

The NIH logo consists of the letters "NIH" in a bold, white, sans-serif font, positioned to the left of a blue chevron graphic that points to the right.

National Institutes of Health

Turning Discovery Into Health

Addressing complexity in a complex world

**Approaches to understanding the
Intersection of Climate/Environmental Change
(CEC), food systems, diet, nutrition and health**

Daniel J. Raiten

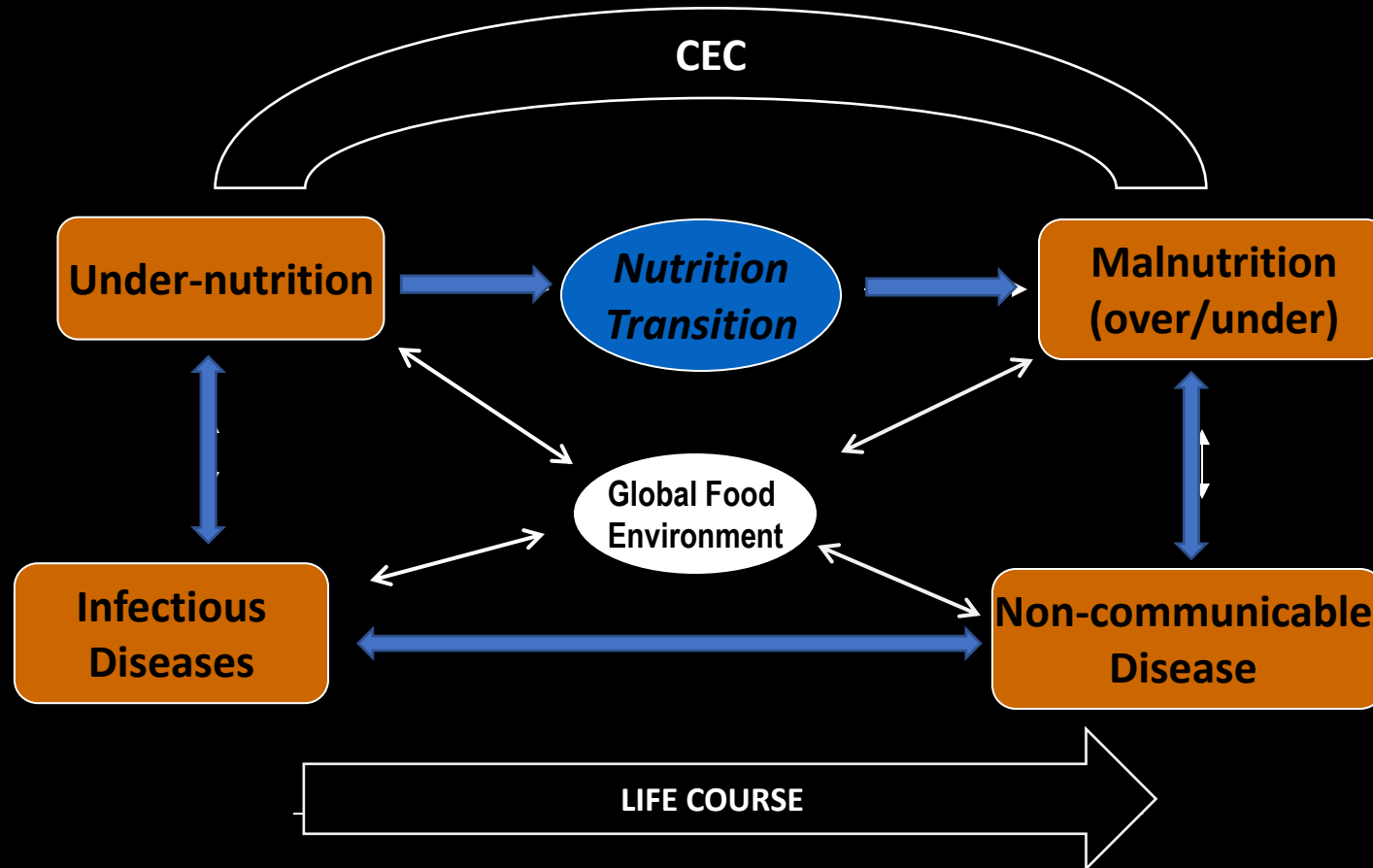
NIH Office of Nutrition Research

Disclosures

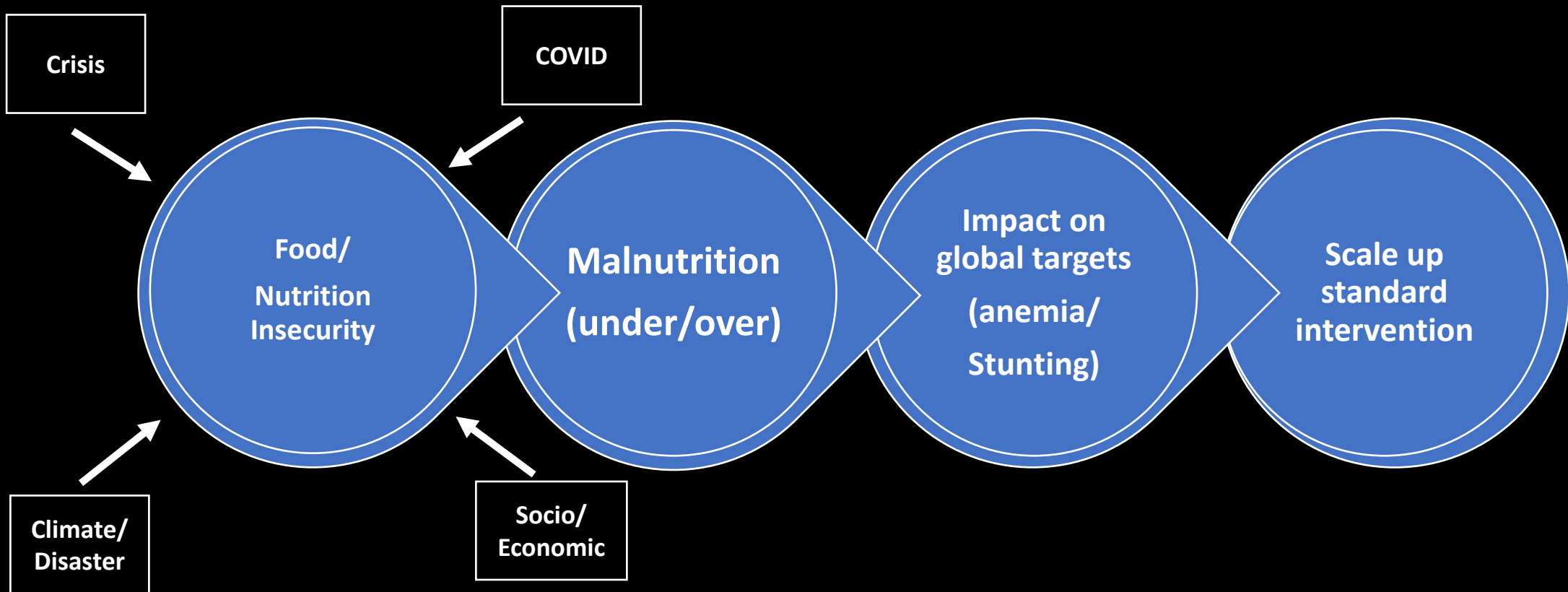
No conflicts to disclose

The State of Global Diet, Health and Malnutrition:

A Complex Health Context: it's not just about too much or too little!



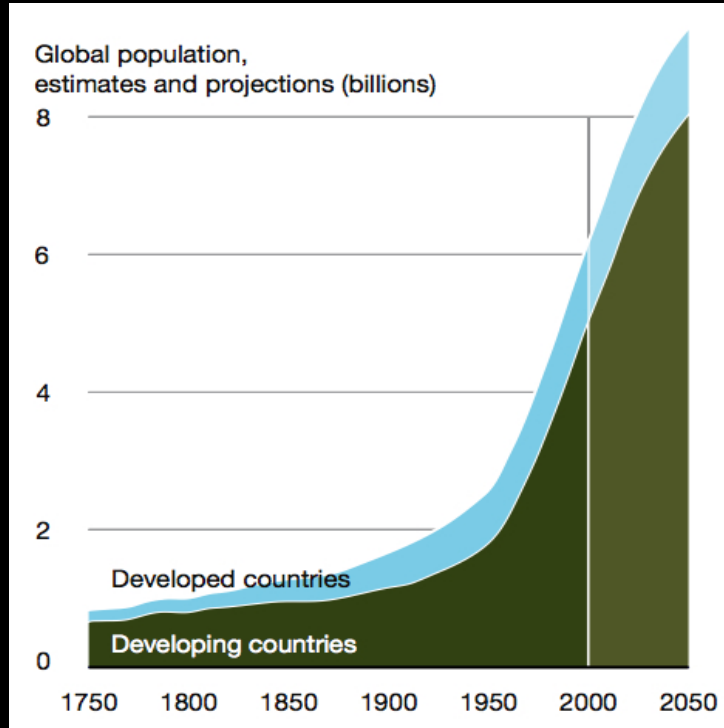
The Linear Logic: Current Response to Global Health / Nutrition Challenges



This logic is understandably focused on programs and policy, but is limited with regard to addressing specific diet, nutrition and health issues because it ignores the biological and environmental realities of health and disease.

CONTEXT MATTERS!

A Perfect Storm



9.2 billion people by 2050
(8 billion in LMIC countries)

60% more food

Less agricultural land

Urbanization

Climate change

Emerging new infections, e.g.,
COVID-19 pandemic, etc.

Political crises, e.g., Russia's
war on Ukraine, Middle East...

Global Food and Nutrition Guidance

- Food-Based Dietary Guidelines- (e.g., DGA, CDG) : dietary patterns to promote health and prevent disease
- Global Nutrition Targets 2025: WHO; focused on reducing/eliminating hunger, and consequences of malnutrition (overweight obesity, low-birth weight, under-nutrition, stunting, wasting, nutrition responsive anemia)
- Sustainable Development Goals (SDGs): eliminate hunger, clean water/sanitation, support sustainable food systems and support economic development

SDG #2:

End hunger, achieve food security and improved nutrition
and promote sustainable agriculture.

Goal 2: Zero Hunger - The Global Goals

Of the 7 “targets” listed under this SDG, only 2.2 addresses “malnutrition:
“END ALL FORMS OF MALNUTRITION

By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons”

Status Update: Global Hunger

“ In 2022, 738.9 million people faced hunger, 2.4 billion in 2022 were moderately or severely food insecure, and over 3.1 billion lacked access to healthy diets. The COVID-19 pandemic added 120 million to the chronically undernourished. By 2030, an estimated 590.3 million will suffer hunger. Progress toward global nutrition targets is uneven. “

The planet faces crises, exceeding safe limits in six of nine planetary boundaries, majorly tied to agrifood systems. These systems contribute 30 percent of anthropogenic greenhouse gas (GHG) emissions, impeding climate goals.”

From: [Achieving SDG 2 without breaching the 1.5 °C threshold: A global roadmap, Part 1 \(fao.org\)](#)

For additional info from FAO:

[Hunger | FAO | Food and Agriculture Organization of the United Nations](#)

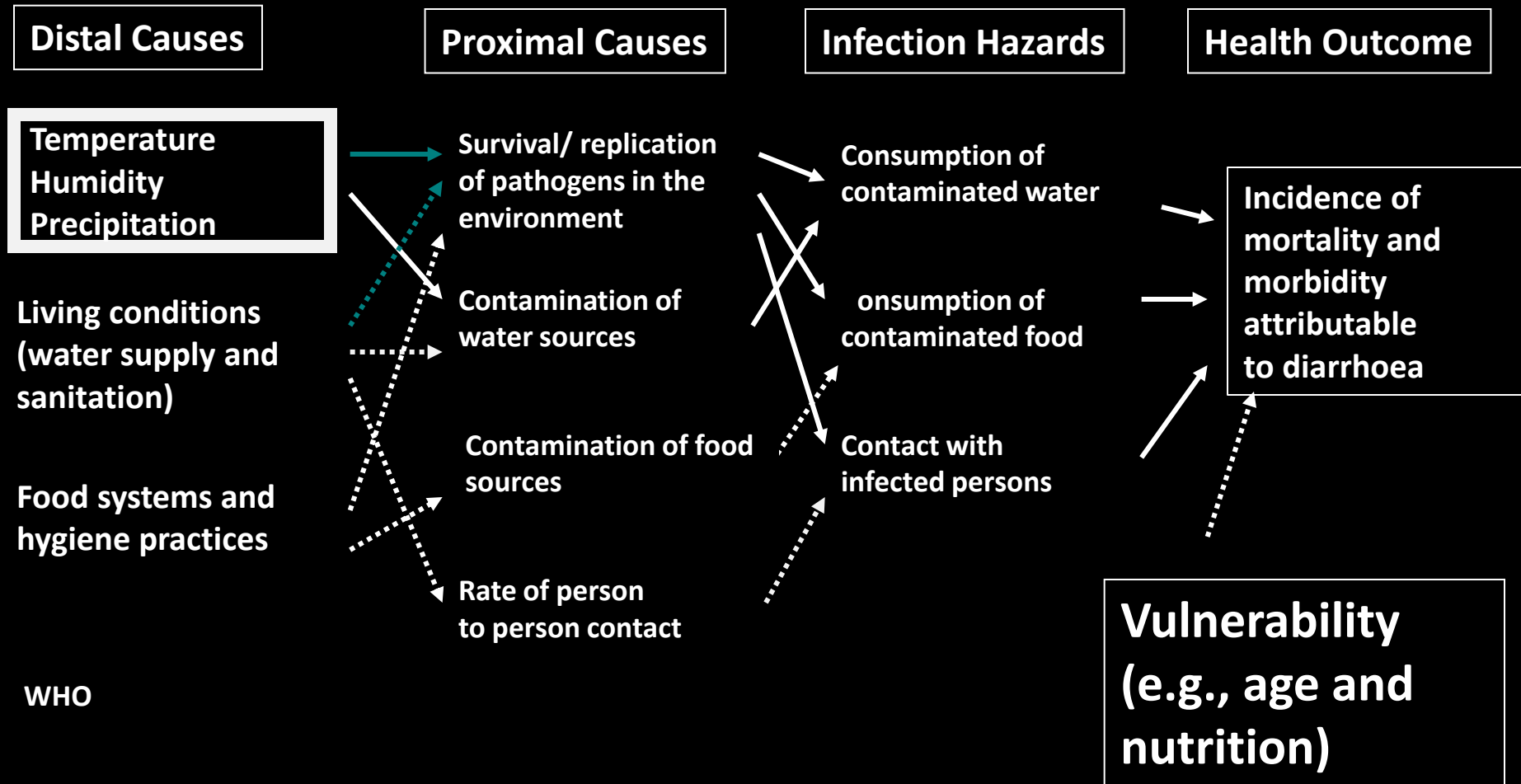
How can we interpret these trends?

1. Great strides have **been** made in reducing the impact of under-nutrition on child health but stunting and under-nutrition remain a major target for the global health community,
2. An alarming trend has emerged in the global prevalence of overweight and obesity and DIET-RELATED NCDs across the life course, and this trend has extended well into LMIC, **where** historically, the focus of efforts **has been limited to** under-nutrition,
3. Communicable infectious diseases (CID) including COVID-19 and other emerging CID, HIV, malaria, TB and diarrheal disease remain daunting public health concerns, again hitting LMIC hardest.

In most settings a collision is occurring of CID, NCD, food insecurity, over- and under-nutrition within the same population and, in many settings, in the same individuals. This collision, including the multiple burdens of malnutrition (over- under-nutrition and increasingly, both), is just beginning to be addressed in any meaningful manner

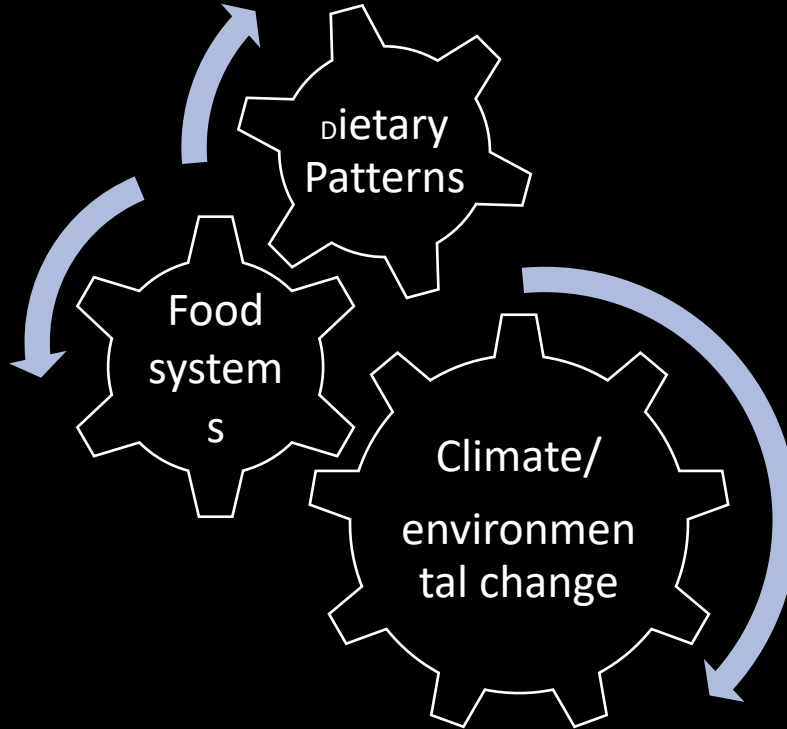
Superimposed on all of this is the impact of CEC!

More complexity: Pathways for Weather to Affect Health: Example - Diarrheal Disease



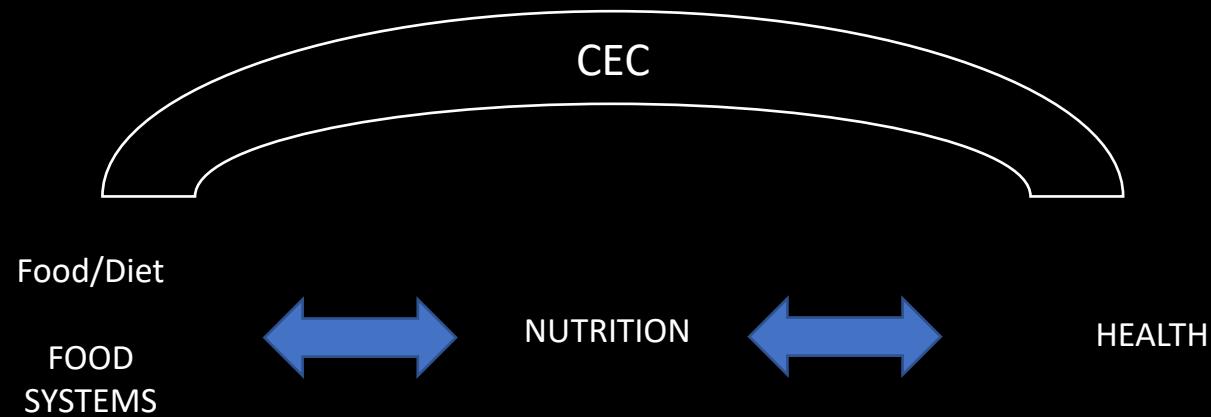
The Current Impetus ” for Action

Reciprocal relationships CEC, food systems and dietary patterns



Aspiration: Avoiding the “Food: Footprint Paradox”
i.e., assuring dietary patterns with low “carbon footprint” that support sustainable food systems and meet nutritional needs of a growing population

Fundamental Relationships



Nutrition is the “glue” that ties food/food systems to health
CEC affects and is affected by these relationships in ways that
will be explored by ADVANTAGE

Adding value: A different orientation: “Sustainable Nutrition”

sustainable nutrition

in individuals and populations may be defined as

- The ability to maintain a nutritional status that will support growth, development and health throughout the life course, and,
- Achievable through the recognition of the synergy between the needs of the target population, their unique health context and factors affecting the capacity of food systems required to meet those needs.”

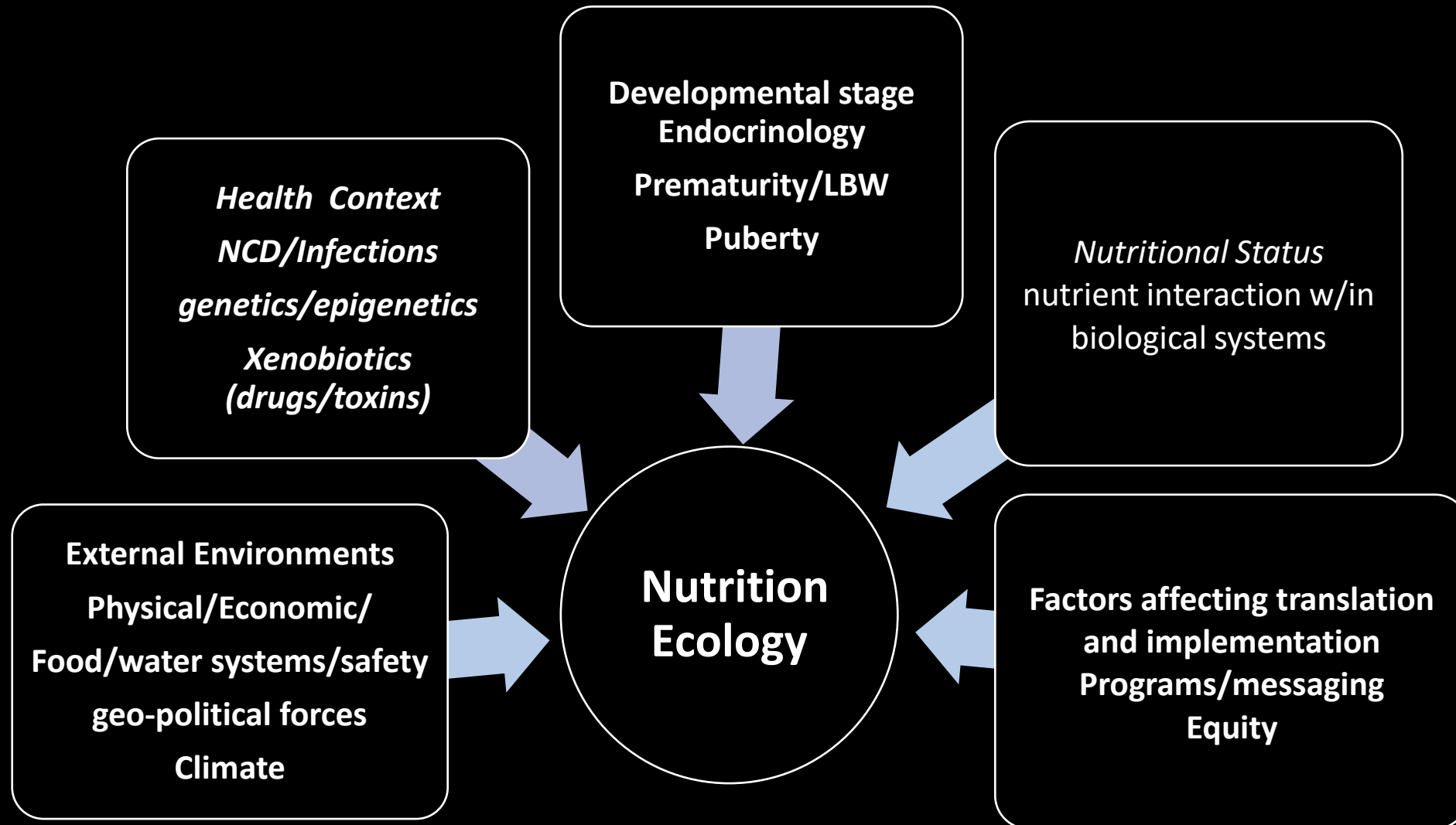
How can we address this complexity?

Understanding the Nutritional Ecology

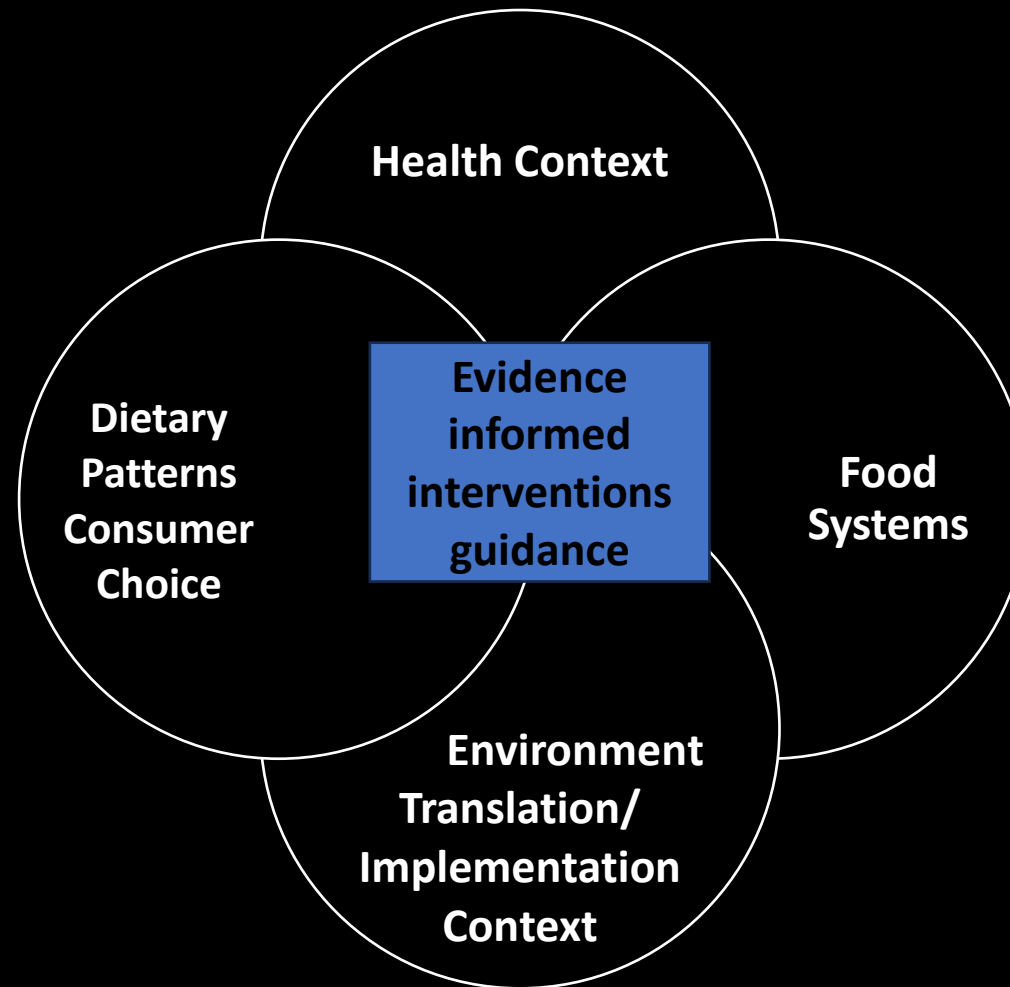
Ecology:

“the set of relationships existing between any complex system and its surroundings or environment.” (Dictionary.com)

The Nutrition Ecology: Accounting for Sources of Variability



The Ecology of Interventions



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Turning Discovery Into Health

“Agriculture and Diet: Value Added for Nutrition
Translation/Adaptation in a Global Ecology”

ADVANTAGE Project

Application of the Ecological Approach

Core drivers

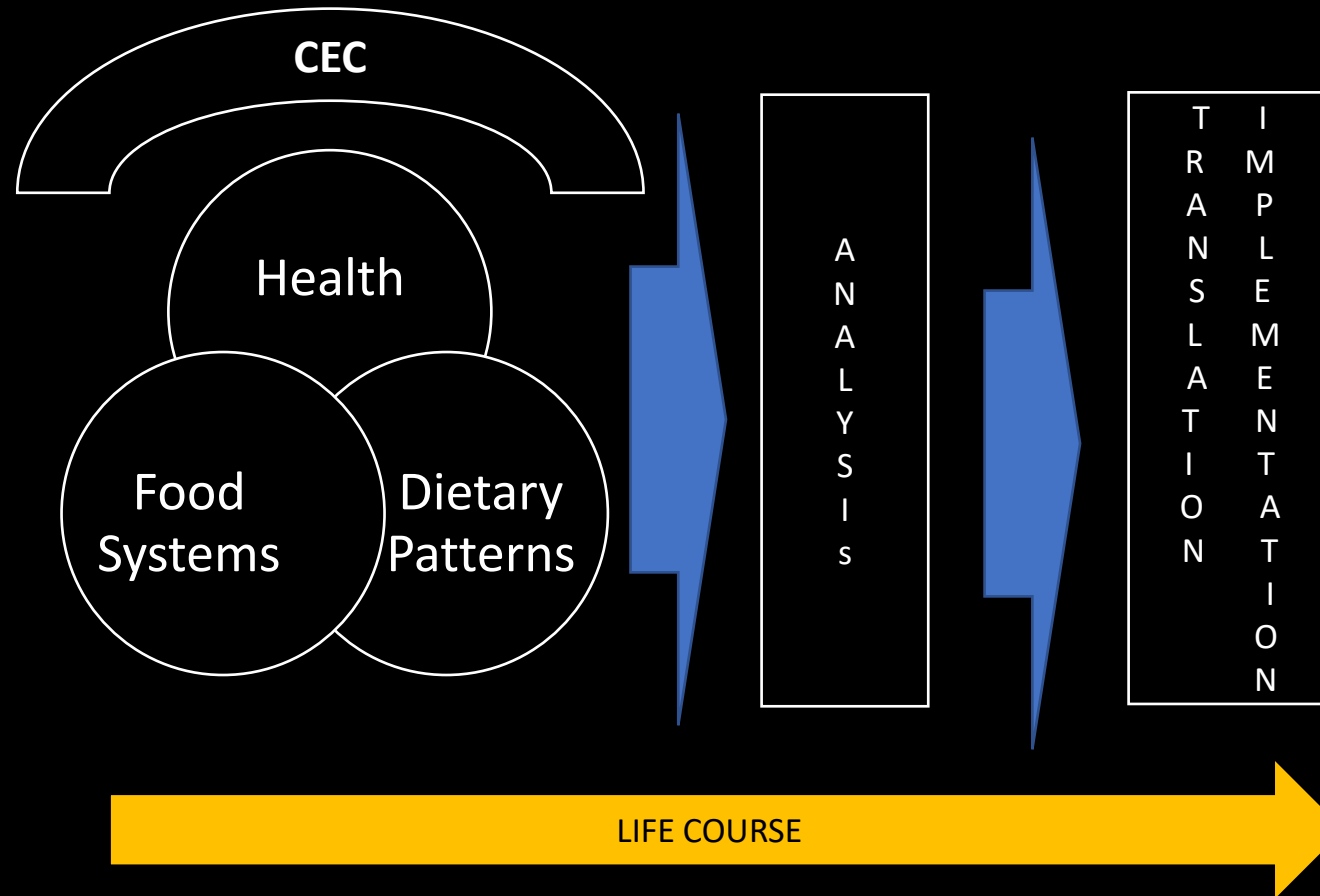
Underlying Premise:

The development of sustainable and resilient diet/nutrition related, evidence informed guidance, recommendations, policy and standards of care to promote health and prevent disease, requires consideration of a) relevant health targets, b) an appreciation of what the population of interest is currently consuming, and c) an understanding of the food systems' capacity to meet the dietary needs of the target populations

Core Questions:

- 1) What is the impact of a changing environment on these core questions?
 - 2) Can we achieve precision of assessment and attribution in the absence of consideration of the role of CEC?
- And,
- 3) If not, how can we integrate this ecological approach into our analytical frameworks?

An ecological approach to evidence-informed guidance and interventions



THANK YOU!