Advancing the Frontiers of Population Nutrition Research: New Questions, New Methods and New Approaches

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Feb 18, 2013

Scope

Outline
1. Frontiers in six dimensions
2. Rationale for these frontiers
   – Trends in society
   – The nature of problems
   – Trends in science
3. Illustrations
4. The Nature of Frontiers
5. Summary

Frontier Dimensions

- Why we study
- What we study
- Who we study
- How we study: Methods
- How we study: Approaches
- Disciplines
Rationale for these Frontiers

1. Trends in society
2. The nature of problems
3. Trends in science

Trends in Society

• Nutrition has ascended on public and private agendas
• An extensive web of interconnected issues now is recognized
• Demand for results and accountability in public programs and publicly funded research
• Demand for research on effectiveness of interventions at scale (translational and implementation science)
• Nutrition must respond to these trends in order to remain relevant
Rationale for these Frontiers

1. Trends in society
2. The nature of problems
   - Simple, complicated, complex, wicked
3. Trends in science
Four Types of Problems

**Simple**

Adapted from: Getting to Maybe: How the World is Changed. Westley, Zimmerman, Patton, 2006

**Complicated**

Adapted from: Getting to Maybe: How the World is Changed. Westley, Zimmerman, Patton, 2006

**Complex**

Adapted from: Getting to Maybe: How the World is Changed. Westley, Zimmerman, Patton, 2006

**Socially Complex**

Adapted from: Getting to Maybe: How the World is Changed. Westley, Zimmerman, Patton, 2006

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**Technical vs Wicked Problems**

- Indeterminacy in problem formulation
- Non-definitiveness in problem solution
- Non-solubility
- Irreversible consequentiality
- Individual uniqueness


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The role of business and cross-sector collaboration in addressing the “wicked problem” of food insecurity

Ralph Hamann, Stephanie Giamponaro, David Johnston & Schrin Yachkaschi

Development Southern Africa Vol. 28, No. 4. October 2013

**Principles for Framing a Healthy Food System**

Micheal W. Hamm

Dept. of Community, Agricultural, Recreation, and Resource Studies

Crop and Soil Sciences, Food Science and Human Nutrition

Michigan State University, East Lansing, Michigan, USA

Wicked problems are used simply defined as ones that are impossible to solve. In other words, the range of complex interacting effects...
Because wicked problems are in essence “expressions of diverse and conflicting values and interests” (Norton, 2012, p. 450), the process of working with them is fundamentally social, and should not be scientized in the conventional sense (Conklin & Weil, 2007).
**Implications of Wicked Problems for the Research Approach**

"Because wicked problems are in essence "expressions of diverse and conflicting values and interests" (Norton, 2012, p. 450), the process of working with them is fundamentally social, and should not be scientized in the conventional sense (Conklin & Weil, 2007).

Instead of the partial and linear strategy of divide and conquer that aims at searching for definitive solutions, it requires a holistic and process oriented approach that is by nature adaptive, participatory, and transdisciplinary (APT for short).

By examining a wicked problem as a whole through a panoramic social lens rather than a scientific microscope, and working with it through an open and heuristic process of collective learning, exploration, and experimentation, the APT approach promises to be efficacious in fostering collaborative behavior, reducing conflicts, building trust among all stakeholders and communities involved, and ultimately producing better and more satisfying results.

"With more empirical research and applications, a more developed APT approach, along with innovative methods and skill sets, will be a competent alternative to the traditional solution-seeking approaches.”

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**Dimension** | **Current Tendencies** | **Frontiers**
---|---|---
Why | Generalizable/ fundamental knowledge re. scientific questions | Actionable knowledge of concern to stakeholders, organizations, communities, or publics at various scales
What | nutrients, nutritional status, food and nutrient intake, food insecurity, behavior. | laws, regulations, norms, programs, organizations, systems, change processes in communities, programs, policies, etc.
Who | women, infants, children, elderly, consumers. | policy makers, managers, implementers, leaders, networks, coalitions, private sector actors, citizens, universities
How (methods) | limited range of quant and qual methods: Interviews, focus groups, regression, trials… | social network analysis, discourse analysis, Q methodology, document analysis, media analysis, process tracing, stakeholder analysis, influence mapping, program impact pathways, etc.
How (approach) | detached, objectivist, positivist, reductionist, behaviorist, hypothesis testing | engaged, participatory, action research, CBPR, participant-observer, reflection in action, embedded, emergent, systems-, and complexity-oriented, reflexive, etc.
Disciplines | Nutrition, ep/hiostatistics, biomedicine, psychology, social psychology... | economics, sociology, anthropology, policy analysis, law, urban planning, political science, organizational behavior, management sciences... and TRANSDISCIPLINARY

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**The Nature of Problems: Bottom Line Message**

“We can't solve problems by using the same kind of thinking we used when we created them.”

Einstein
Rationale for these Frontiers

1. Trends in society
2. The nature of problems
3. Trends in science
   - Socio-ecological framework (revisited)
   - Complex Adaptive Systems
   - Mode 2 Knowledge Production

The Socio-Ecological Framework

Social Ecological Approaches to Individuals and Their Contexts: Twenty Years of Health Education & Behavior Health Promotion Interventions

Social Ecological Approaches to Individuals and Their Contexts: Twenty Years of Health Education & Behavior Health Promotion Interventions

The Individual-Centered Ecological Framework

Number of Levels of the Socio-Ecological Model Addressed in 105 Data-Based Nutrition Papers

* Published in American Journal of Health Promotion; the American Journal of Preventive Medicine; Preventive Medicine; and Health Education Quarterly/Health Education and Behavior; Journal of Nutrition Education/Journal of Nutrition Education and Behavior. ** Levels are: Individual, Interpersonal, Organizational, Community, Political, Other.
Papers Published in Journal of Nutrition, Jan 2010-Aug 2012 (Community and International sections only)

Number of research papers: 80
Number focusing on individuals: 80
Policy/program-focused symposia: 2

New Questions
• How are they formed?
• How do they change?
• What do they do?
• How are they implemented?
• What are their effects?

• Intended
• Unintended
• Positive
• Negative

What We Study: New Objects and Questions

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Using Our Socio-Ecological Models: Bottom Line Message

“Standard public health planning models share several attributes: an objective epistemology, an assumption that planning and implementation are two separate linear sequential activities, and an assumption that social systems change can be predicted and controlled.”


Complex Adaptive Systems

“I think the next century will be the century of complexity”
S. Hawking

“Every PhD student in everything should get to grips with the ‘chaos/complexity’ programme, not for reasons of fashion or even legitimate career building, but because this is the way the world works and we need to understand that”
D. Byrne

In: Complexity and the Social Sciences
It is difficult, nowadays, to open a popular science magazine, or a leading science journal, without reading about complexity, the approach to science that is expected to 'define the scientific agenda for the 21st century'. Complexity theory is influencing fields as diverse as physics, cosmology, chemistry, geography, climate research, zoology, biology, evolutionary biology, cell biology, neuroscience, clinical medicine, management, and economics. However, it has to date had relatively little influence on the theory and practice of epidemiology. In this paper we review the basic concepts of complexity theory and discuss their relevance to epidemiology.

### Complexity and its Properties

#### Editorial

**Complexity, simplicity, and epidemiology**

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### Systems in Public Health

**Towards a complexity framework for managing projects**


Evaluating health systems strengthening interventions in low-income and middle-income countries: are we asking the right questions?


Systems thinking for strengthening health systems in LMICs: need for a paradigm shift


Interdisciplinarity and Systems Science to Improve Population Health

A View from the NIH Office of Behavioral and Social Sciences Research


**Systems Thinking to Improve the Public’s Health**


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### Complexity, simplicity, and epidemiology


“...exploration of complex adaptive systems theory for the design of research on health care organization..."
Interdisciplinarity and Systems Science to Improve Population Health: A View from the NIH Office of Behavioral and Social Sciences Research

**Programmatic Direction #1. Next-Generation Basic Science**
- Gene–environment interactions
- Environmental effects on physiology
- Technology, measurement, and methodology
- Social integration and social capital
- Complex adaptive systems
- Social movements and policy change

**Programmatic Direction #2. Interdisciplinary Research**

**Programmatic Direction #3. Systems Science and Health**

**Programmatic Direction #4. Population Impact**


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Research on Wicked Problems and Complex Adaptive Systems

"Much of the research and scholarship, as substantive as it may seem, remains largely a repetitive description of the social reality of wickedness, rather than well-grounded theoretical explorations or empirical investigations."

"Aside from substance, the peer reviewed scholarly publications on wicked problems remain modest in quantity—our recent survey found a total of 332 cited papers on the Scopus database in the Elsevier Editorial System, and 162 on Web of Science. They are also geographically scattered, presenting a huge disparity across the world."

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**Trends in Science: Bottom Line Messages**

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"Every PhD student in everything should get to grips with the ‘chaos/complexity’ programme, not for reasons of fashion or even legitimate career building, but because this is the way the world works and we need to understand that" **D. Byrne**

"If you want to truly understand something, try to change it." **Kurt Lewin**

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**Illustrations**
### Selected Research Projects

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<th>Who</th>
<th>What</th>
<th>How/Methods</th>
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<td>1982-84</td>
<td>Male laborers</td>
<td>CHD risk factors</td>
<td>Surveys</td>
<td>Mode 1</td>
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<td>NYS</td>
<td>1980</td>
<td>Govt. Sectors, Communities</td>
<td>CHD risk factors</td>
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| N. Samoa | 1985-88 | Sani | Response to disaster | Experience | Participatory observers |

| Global | 1988-96 | Children | Mortality | Meta-analysis | Mode 1 |

| NTP | 1989-90 | Communities | Planning | Experience, 1 method | Participatory observers |

| SR | 1986-88 | USA | Policy formulation | Surveys, Meta analysis | Developmental evaluation/MA |

| MALA | 1984 | CHD care | CHD risk factors | Surveys | Mode 1 |

| US/FD | 1998-99 | Govt | Response to disaster | Experience | Participatory observers |

| Global | 1988-96 | Children | Mortality | Meta-analysis | Mode 1 |

| NYS | 1989-90 | Communities | Planning | Experience, 1 method | Participatory observers |

| US | 1988-89 | NYS | Govt | Response to disaster | Experience | Participatory observers |

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Recent and Current Research

- Mainstreaming Nutrition Initiative
- Program Implementation
- SuNCaP

Mainstreaming Nutrition Initiative

- Funded by World Bank nutrition section
- ICCDR,B, Cornell, 2006-8
- Objective: develop approaches and experience in moving nutrition from the status of a marginal issue with time-limited funding to a permanent feature on policy agendas and in MCN programs and policies

1. Cross-country study (interviews, written case studies, observations)
   - 30 respondents (nationals, researchers, NGOs, donors)
   - 18 country experiences
2. Focal countries (participant-observer and interviews):
   - Bolivia, Guatemala, Peru
   - Vietnam, Bangladesh
3. Conflict and consensus sub-studies (interviews)
   - Bolivia
   - Guatemala

The Nutrition Policy Process: The Composite Case of Esperanza

- Seasonal and chronic food insecurity
- Home gardening & poultry
- Clinic nutrition education

NPP: dynamic, contingent, emergent, non-linear, multi-scale, chaotic, open systems ("complexity")

Donor Conflicts resume

Donor

Mainstreaming Nutrition

- Unified Nalt Nur Strategy:
  - Core objectives
  - Diverse implement

World Bank 2006

Mainstreaming Nutrition

- "The international nutrition system – made up of international and donor organizations, academia, civil society, and the private sector – is fragmented and dysfunctional."

The International Nutrition System

Donor

Mainstreaming Nutrition

Societal Conditions

Catalytic Events

Structural Factors & Behaviors

Points of Contention

Strategies & Tactics

Enhanced commitment, coherence, coordination and support for the national nutrition agenda

Pelletier, SCN News 56, 2008
**Points of Contention**

"[] the donors and NGOs basically could not get their act together because they were all arguing for their own special interest or their own view of how things ought to be handled for nutrition." (International researcher and consultant to countries)

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**Strategies and Tactics**

"[] they had a lot of disagreements but they always went ahead with one voice. They sat behind closed doors and didn’t get out, but then they put on a good face when they came out and had one recommendation. (Donor agency)

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**Strategic Capacity**

The human and institutional capacity to:

- build commitment, vision and consensus towards a long-term national nutrition agenda,
- broker agreements,
- resolve conflicts,
- respond to recurring challenges and opportunities,
- build relationships,
- undertake strategic communications,
- strengthen operational capacities and implementation as part of the national nutrition agenda


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**The Challenge**

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**Program Implementation**

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**Program Implementation**
Program Assessment Guide (PAG)

**Processes**

- Participatory Procedures To Strengthen:
  - The Systematic Integration Of Evidence, Contextual Knowledge & Experience
  - Shared understanding, commitment, ownership, motivation & capacity to advance the micronutrient agenda
  - Links with the broader nutrition and health agendas in the country

**Outputs**

1. Action Plan to Address Barriers & Enablers
2. Operations Research Agenda
3. Issues for Inclusion in M&E
4. Strategic Plan to Build Support, Capacity & Sustainability

Applications of the PAG

1. Kyrgyzstan (micronutrient powders)
2. Bolivia (micronutrient powders)
3. Nepal (iron-folate supplements)
4. Tanzania (iron-folate supplements)
5. Haiti (mobile clinic w/ IFA)
6. Haiti (community-based programs w/ multiple interventions)
7. Haiti (Child Health Weeks w/ vit A)

Lessons Learned

1. Sponsorship, Responsibility, Commitment, Follow-up
2. Timing
3. Preparation
4. Participants
5. Contextuality (selection and sequencing)
6. Time constraints
7. Facilitation

SuNCaP (Sustainable Nutrition Capacities Project)

- UNICEF/EU, 3 year project
- Build on MNI and PAG
- Focus on:
  - Strategic capacities
  - Adaptive Management
  - Developmental Evaluation

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The Nature of Frontiers

- Detailed maps do not exist — they are vague, sketchy and made during exploration and settlement
- Explorers must be willing to embrace uncertainty, danger, hardship and hunger, so the tangible rewards (and/or the quest for discovery) must be substantial
- New tools, skills and relationships will be needed to survive and thrive in the new lands
- Native inhabitants, fellow travelers and explorers from other lands possess valuable knowledge to aid the process
- Frontiers move in many directions and over varied terrains, so diversity in focus and approach is warranted
Summary

- Nutrition has “arrived”
- “Nutrition” is no longer just “nutrition”
- How can we deliver results at scale?

“We can’t solve problems by using the same kind of thinking we used when we created them.”

Einstein

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D. Byrne

Acknowledgments

to everyone in my Complex Adaptive (Learning) System

"Never doubt that a small group of thoughtful, committed people can change the world. Indeed, it is the only thing that ever has." – Margaret Mead