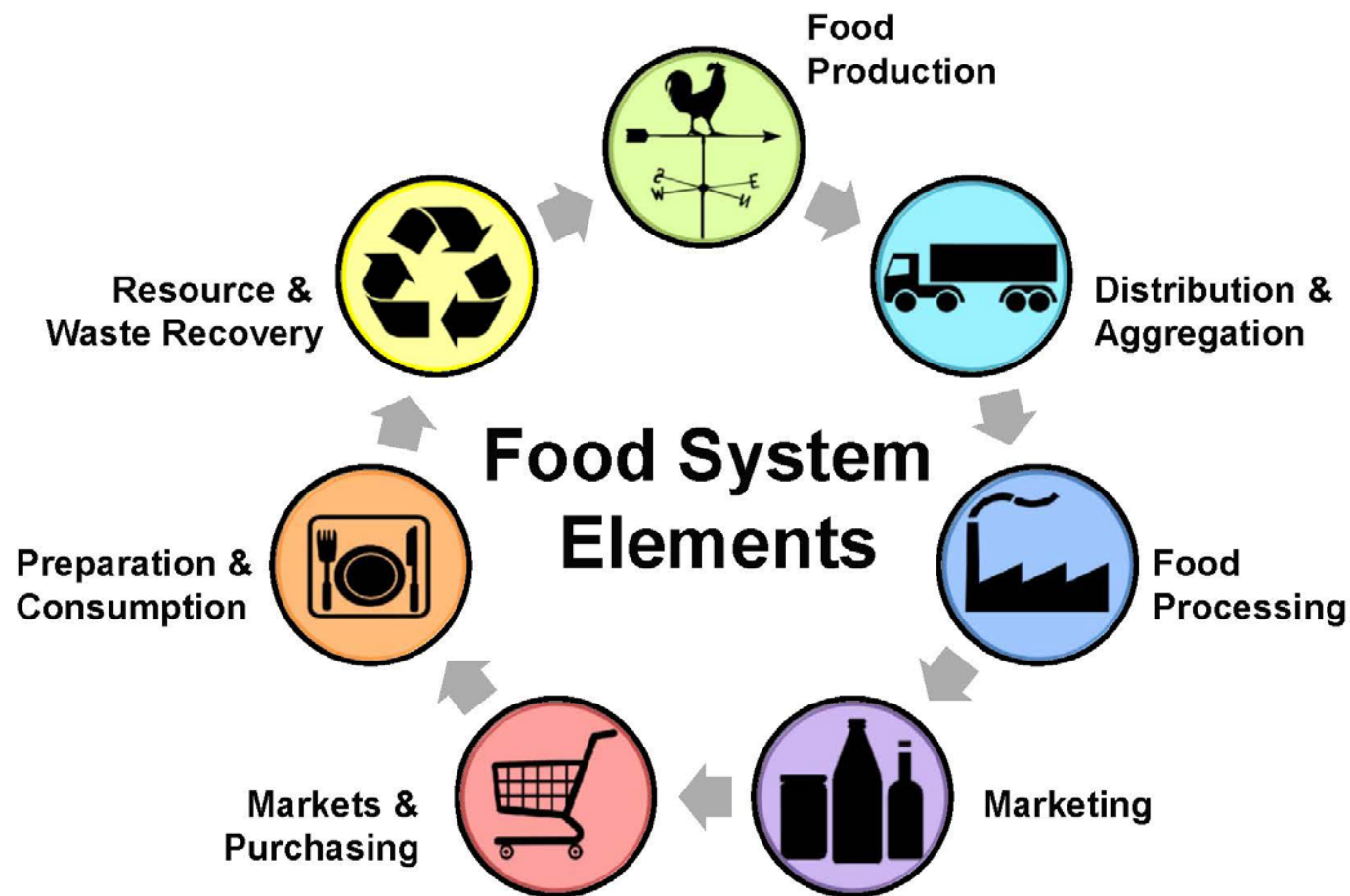


Using Science as Evidence in Public Policy

Marilyn Sitaker, MPH, Battelle Memorial Institute
Extension as Urban Policy Advisors Workshop, February 19, 2015

Food Chain



Adapted by Christy Shi, Center for Environmental Farming Systems.

From: Wilkins, J. and Eames-Sheavly, M. Discovering the Food System; An experiential learning program for young and inquiring minds.

Cornell University, Departments of Nutritional Science and Horticulture. <http://www.discoverfoodsys.cornell.edu/>

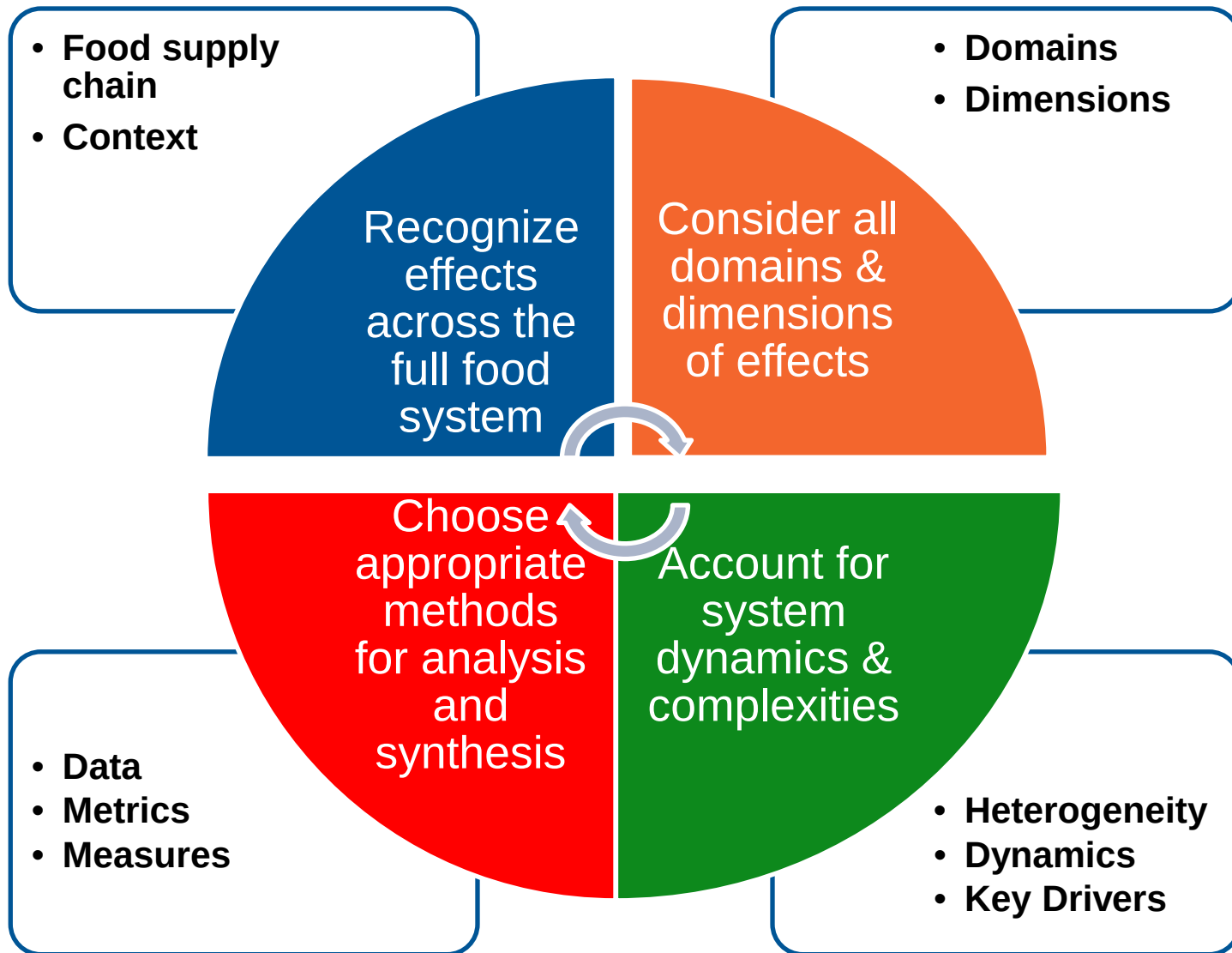
Complex systems have...

1. Each element has its own set of operating features & **actors**: **individuals, institutions, & even insect/micro-organisms.**
2. These actors are often quite different from one another (**heterogeneity**).
3. Elements interact with one another, but also influence/ are influenced by environmental, social, & economic contexts. This can happen across networks, sectors, and geographic boundaries (**spatial complexity**).
4. Actors are **interdependent**, and adapt to changes, causing **feedback loops**
5. Feedback, adaptation and interdependence can produce **nonlinearity, path dependence & resilience (dynamic complexity)**.

Purpose of the IOM Framework

- (1) Understand the environmental, health, social, and economic effects associated with all Food System components;
- (2) Encourage better data collection systems and methodologies to identify and measure effects;
- (3) Inform decision-making in food/agricultural practices & policies to minimize unintended health, environmental, social, and economic consequences.

Four Key Principles



1. Recognize Effects Across the Full Food System

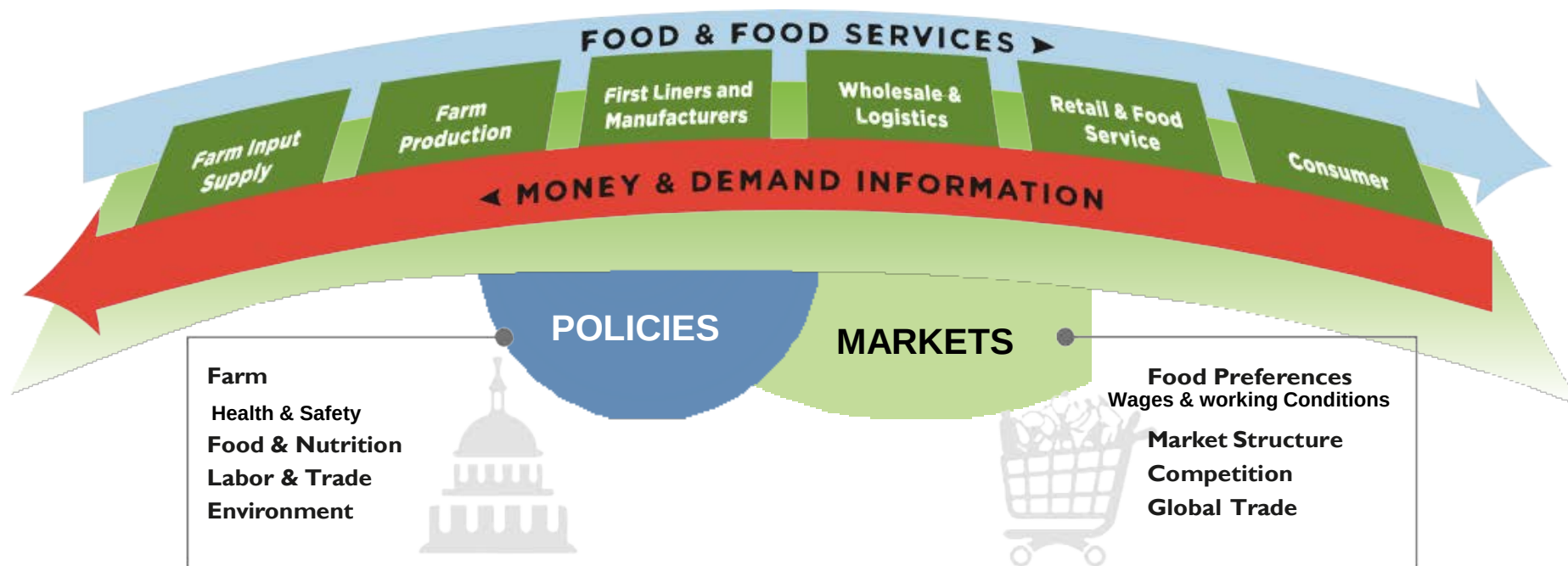
- **Food supply chain**
 - Inputs & Production
 - Processing & Distribution
 - Consumption & Waste
- **Context matters**
 - Biophysical
 - Science & Technology
 - Social Organizations



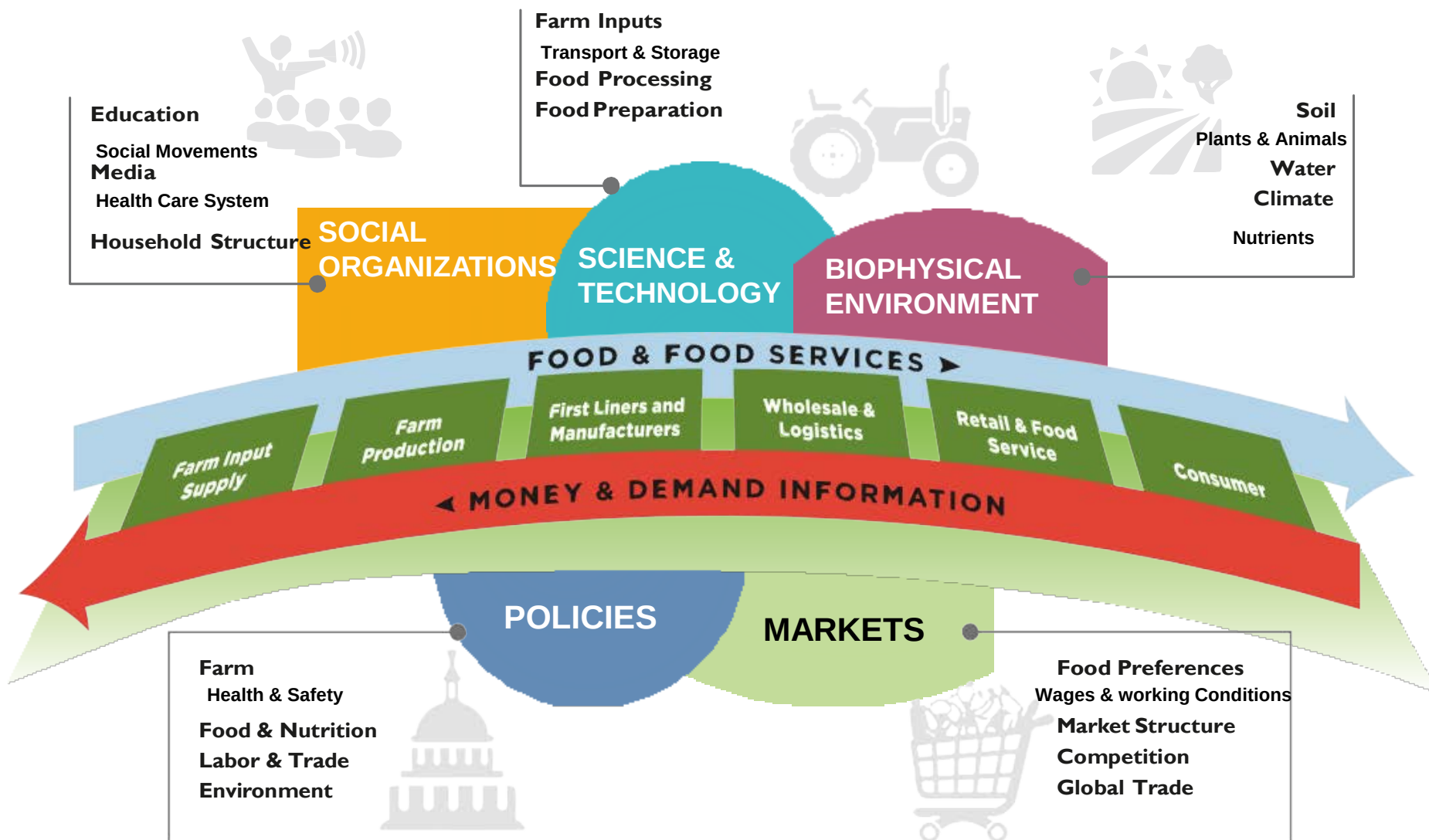
Links between Food Supply Chain & Contexts



Links between Food Supply Chain & Contexts



Links between Food Supply Chain & Contexts



2. Consider all Domains and Dimensions of Effects

- **Domains**
 - Health, Environmental,
 - Social, Economic
- **Dimensions**
 - Quality, Quantity,
 - Distribution, Resilience



Ex: Considering dimensions across all domains

Domains		Dimensions			
		Quantity	Quality	Distribution	Resilience
	Health	Enough calories for good health & weight	Food that is safe & meets recommended dietary guidelines	All population groups can access many food types	Trusted Food safety level recovers after contamination
	Environment	Plentiful food production from land and water	Biodiversity & quality of natural environment in agricultural setting	Equal risk of agrochemical runoff across diverse landscapes	Quick recovery of agricultural production after flood or drought
	Social/ Economic	Rising disposable income for consumers & food system workers	Variety of affordable foods across income levels	Cost of meeting dietary needs is equitable across income levels	Community retains economic viability after loss of major employer

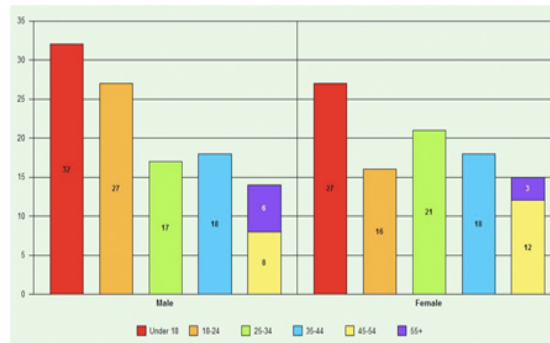
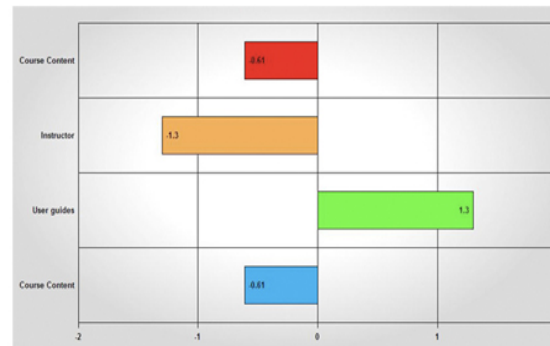
3. Account for System Dynamics and Complexities

- **Heterogeneity**
 - Human
 - Biophysical
 - Interdependence
- **Dynamics**
 - Feedback
 - Adaptation
- **Key Drivers**

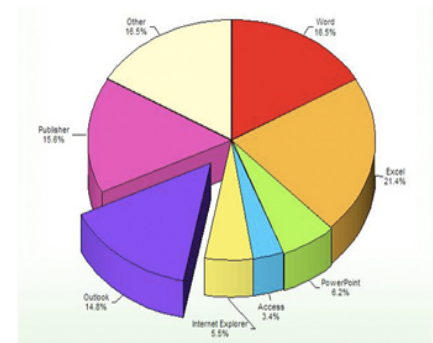


4. Data, Metrics, and Methods

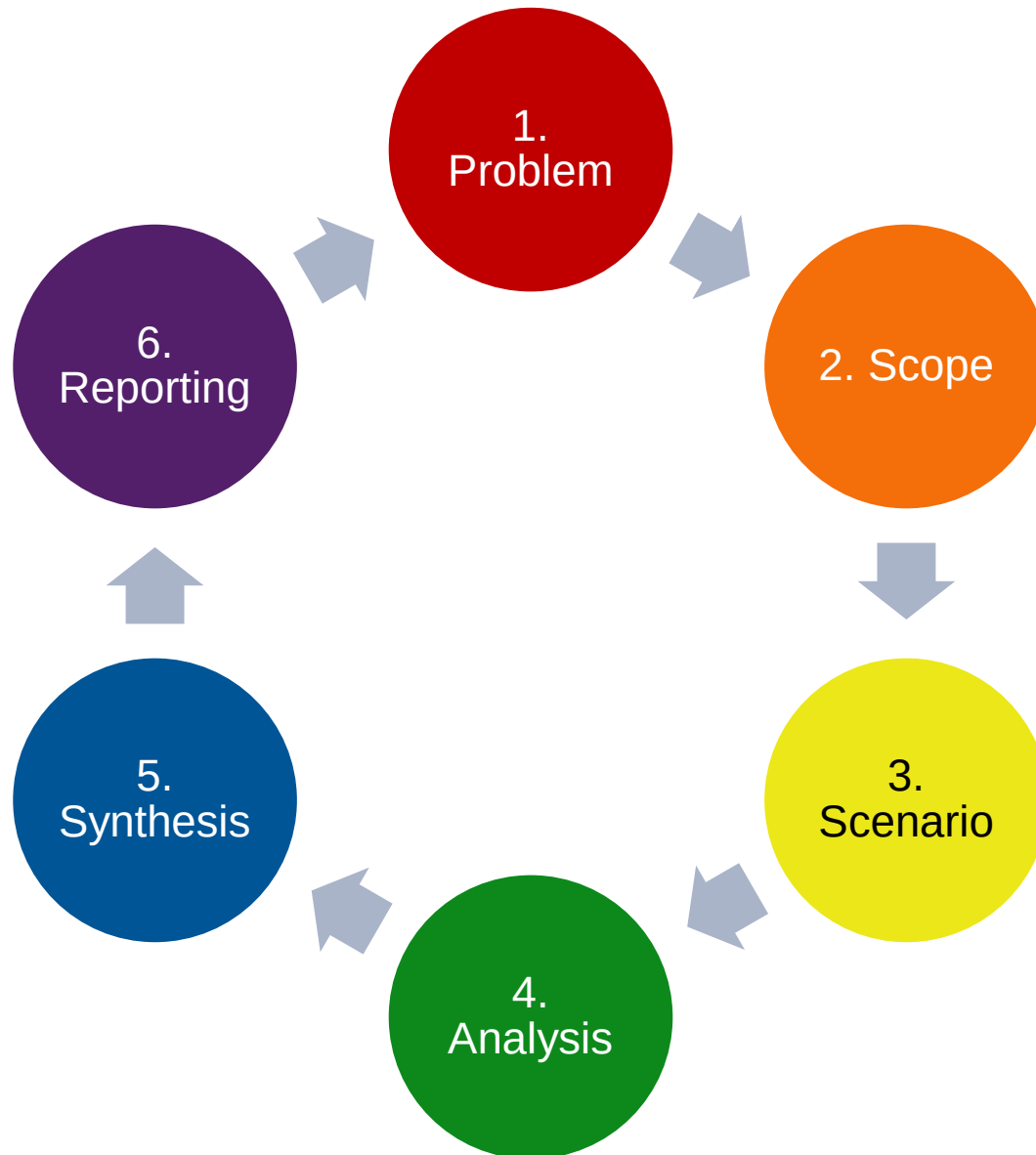
- Assumptions & Boundaries
- Synthesis & Interpretation
- Stakeholder Engagement



		Male-Age					Female-Age					
		Base	Under 18	18-24	25-34	35-44	45-54	Under 18	18-24	25-34	35-44	45-54
Base		196	32	27	17	18	8	27	16	21	18	12
Course Taken	Word	102	16	17	7	9	4	16	11	13	4	5
		52%	50%	63%	41%	50%	50%	59%	69%	62%	22%	42%
	Excel	131	26	22	14	15	4	18	8	9	10	5
		67%	81%	81%	82%	83%	50%	67%	50%	43%	56%	42%
	PowerPoint	37	16	5	3	3	1	1	1	3	3	4
		19%	50%	19%	18%	17%	13%	4%	6%	-	17%	33%
	Access	21	-	-	-	-	4	5	5	4	3	-
		11%	-	-	-	-	50%	19%	31%	19%	17%	-
	Internet Explorer	33	1	2	3	6	4	7	5	-	1	4
		17%	3%	7%	18%	33%	50%	26%	31%	-	6%	33%
Outlook	90	8	10	10	12	7	-	8	16	11	8	
		46%	25%	37%	59%	67%	88%	-	50%	78%	61%	67%
	Publisher	96	16	12	8	6	1	23	6	9	11	4
	49%	50%	44%	47%	33%	13%	85%	38%	43%	61%	33%	
Other	101	14	22	13	12	-	8	4	9	11	8	
		52%	44%	81%	76%	67%	-	30%	25%	43%	61%	67%



6 Framework Assessment Steps



How can the Framework help extension professionals in policy work?

1. Extension professionals can help policymakers see the “bigger picture” to understand complex food systems and their dynamics
2. Working with multi-disciplinary academic partners, extension professionals can provide scientific evidence on many relevant factors that drive system change
3. Extension Professions can provide input to decision makers during the multiple steps in the assessment process

Example: Using Systems Framework to Gather Scientific Evidence

- In 2011, the Nutrition, Obesity, Policy Research & Evaluation Network (NOPREN) Rural Food Access Working Group met to discuss results of a concept mapping project.
- The policy/research priorities ranked highest by experts included strategies designed to build economic viability in rural communities:

Research Priority	Questions to explore
Economic development, viability & consumer purchasing power in rural communities	How can economic development efforts, via food producers and entrepreneurs, influence consumer purchasing power and behaviors? What policies help or hinder rural economic development?

Rural Access to Foods Workgroup:

- **Local Food Economies:** formed as a NOPREN subgroup, with Sitaker, Seguin, Kolodinsky and Pitts.
- **Literature Review:** 4 entrepreneurial food systems innovations: CSAs, Farmers' Markets, Farm-to-Institution programs, and Food Hubs.
- **Questions:** Do these innovations
 - Enable producers to make a living?
 - Strengthen local economies?
 - Improve access to affordable, healthy foods for local residents?
 - Contribute to greater dietary intake of healthy food?

Q1 Enable producers to make a living?

- **Farmers' Markets:** can yield returns to producers that range from equivalent to that of mainstream food supply chains to up to 7X that amount (King, 2010).
- **CSAs:** CSA's generated 87% net return per dollar compared to farmers' markets (67%) and wholesale channels (58%) in 4 NY farms (LeRoux, 2010).
- **Farm-to-Institution:** direct sales to schools can increase revenue (Conner, 2011), though studies show only modest increases in farmer income (Joshi, 2008; Schmidt, 2006).
- **Food Hubs:** while returns to farmers can increase over time, many food hubs still need support of public dollars to operate (Schmidt, 2011).

Q2 Strengthen local economies?

Author (year)	Returns to producers	Increased Employment	Increased Gross Output	Increased Personal Income
Otto, 2010	\$29M in direct sales	576 jobs	\$59.6M	\$17.8M
Hughes, 2008	Not reported	119 jobs, (82 net)	\$2.4M (net \$1.1M)	\$0.7M (net \$0.2M)
Henneberry, 2009	Not reported	113 jobs	\$6M	\$2.2M
McCarthy, 2001	\$550K in direct sales for vendors	Unknown	\$450K, enhanced sales for nearby businesses.	Unknown
Meyers, 2001	Annual revenues of \$192,030	Unknown	\$966K, enhanced sales for nearby businesses.	Unknown

Local food systems have potential for greater community economic impact because most of the revenue is retained locally—whether food is purchased directly from the producer, or purveyed by local stores/restaurants (O’Hara, 2011)

Q3 Improve access to affordable, healthy foods for local residents?

- **Farmers' Markets:** produce at the market can be more affordable compared to supermarket prices (Flaccenvento, 2011; Claro, 2011; McGuirt, 2011).
- **CSAs:** for organic produce, CSA shares can save up to 39% compared to supermarkets (Sabih, 2000; Cooly, 1998).
- **Food Hubs:** a national survey found that 50% of food hubs actively distributed products in “food deserts,” and 25% accepted SNAP or other benefits, thereby increasing healthy food access for both urban and rural low income consumers (Barham, 2012).

Q4 Contribute to greater dietary intake of healthy food?

- **Farmers' Markets:** various studies show that incentive program participants have increased fruit and vegetable consumption compared to non-participants (McCormack, 2010; Jilcott Pitts, 2013, 2014; Ruelas, 2012).
- **CSAs:** while many studies include reports of greater amount and variety of produce consumed, few use traditional dietary assessments (McCormack, 2010).
- **Farm-to-Institution:** a recent review showed that 10/11 F2S programs reported improved dietary behaviors as a result of being served more fruit and vegetables (Joshi, 2008) .

Summary

- All 4 innovations appear to be profitable for producers and communities—yet supporting studies are specific to *time* and *place*, and therefore not generalizable.
- Except for Farmer's Markets, there is insufficient evidence—particularly using validated dietary assessments-- to determine whether these innovations lead to greater intake of healthy food.
- A transdisciplinary approach is needed to fill existing research gaps, with expertise in economics, public health, nutrition, community development, etc.
- Studies need to use consistent methods, time frames, interventions across diverse geographical contexts to yield generalizable results.

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