



# Simplifying Complexity:

## Public Health Approaches & Practice in Complex Systems

July 4th & 5th, 2019

### Think Piece



**Public Health**  
Association of BC

### Public Health Approaches and Practice in Complex Systems

Over the 2019 public health summer school, participants will be introduced to Complex Adaptive Systems thinking, what it is, and how it can be used to create innovative solutions to population level interventions in public health within four subtopics. Two days of engaging speakers and relevant content will support attendees in professional development that addresses the everyday complexity facing a modern public health practice.

#### What is Complexity Science?

Complexity science is the study of systems and problems that are dynamic, unpredictable and multi-dimensional, and have interconnected relationships and parts. The study of complex adaptive systems (CAS) occurs within the paradigm of complexity science. In the challenging and changing times of public health practice today, practitioners can benefit from embracing and understanding how complexity science can support improved and proactive quality of care.

#### What are Complex Adaptive Systems (CAS)?

The term 'complex adaptive system' can be used to describe any system made up of interrelated components that are constantly changing. Characteristics of CAS can include both unpredictability and resilience.

#### Public Health in the Age of Complexity

There are many examples of complex public health issues, including pandemics and climate change. The problems targeted by preventive interventions are often complex, embedded in multiple levels of social and environmental context, and cover the developmental lifespan. The norm for much of public health services is to address complex issues in silos restricting potential for real change.

Common individual responses to complex problems can be to give up, assign blame, or oversimplify solutions. Instead, we need to approach complex problems together, using our best collective responses and resources.

Complex Adaptive Systems thinking can assist with:

- Defining the problem
- Implementing interventions
- Assessing intervention outcomes

#### Act Local, Think Systems – CAS in Public Health

Understanding CAS theory can be useful for public health practice. CAS frameworks can put complex problems into context, and promote shared understandings and approaches that recognize interconnectedness, interdependence, and collective responsibility.

The goal is not to simplify complex systems, but to illuminate them so that the many individual and organizational players affecting public health can see their place, progress, challenges and opportunities for action anywhere within the system, in the context of the larger whole.

#### We need to start thinking differently

	Reductionist	Systems Thinking
Problem exploration	Isolate parts	Explore emergent nature of the whole
Goal	Solve a problem	Develop shared understanding of problem, approach, progress
Nature of problem	Understood objectively	Multiple causes, no single solution, perspective and context matter
Responsible to take action	Others	Everyone

Adapted by Dr. Finegood from [The Australian Prevention Partnership Centre](#)



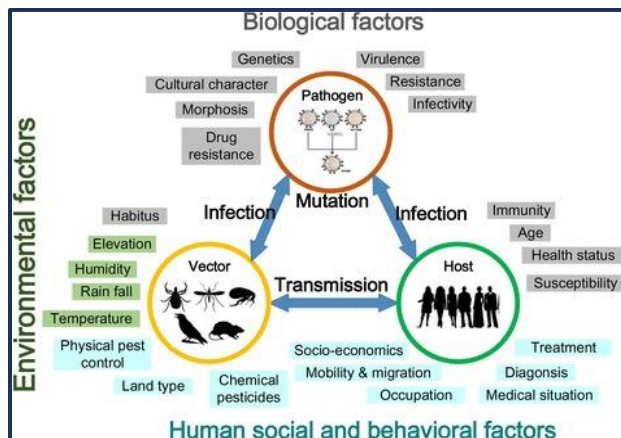
**Food Security & Food Systems**

There are many different food systems with local and global components that interact and help to shape the overall outcome of food security for communities. In CAS, small changes anywhere in the system have the potential to impact other components. Farm to School initiatives are examples of local action that can strengthen regional food systems.

**Immunization & Infectious Diseases**

The WHO identified vaccine hesitancy as one of the top 10 global health threats of 2019. Classic epidemic modelling is based on the assumption that people are identical and behave in similar, rational ways. New models are considering the

influence of social networks, and the complexity of human behavior which can be influenced by cognitive bias and fear.



Xia S, Zhou XN, Liu J. 2017

**Overdose Prevention & Response**

Drug policy is a complex adaptive system where interactions among system actors and components have evolved along with patterns of drug use, enforcement, prevention, treatment, and harm reduction activities over time. In a CAS framework, harm reduction is a complex process where values, facts, and technologies interact in the socio-political environment.

Wicked Problems	Tame Problems
There is no definitive formulation of a wicked problem	Have a relatively well-defined and stable problem statement
Wicked problems have no stopping rule	Have a definite stopping point, i.e. we know when the solution or a solution has been reached
Solutions to wicked problems are not true-or-false, but better or worse	Have a solution which can be objectively evaluated as being right or wrong
There is no immediate and no ultimate test of a solution to a wicked problem	Belong to a class of similar problems which can be solved in a similar manner
Every wicked problem is unique	Have solutions which can be tried and abandoned
Wicked problems have no given alternative solutions	Comes with a limited set of alternative solutions

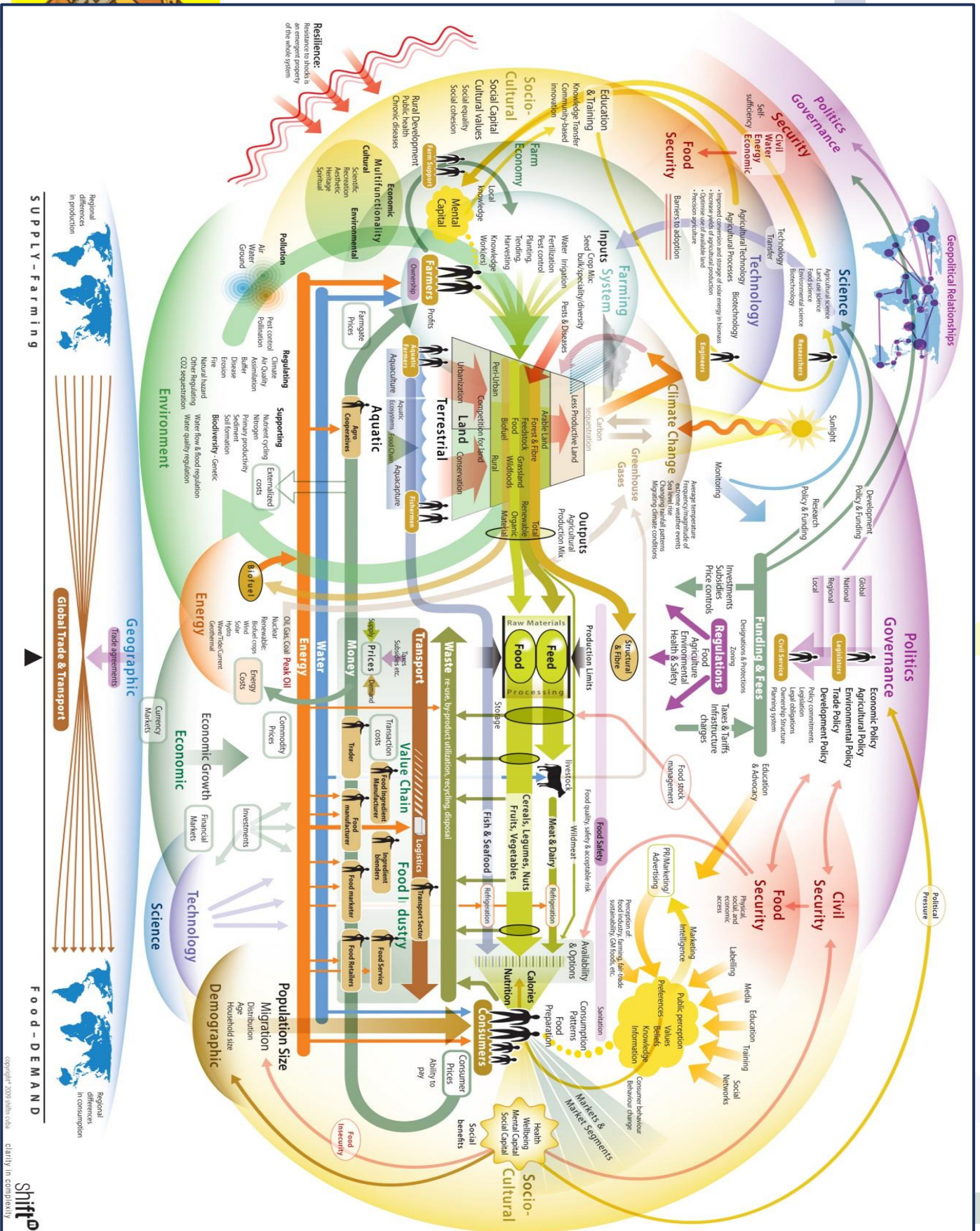
Adapted from: Ison & Collins, 2008 and Conklin, 2006

**Health Equity & Wicked Problems**

The Systems Health Equity Lens (SHEL) is designed to inform health system planning and actions using a socio-ecological model to shift the health system towards health equity as a value, priority and set of actions across all levels. Intersectionality and complexity are the theoretical foundations of the SHEL. The SHEL shifts attention away from attempts to identify 'vulnerable' or 'at-risk' populations to a focus on systems, structures and processes that create disadvantage and vulnerability.

Problems in public policy that involve complex social issues are often wicked in nature, including health inequalities. That is, they are difficult to define, offer no apparent final solutions, potentially affect a vast array of other problems and have long been resistant to effective intervention. Resolving wicked problems within complex systems requires collaboration, shared understanding, and dialogue.

In summary, CAS thinking can underscore and support the collaborative approaches that will enable public health practitioners to maximize their reach and impact. Join us for two days of learning that will unite public health practitioners across the province and across Western Canada. Together we can do better.



Global Food Systems Map



## Further Reading & Resources

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Stockholm Environment Institute. *Food and Our Future: Sustainable Food Systems in Southeast Asia.* <https://view.vzaar.com/7392344/video>

Stockholm Resilience Centre. *What are Complex Adaptive Systems?* <https://www.youtube.com/watch?v=BfnY9gn6ktk>

The Australian Prevention Partnership Centre. *Why Use A Systems Approach?* <https://www.youtube.com/watch?v=jJlCagxD0qI&feature=youtu.be>

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