee will undertake the following activities:

3) In constructing examples, describe strengths and weaknesses of the framework in different contextual situations.

4) Identify information needs and gaps in methods and methodologies.

Outline of the report

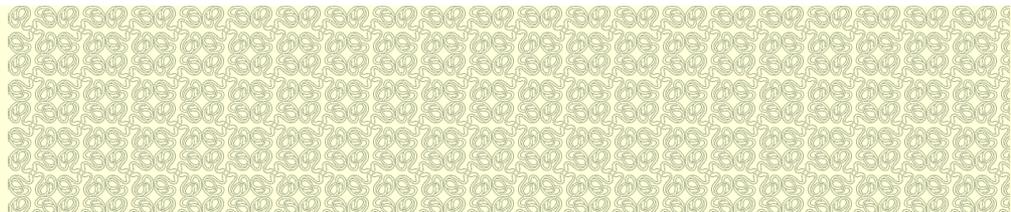
- **Description of the current US food system and its evolution**
- **Chapters on health, environmental, social, and economic effects of the food system**
- **The framework for assessment**
- **Examples of decisions that would benefit from use of the framework**

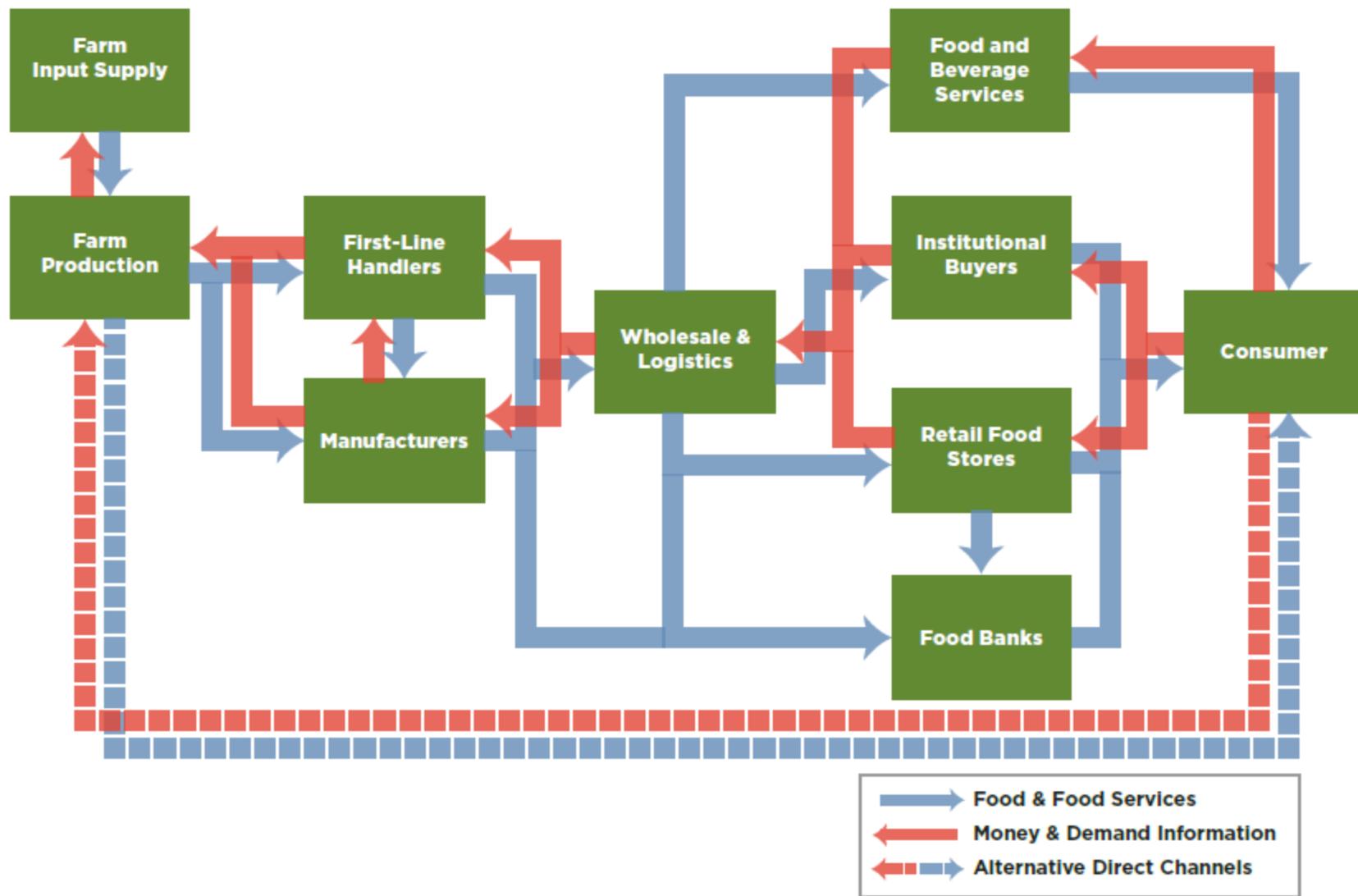


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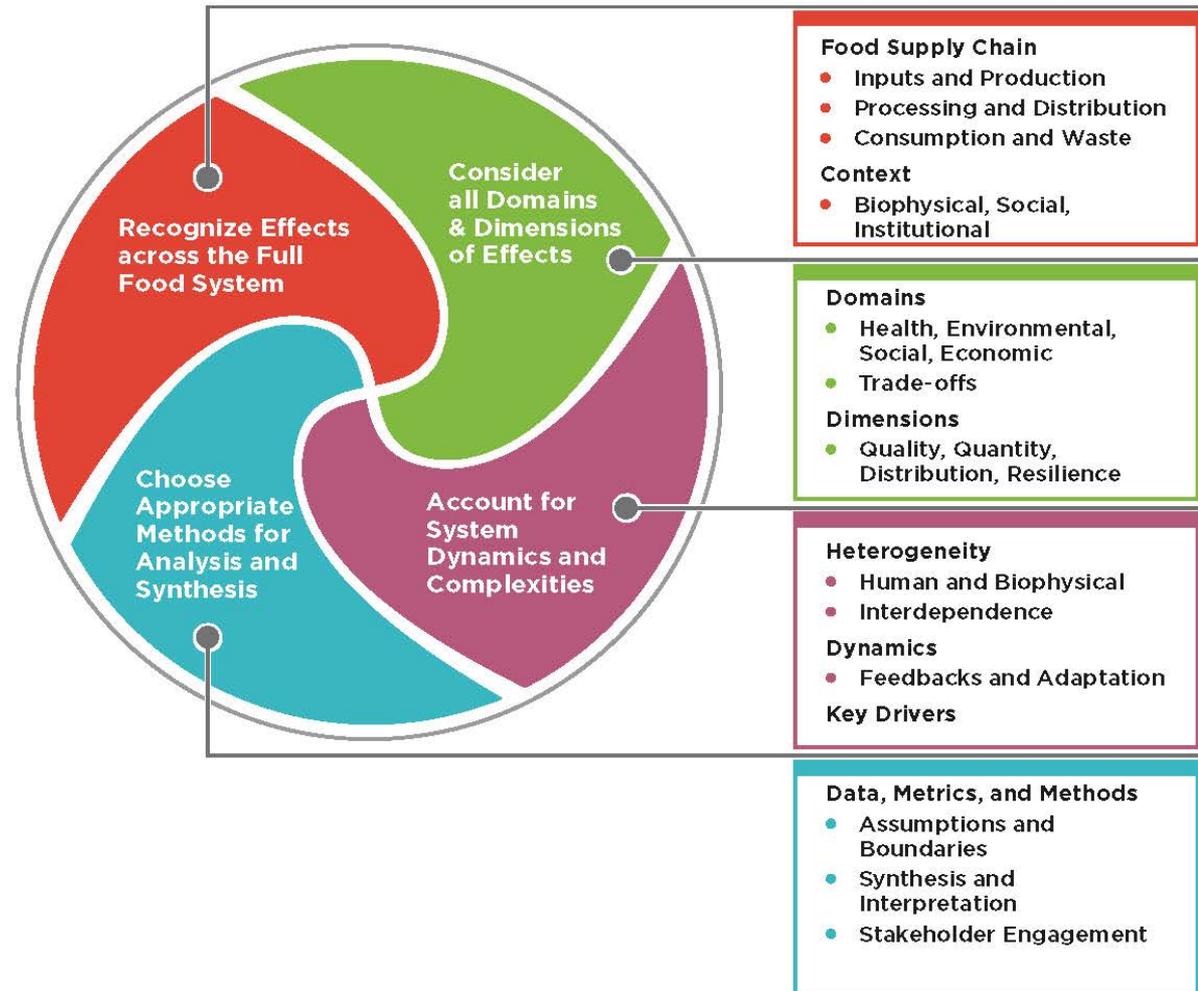




Some Potential Effects of the Food System

Health	Environment	Social	Economic
Obesity	Resources (water and soil)	Food insecurity	Food insecurity
Chronic diseases	Nutrients pollution (ammonia)	Access to health care	Economic inequalities
Food-related infections	Pesticide pollution	Workers' well-being	Workers' wages
Food-related contaminants	Ecological balance	Social inequalities	Rural development
Nutrient deficiencies	Greenhouse gas and climate change	Independence to make decisions	Industry profits

Framework Concept



Principles of the Framework (1)

Recognize Effects Across the Full Food System

Food Supply Chain

- Inputs and Production
- Processing and Distribution
- Consumption and Waste

Context

- Biophysical, Social, Institutional

Principles of the Framework (2)

Consider All Domains & Dimensions of Effects

Domains

- Health, Environmental, Social, and Economic
- Trade-offs

Dimensions

- Quality, Quantity, Distribution, Resilience

Principles of the Framework (3)

Account for System Dynamics & Complexities

Heterogeneity

- Human and Biophysical
- Interdependence

Dynamics

- Feedbacks and Adaptation

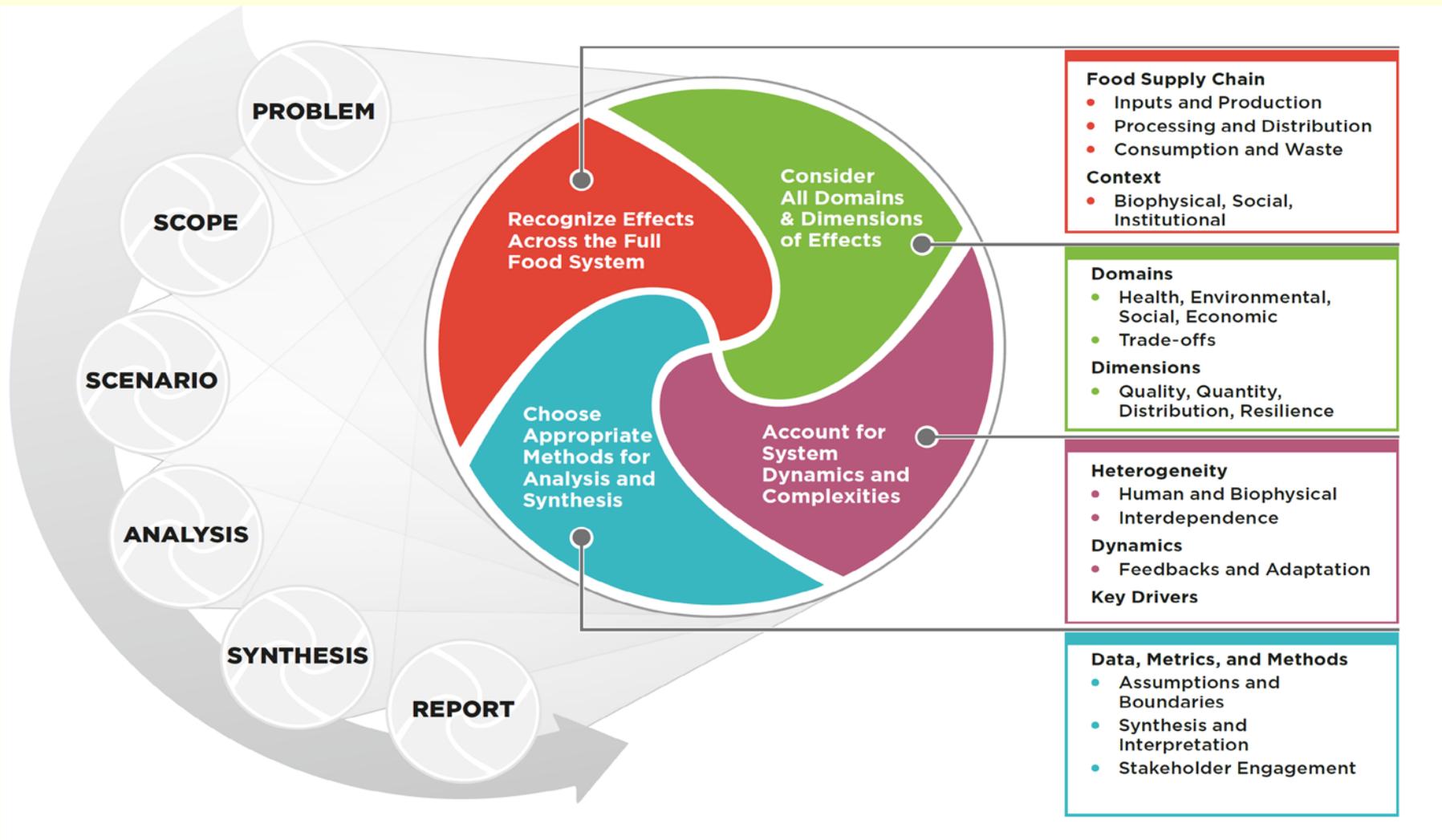
Key Drivers

Principles of the Framework (4)

Choose Appropriate Methods for Analysis and Synthesis

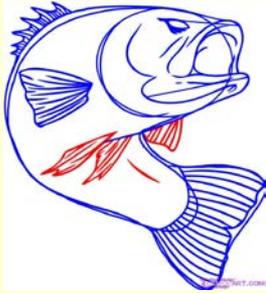
Data, Metrics, Models, and Methods

- Assumptions and Boundaries
- Synthesis and Interpretation
- Stakeholder Engagement



Examples

- The use of antibiotics in agriculture
- Recommendations for fish consumption and health
- Policies mandating biofuel blending in gasoline supplies
- Recommendations to increase fruit and vegetable consumption
- Nitrogen dynamics and management in agroecosystems
- Policies on hen housing practices



APPLYING THE FRAMEWORK

What if Americans ate more fish?

The 2010 Dietary Guidelines for Americans recommend consuming 8 ounces of fish every week—almost double current consumption

Possible health benefits of eating more fish- (reduced risk for cardiovascular disease in adults and better cognitive development in children).

But other possible effects across domains?

- **human health**
- **environmental sustainability**
- **social**
- **economic**

Uses of the Framework

- **For decision makers, to examine policies or proposed changes in the food system and to guide their decisions**
- **For researchers interested in examining the environmental, health, social, and economic effects of the food system**
- **For researchers, to identify uncertainties and prioritize research needs**
- **For other stakeholders, to develop evidence that will be helpful in understanding the costs and benefits of alternative configurations.**

A Few Caveats when Using the Framework

- **Limited resources might preclude a comprehensive analysis of the food system.**
- **Limited studies should consider these questions and acknowledge assumptions and boundaries:**
 - **Consider the full food supply system?**
 - **Address all four domains and dimensions of effects?**
 - **Account for interaction and dynamic feedback processes?**
 - **Account for heterogeneity in the human population and environment setting?**

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A Few Caveats when Using the Framework

- **The framework can be applied to any food system.**
- **In addition to system-wide effects, other factors, such as value judgments, underlie many choices for interventions.**

Actions Needed

- **Data collection and validated metrics and methodologies (see examples in Appendix B of the report)**
 - local, regional, state, national, and international
 - continued support for methods and models to understand the U.S. food system effects
 - methods for data and models sharing
- **Increased human capacity**
 - in academia, the private sector, and government agencies in all aspects of complex systems approaches

Conclusions

Comprehensive studies are rare

1) Comprehensive studies of food system configurations that use all principles of the committee's framework are rare and often they lack clear statements of boundaries and assumptions about the affected domains, their interactions, or dynamic feedbacks.

Integrated assessments can highlight new outcomes and tradeoffs

2) Studies that consider the entire food supply chain and address multiple domains and dimensions of effects of an intervention and its drivers can identify outcomes and tradeoffs that are not visible in more narrowly focused assessments.

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Interventions likely to have systemic effects

3) Policies or actions that aim for an outcome in one domain of the food system (e.g., health) can have substantial consequences in the same and in other domains (e.g., environmental, social, and economic domains).

Public data and models are critical to assessments

4) Publicly collected data and publicly supported models are critically important in assessing the effects of the food system. The lack of access to data collected by industry can be a major challenge.

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Stakeholders are important

5) Stakeholders are important audiences and sources of data. They also can contribute to, identify, or scope the problem and potential effects. Effectively engaging stakeholders has challenges, therefore, this type of participatory process requires careful planning.

Integrated assessments necessary to meet future challenges

6) To meet challenges in the 21st century, needed improvements in the food system may require more comprehensive approaches that incorporate non-technological factors and that take full account of social, economic, ecological, and evolutionary factors.

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Context matters: food system effects linked to drivers

7) For decision-makers to discover the best opportunities to intervene, it is important to understand the drivers (e.g., human behavior, markets, policy) and how they interact with each other and with the observable effects.

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To Access the Report and Other Materials

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