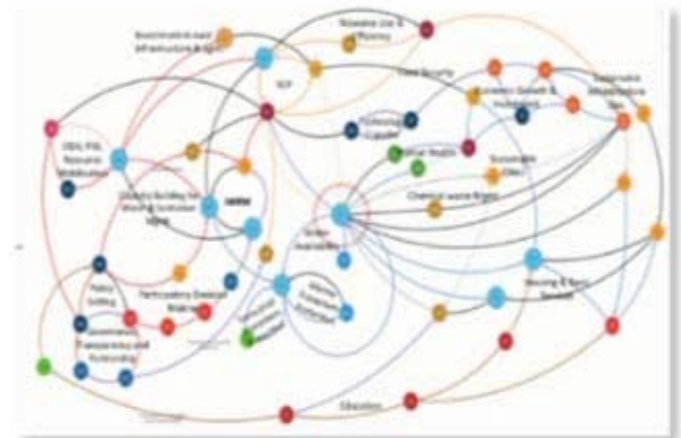


Introduction to Systems Thinking

Principles and Analytical Tools

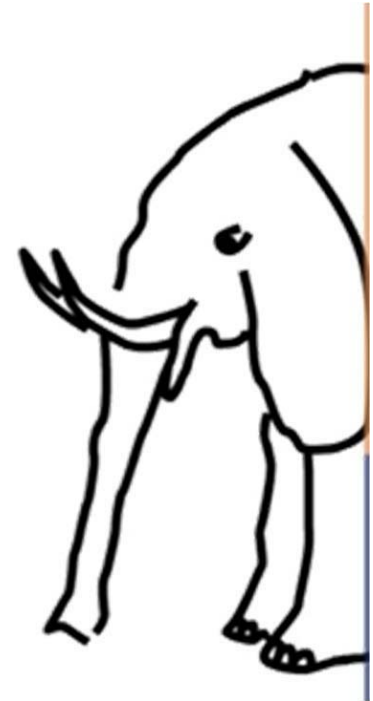
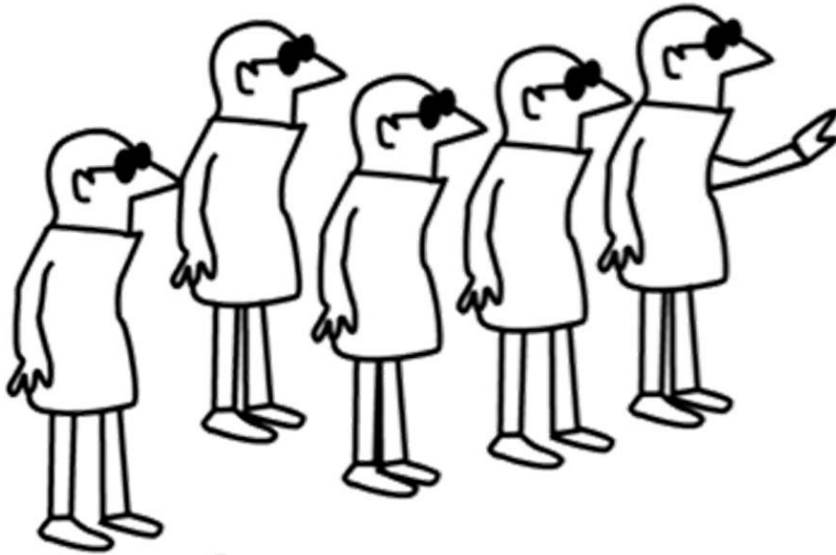
Environment and Development Division
UN ESCAP



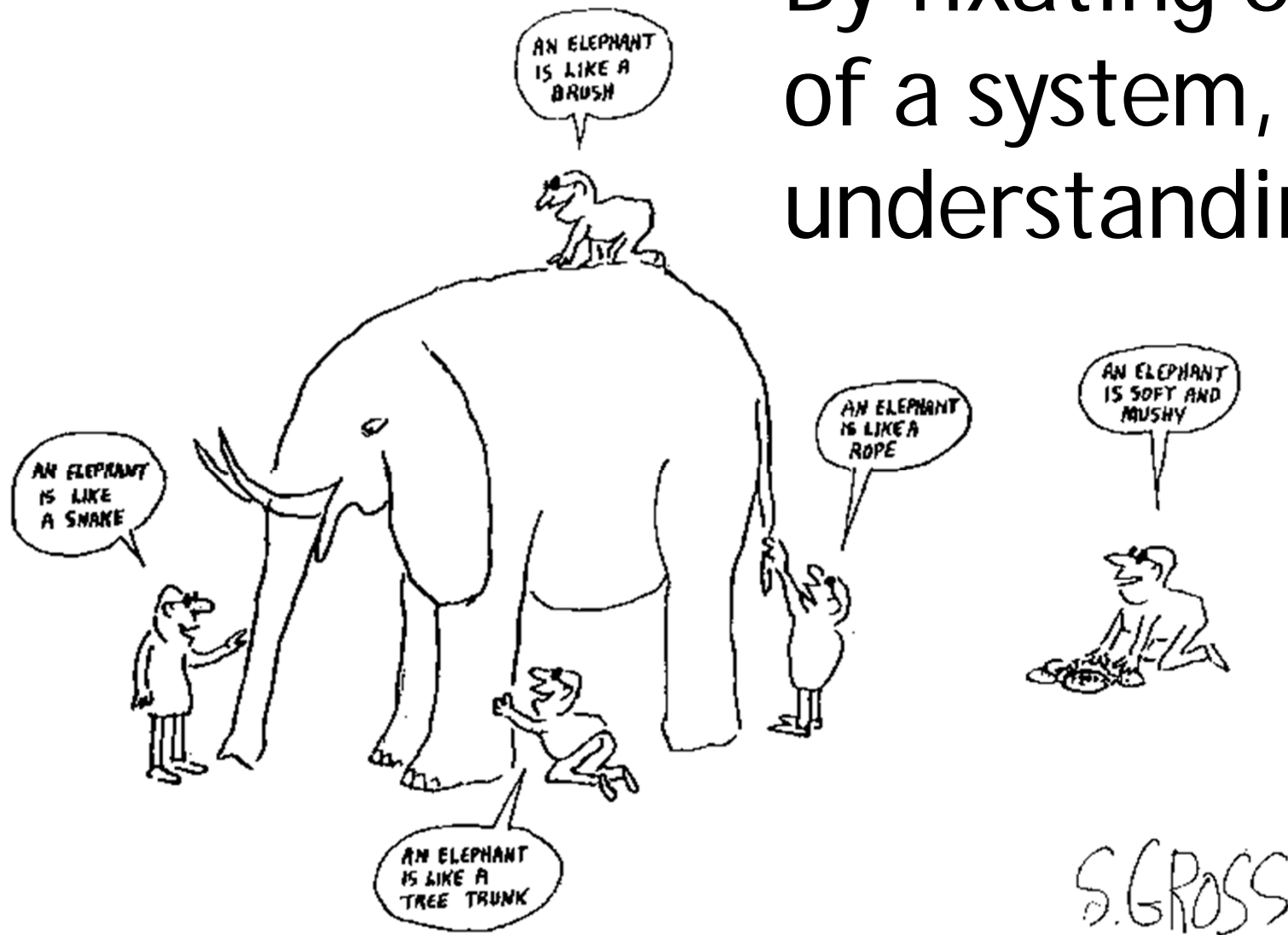
“ Any intelligent fool can make things bigger, more complex, and more violent. It takes a touch of genius — and a lot of courage to move in the opposite direction. ”

Ernst F. Schumacher, Development Economist & Statistician

What is a Systems Perspective?

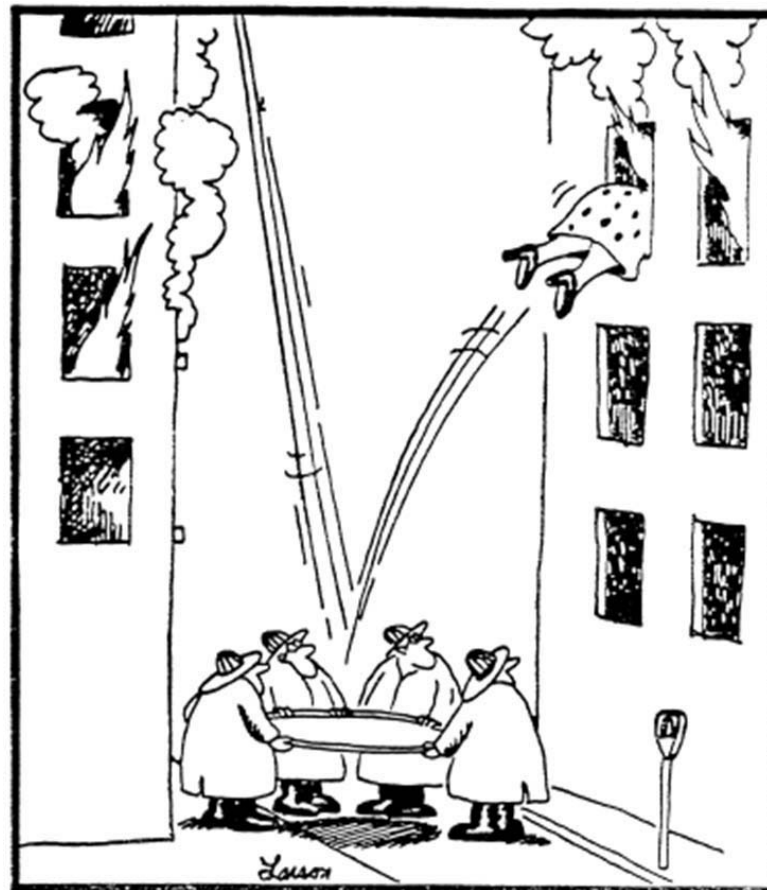


By fixating on the parts of a system, we miss understanding the whole



Lacking a Systems Perspective...

the solution to one problem can easily lead to a new and bigger problem later on or somewhere else in the system



Artist:
Gary Larson

**“unintended
consequences”**

“Systems Thinking is seeking to understand the connections among elements in a system”

- ✓ what depends on what,
- ✓ what is causing what,
- ✓ where are information flows,
- ✓ where control decisions are made,
- ✓ what information flows are critical,
- ✓ how to best engage stakeholders,
- ✓ And how best to manage or intervene in the system for desired results.

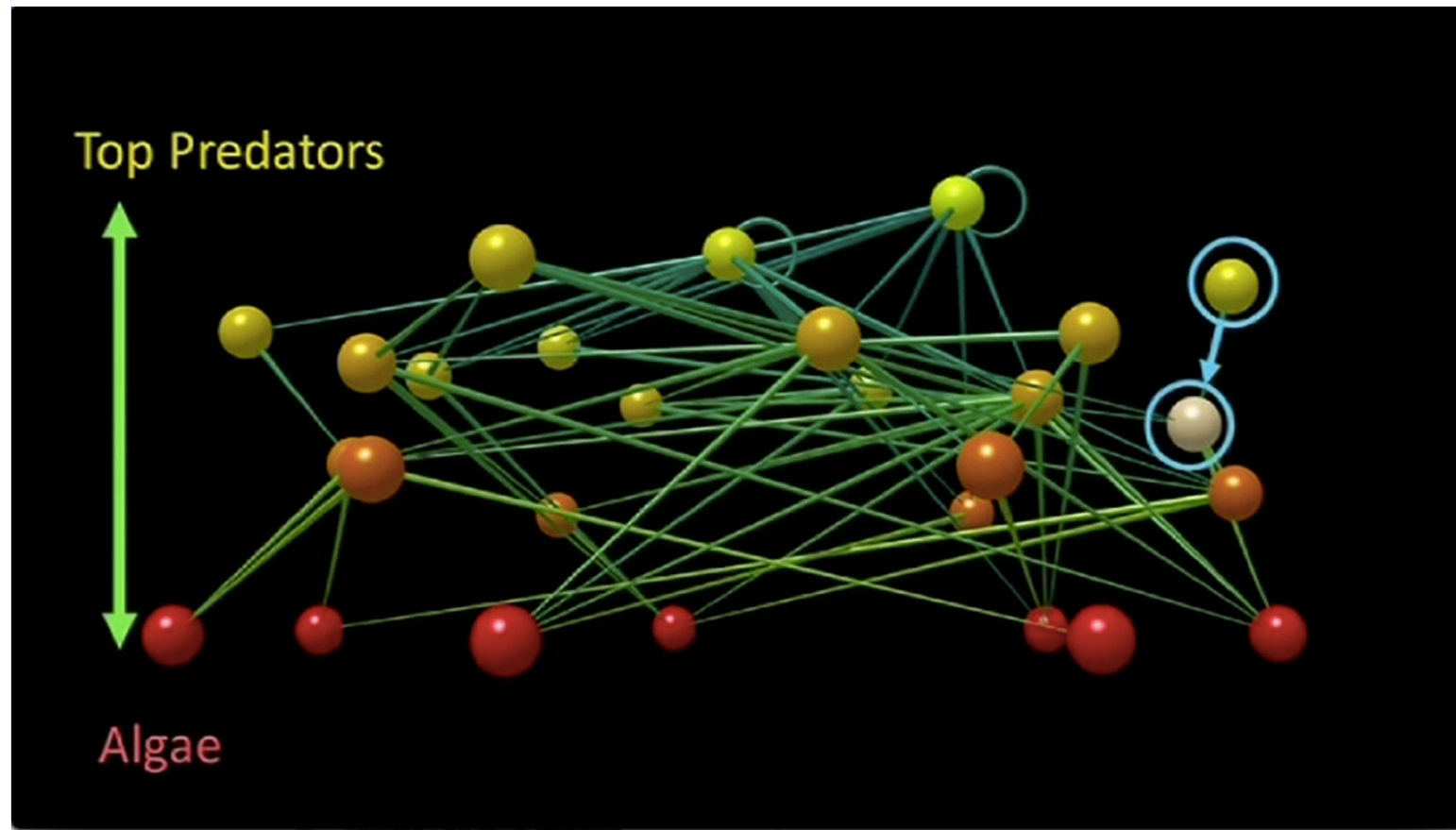




"One man cannot do right in one department of life whilst he is occupied in doing wrong in any other department. Life is one indivisible whole"

-Gandhi

Finding the Simple Answer within Complexity and the strength of Systems Thinking and Systems based Visualization Tools

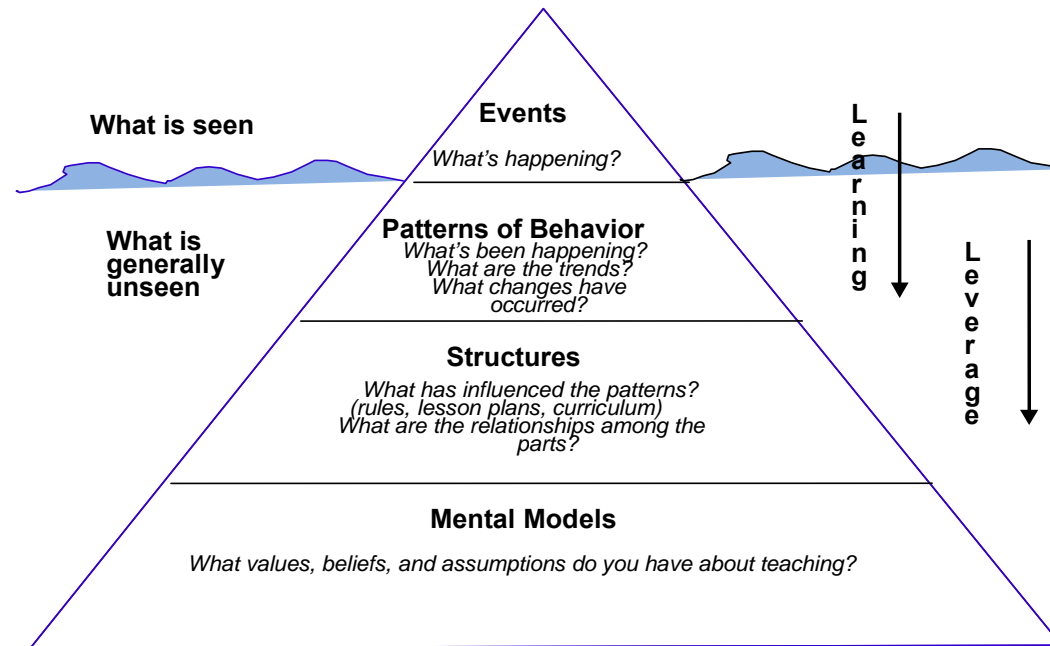


Eric Berlow: Simplifying Complexity

<https://www.youtube.com/watch?v=UB2iYzKeej8>

Systems Thinking helps us to . . .

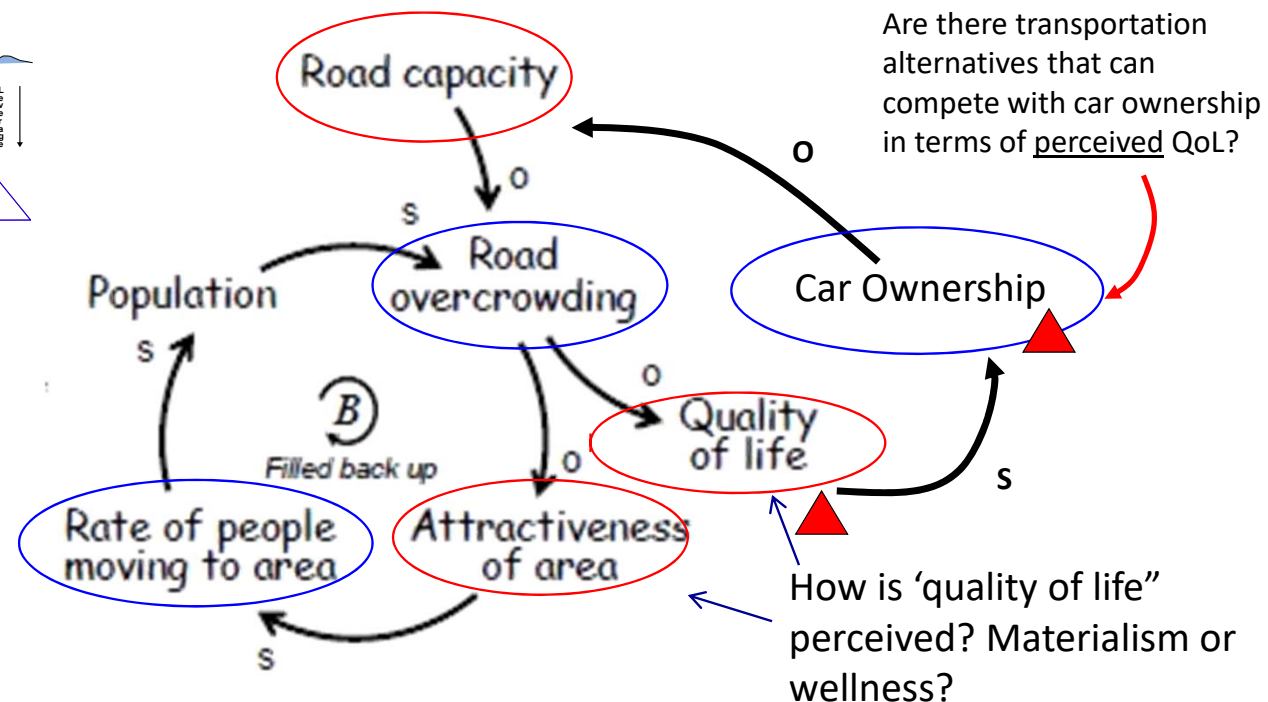
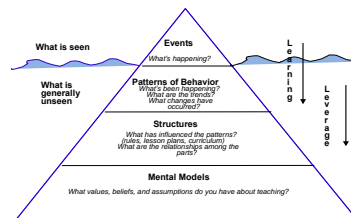
- . . . move the focus away from **events** and **patterns of behavior** (*which are symptoms of problems*) and toward **systemic structure** and the underlying **mental models**



Source: Senge, Peter, *The Fifth Discipline*, 1996.

Systems Thinking helps us to . . .

- . . . To find the most important places for intervention to change the long-term behaviour of a system.

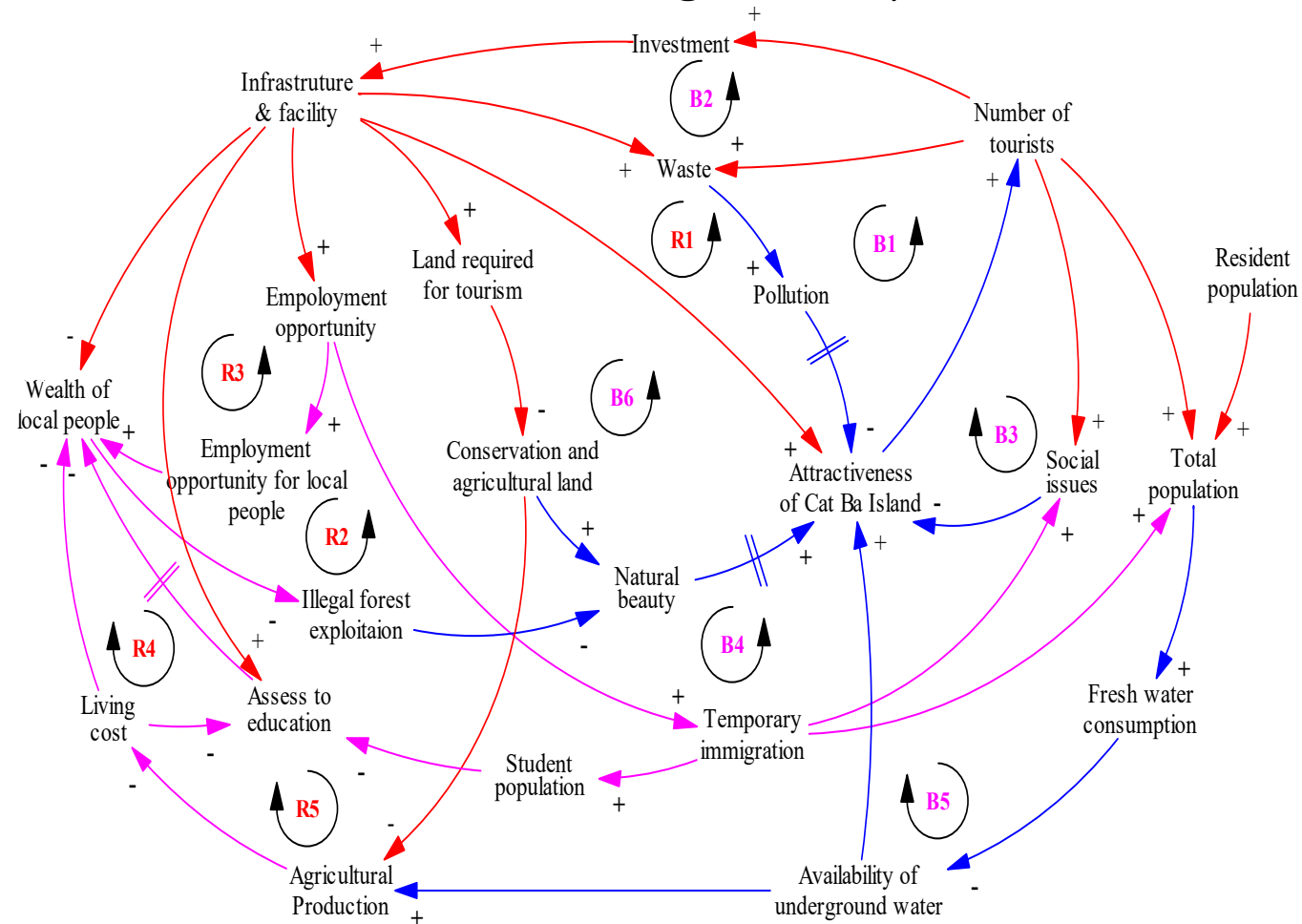


Source: Senge, Peter, The Fifth Discipline, 1996.

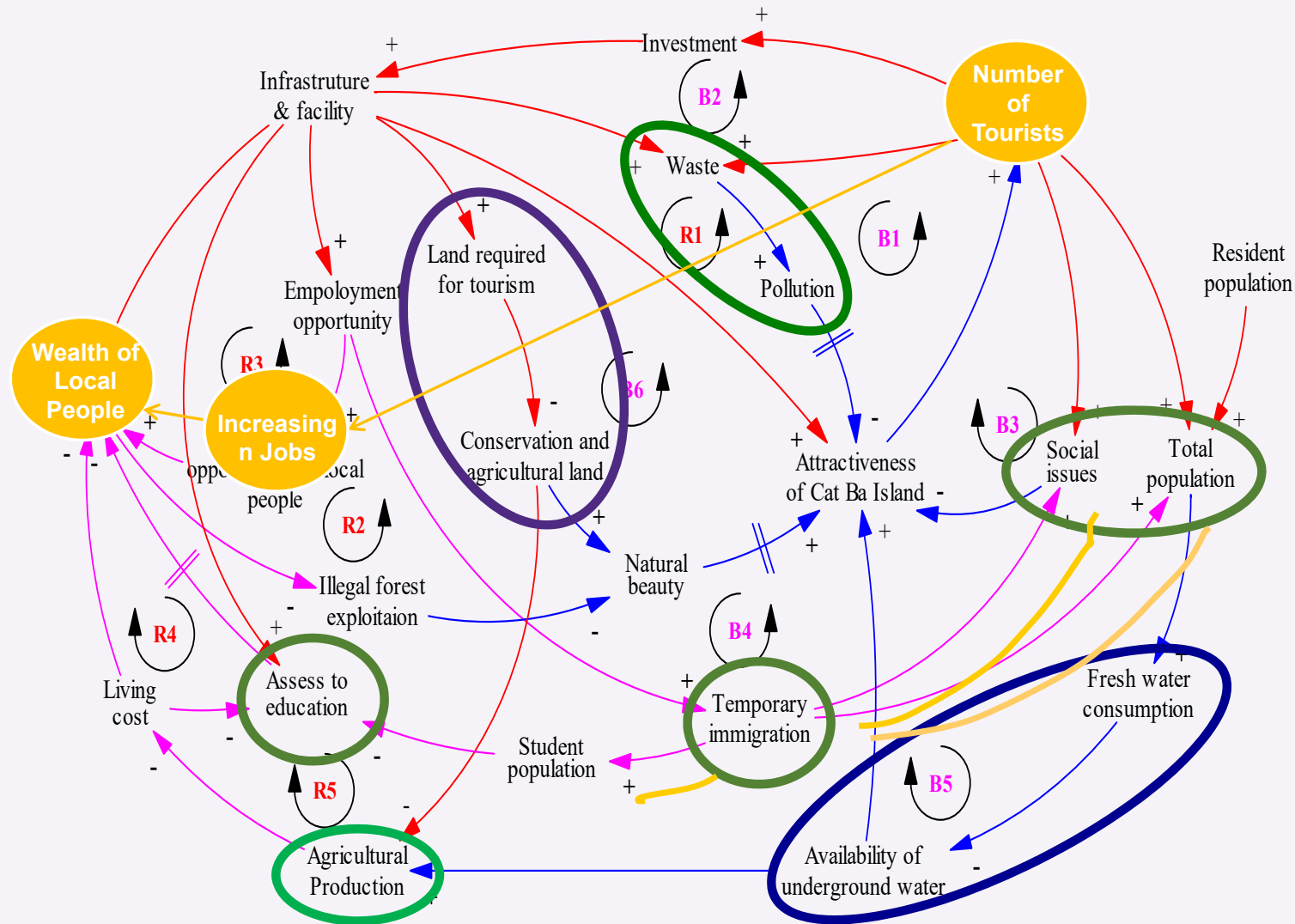
A systems approach is to . . .

1. **Identify a system** - After all, not all things are systems. Some systems are simple and predictable, while others are complex and dynamic. Most human social systems are the latter.
2. **Explain the behavior or properties of the whole system** - This focus on the whole is the process of synthesis. Analysis looks into things while synthesis looks out of things.
3. **Explain the behavior or properties** of the question to be explained in terms of the role(s) or function(s) of the whole.

Example: Promoting Sustainable livelihoods in Vietnam...
Where to act without creating future problems?



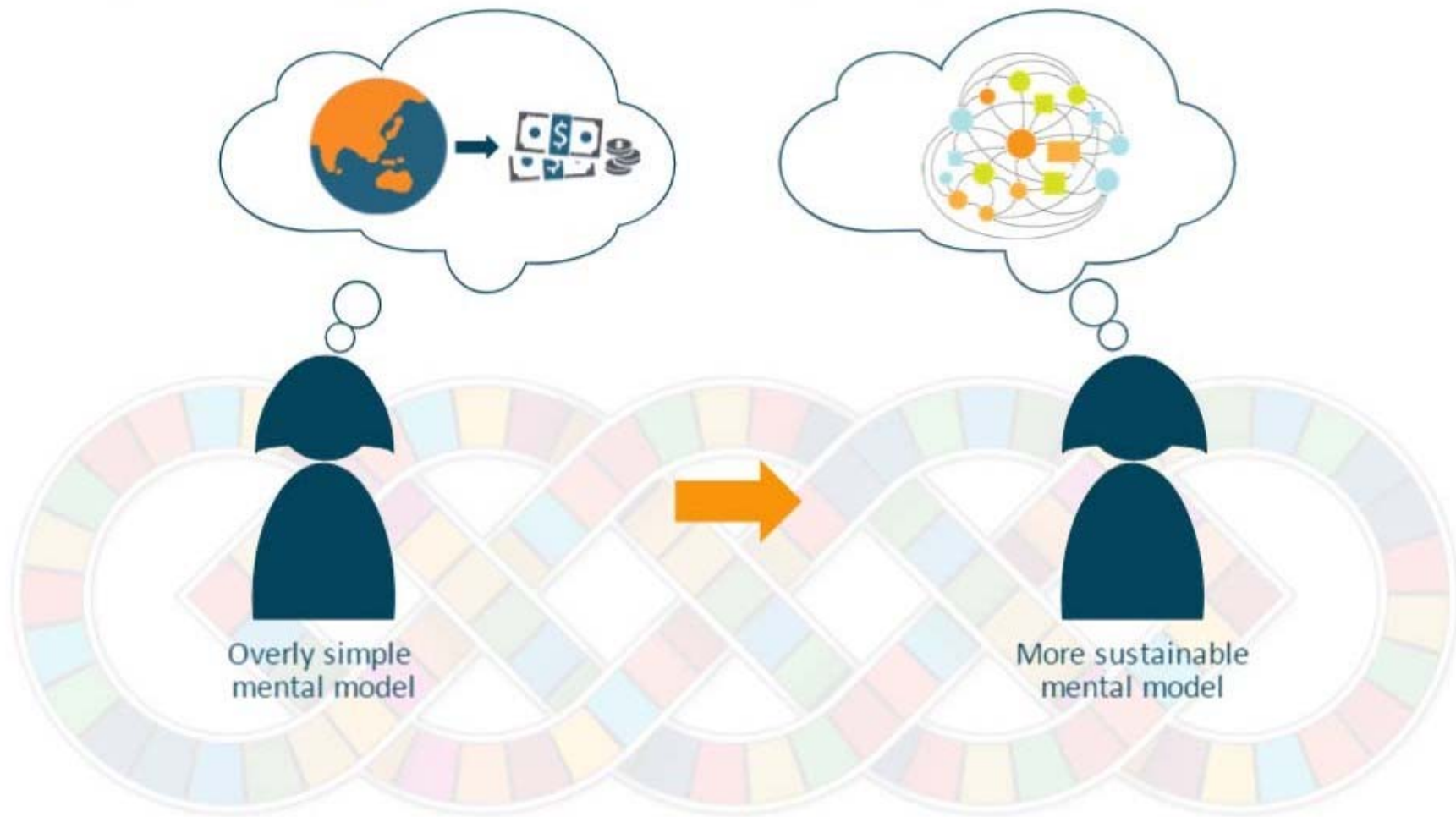
SYSTEMS are non-linear and dynamic

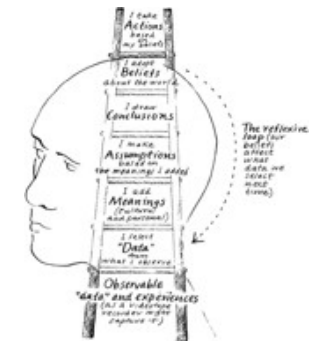
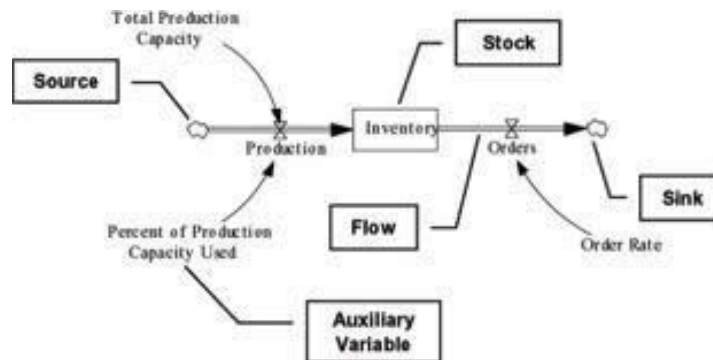
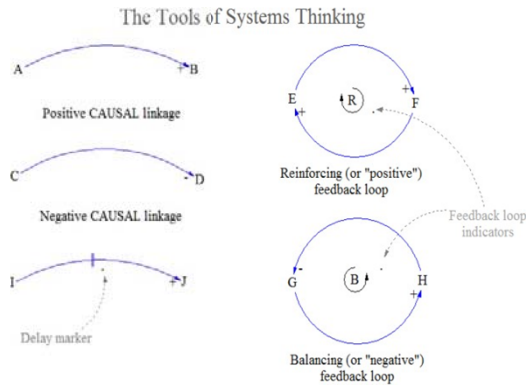


Source: Professor Ockie Bosch and Dr Nam Nguyen

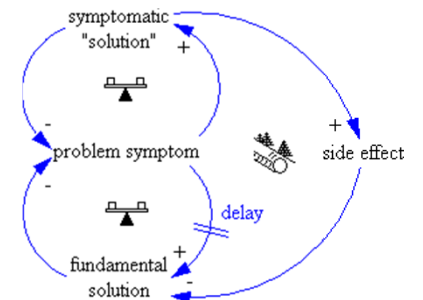
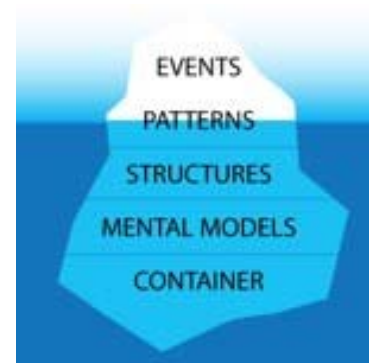
Systems Thinking in a Nut-Shell

Systems thinking is the practice of examining, and improving, our mental models



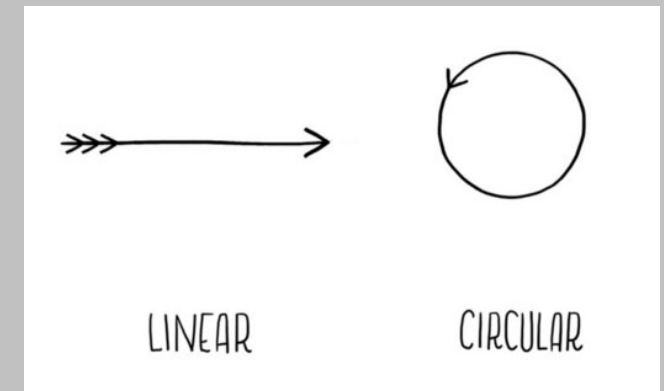


The Tools of Systems Thinking



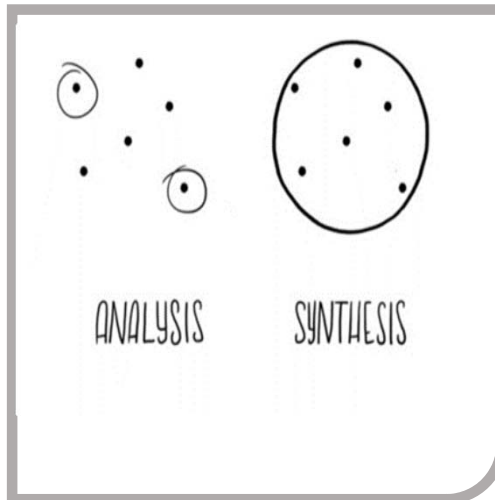
System Thinking

- System mindsets are needed for dealing with complex problem solving
- 4 fundamental concepts:
 - ❖ INTERCONNECTEDNESS
 - ❖ SYNTHESIS
 - ❖ FEEDBACK LOOPS
 - ❖ CASUALITY



Dqdq vlv

Iv#lerxw#lvhfwlrq#i#
frp sdh{lv}#qwr#
p dqdjhdedh#frp srqhqrw#
Dqdq vlv#lv#qwr#kh#
p hfkdqlfdq#lqg#
uhgxfwlrqlw#z ruqylhz #
z khuh#kh#z ruq#lv#
eurnhq#grz q#qwr#duw



V | qkhlv#

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lqwhufrqqhfwgqhvw

V | qkhlv

Iv#lerxw#qghuwdqg lqj #kh#
z krch#lqg#kh#duw#lv#kh#vdp h#
wlp h#lraqj #z lk#kh#hwlwlrqvklsv#
dqg#kh#frqqhfwlrqv#kdwlp dnh#
xs#kh#g | qdp lfv#i#kh#z krch#



CAUSALITY

To understand the feedback loops we need to gain perspective of causality: how one thing results in another thing in a dynamic and constantly evolving system.

The cause and effect concept in system thinking is about being able to understand the way things influence each other in a system (on agency, feedback loops, connections, and relationships)

The Tools of Systems Thinking



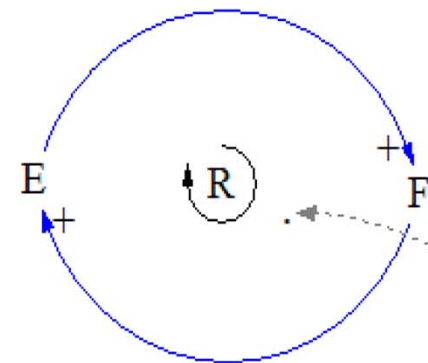
Positive CAUSAL linkage



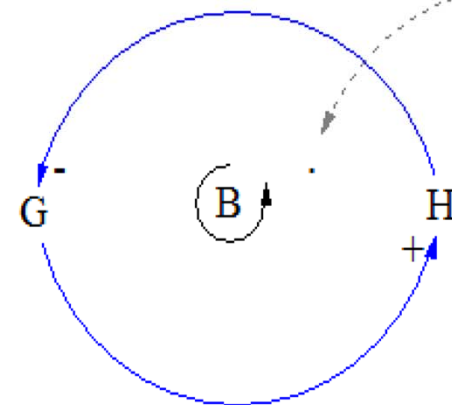
Negative CAUSAL linkage



Delay marker



Reinforcing (or "positive")
feedback loop



Balancing (or "negative")
feedback loop

Feedback loop
indicators

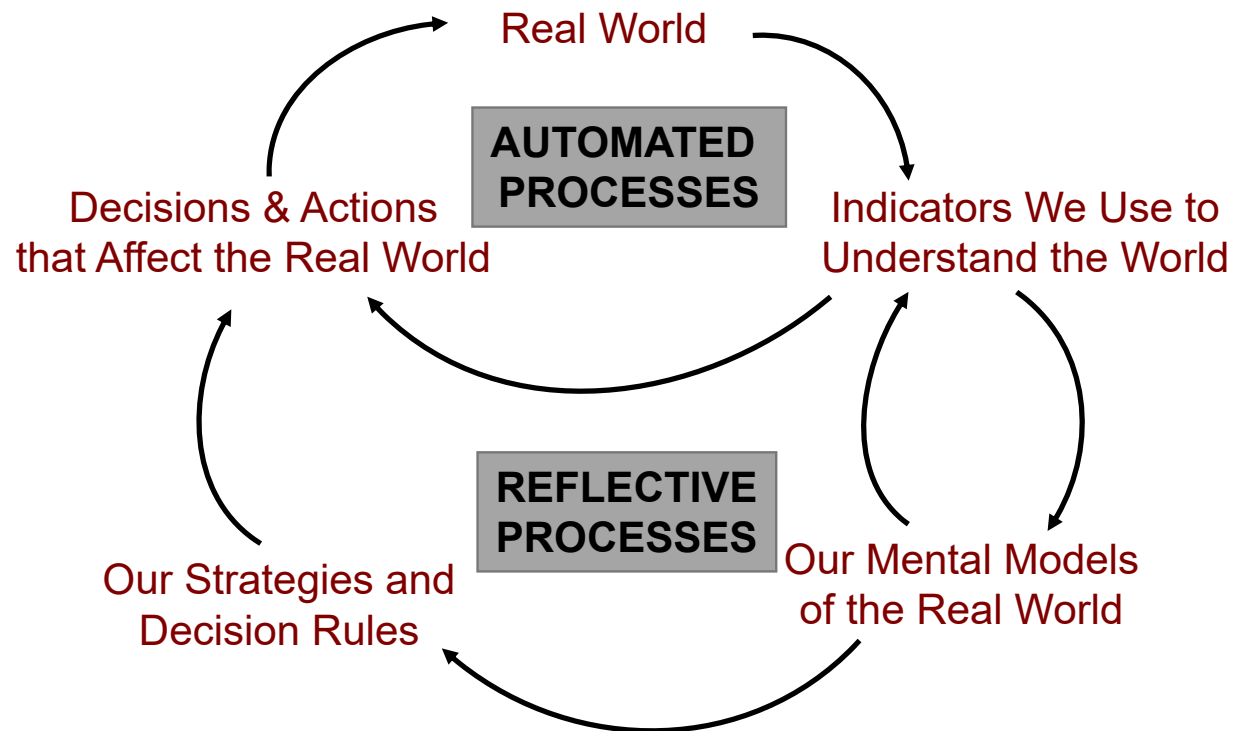
System mapping

Systems mapping is one of the key tools of the systems thinker.



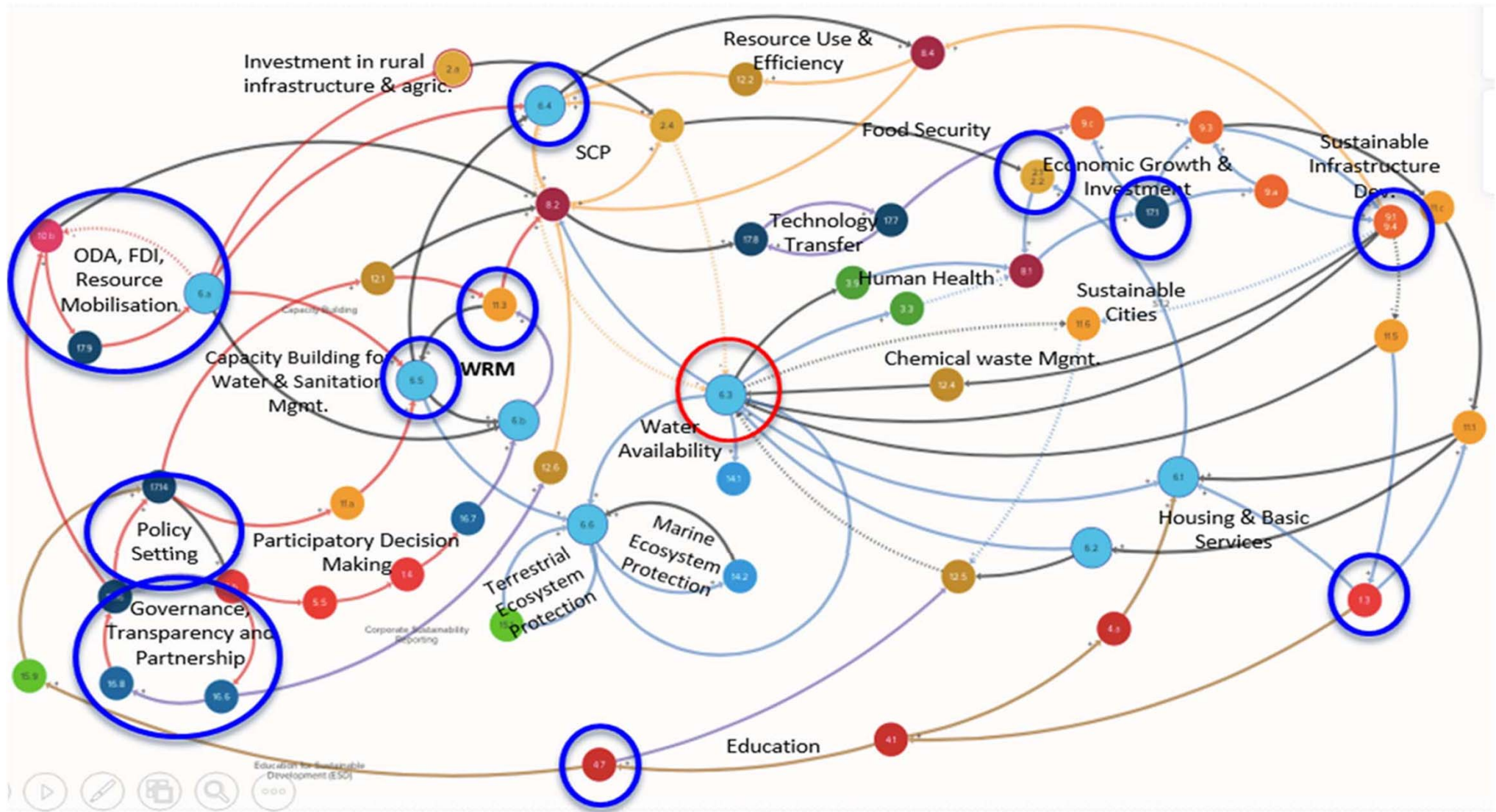
System maps are essentially “models.”

Indicators feed into our mental models ... of all the systems in which we live in, thus influencing our mental models and decisions and strategies



... so it is best to make these mental models explicit.

Developing Causal Loop Diagram focused on SDG 6 targets



System mapping



System Dynamics	Strategic Intervention
System is stagnant or stalled	<ul style="list-style-type: none">• Look for constraints
Vicious cycles	<ul style="list-style-type: none">• Identify “brakes”• Examine intervention points to return process to virtuous cycle
Reinforce virtuous feedback cycles	
Find the strongest feedback structure operating then review the implications and generic leverage points.	
Examine each link and consider the consequences of strengthening it or weakening it	



Policy Gap



Governance Gap



Information Gap



Valuation Gap



Time Gap

Reduce inertia in the policy-making cycle – rectify the lack of understanding of integrated approaches and tools (e.g. stakeholder engagement, integrated monitoring, etc.)

Strengthen institutional capacity for stakeholder engagement, set policy targets that acknowledge environmental limits, and establish social flows

Strengthen stakeholder involvement, transdisciplinary approaches, and science-policy interface

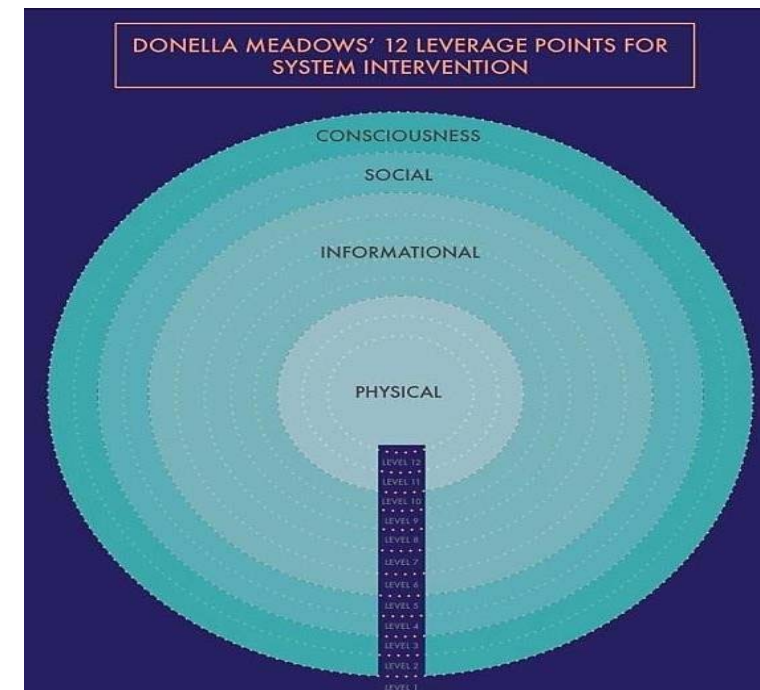
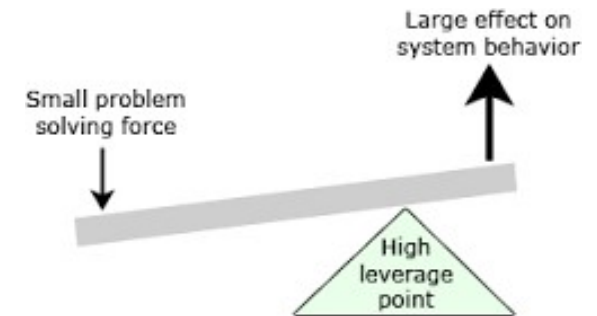
Internalize social and environmental values in decision-making - market interventions, financial and other incentives

Lengthen stakeholder time horizons through policy and financing interventions

Addressing Trade-offs through Systems Thinking

Leverage Points

Meadows (2009) stressed that often the best results come not from large-scale efforts but from small well-focused actions. Thus, there can be “low impact” leverage points and “high impact” leverage points. High impact leverage points resolve underlying causes of undesired system behavior.



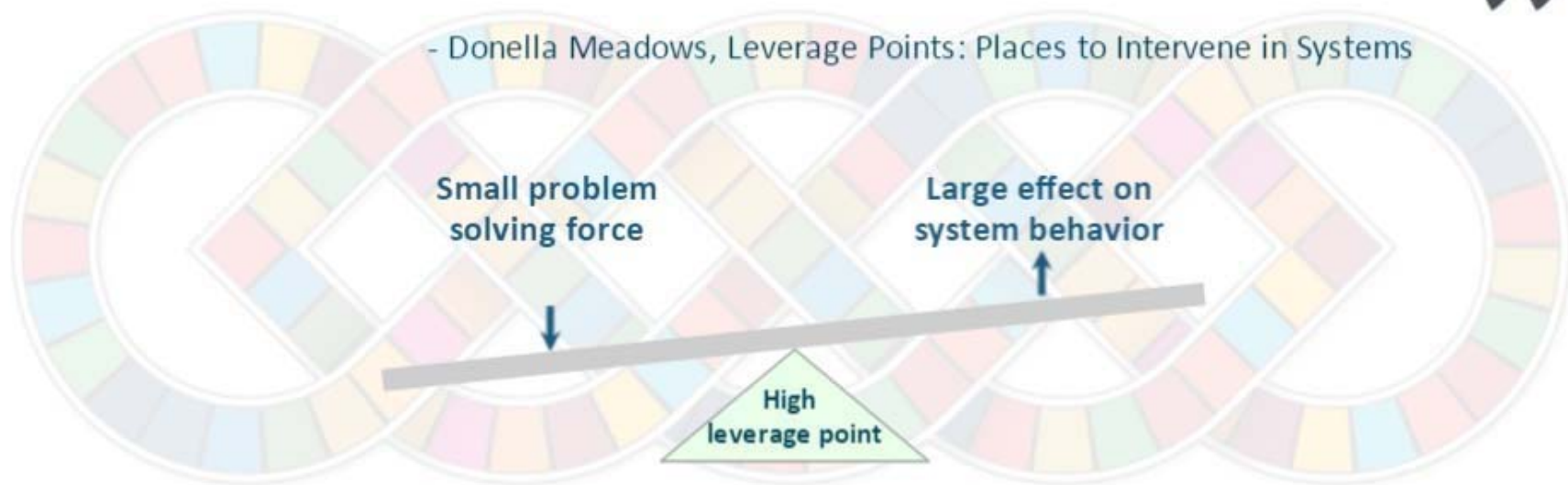
Leverage Points

“

Leverage points are “places to intervene in a complex system...” – be it a company, an economy, a living body, a city, an ecosystem, or even a galaxy for that matter – “...where a small shift in one thing can produce big changes in everything.” They are, therefore, of immense interest to anyone seeking to affect change within our interconnected ecological, social and economic systems.

”

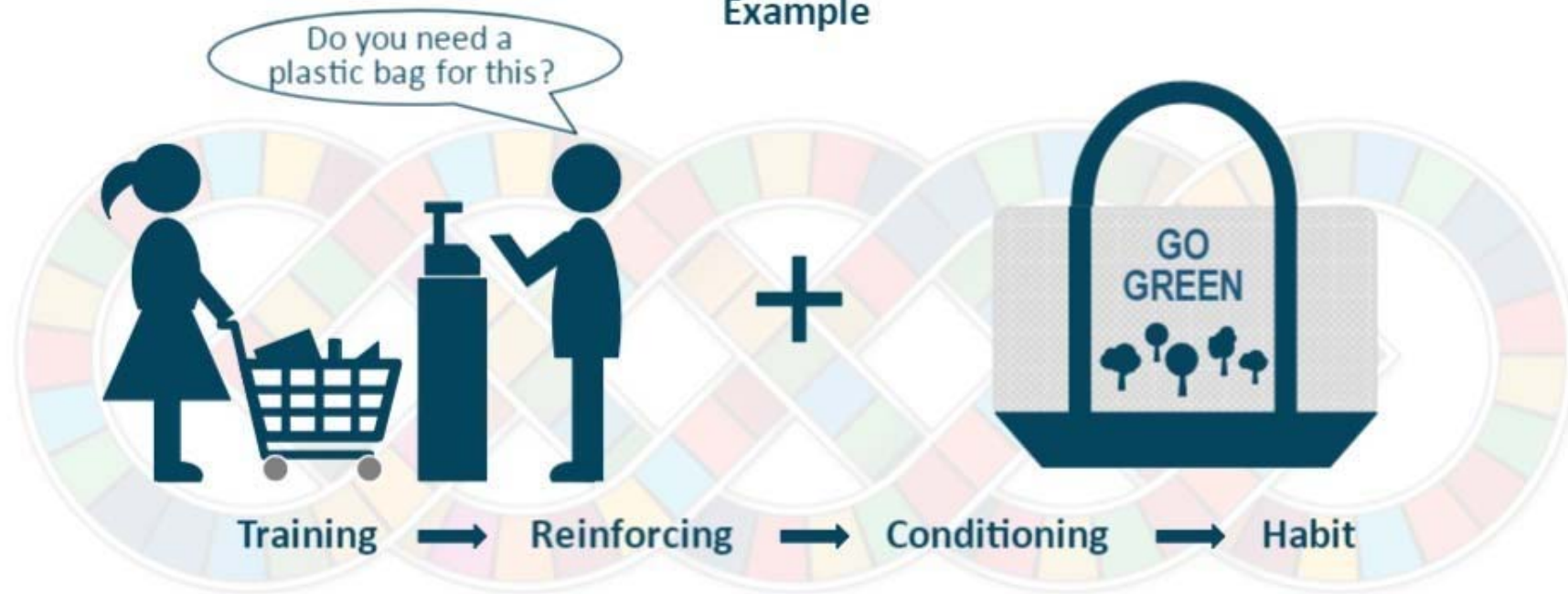
- Donella Meadows, Leverage Points: Places to Intervene in Systems



Leverage Points

1. A leverage point is a place in the system's structure when an intervention can be applied.
2. A **low leverage point** is one where a small level of intervention or change force results in a small change in the behavior of the system. This change is often short-lived and not sustainable.
3. In contrast a **high leverage point** is one where a small level of intervention/ change force, causes a large change in the system's behavior. In contrast, high leverage points resolve the root or underlying causes of the undesired system behaviour.

Example



Achieve
gender
equality and
empower all
women and
girls

5

GENDER
EQUALITY



How does gender
interact with and
impact the other
Sustainable
Development Goals,
and vice-versa ?



Employing Gender-Sensitive Language



- We should talk about gender issues.

AND

- We should be mindful about ***how we talk about gender issues.***
- But **HOW** do we become mindful?



1.Roles & Responsibilities:

“ The differential impacts (of environmental degradation and climate change) are more likely to make life harder for women as they carry the responsibility to ensure food security for their families”

“The differential impacts are more likely to make life harder for women, because of the expectation that they are to manage their family's food security”



Exercise:

“Women are not well-resourced to innovate. Gender disparities in the availability and access to extension services are a significant constraint for women: the availability of services does not consider women’s time, mobility and childcare constraints”



Suggested rephrasing:

“Women face institutional constraints while accessing agricultural services. Gender disparities in the availability and access to extension services are a significant constraint for women. The availability of services does not consider women’s time, mobility and childcare constraints”



Portrayal of Women

Avoid universal portrayals of women as:

- Weak
- Soft
- Illiterate
- Uneducated.....

Instead of:

“ Women face literacy issues ”

[or]

“ Women are known to be illiterate ”

Say:

“ Women in XYZ region have been reported to have XX per cent literacy rates ” (Insert citation)





SDG 17

Mobilizing sufficient resources will be critical for meeting the gender equality commitments of the 2030 Agenda.



SDG 16

Women play a vital role in preventing conflict and forging and maintaining peace. By fully protecting women's rights, peaceful and inclusive societies will be within reach.



SDG 15

Women's specific knowledge of and dependence on forests makes them key contributors to forest conservation and regeneration.



SDG 14

Empowering women in local fisheries decision-making leads to better resource governance and conservation.



SDG 13

Gender equality is critical to mitigate climate impacts: Women's inclusion in climate discussions leads to improved outcomes of climate-related projects and policies.



SDG 12

Unsustainable production and consumption patterns are gendered, with women suffering disproportionately from resource scarcity and natural disasters resulting from climate change.



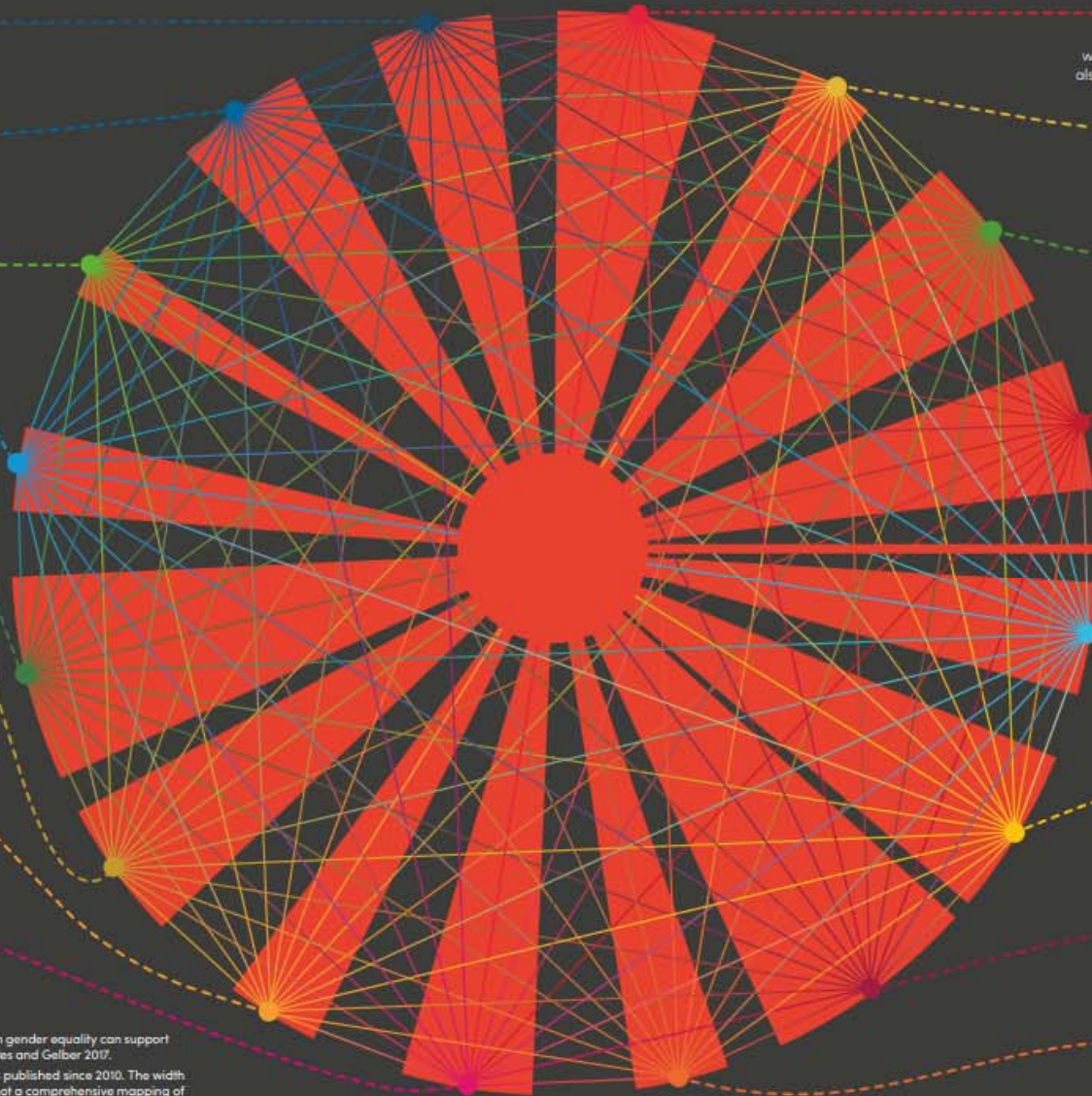
SDG 11

Women have equal rights to the city, and their safety in public spaces is crucial for sustainable urbanization.



SDG 10

Gender equality is crucially linked with overall equality in society.



SDG 1

Research shows that more cash in the hands of women contributes not only to eliminating poverty but also to better education, nutrition and health outcomes for children and other members of the household.



SDG 2

Women play a critical role in food production, processing and distribution and are therefore essential to meeting the agricultural productivity and nutrition targets of Goal 2.



SDG 3

Gender equality in health is one of the most direct and potent ways to reduce health inequities overall and to achieve Goal 3.



SDG 4

Achieving equality in education will boost women's employment and empowerment, add to economic growth and contribute positively to child well-being and development.



SDG 5

Gender equality is central to the SDGs, and if it is not achieved, the implementation of all the goals will be compromised.



SDG 6

Women and girls play a central role in the provision, management and safeguarding of household water and sanitation. Addressing the water and sanitation needs of women benefits the health and well-being of entire communities.



SDG 7

As primary energy managers in households, women can play a powerful role in the successful transition to sustainable energy for all.



SDG 8

Women's access to decent work is an essential measure of inclusive and sustainable growth.



SDG 9

Increasing women's participation in technology, science and innovation is critical for meeting the global challenges ahead.



Source: The infographic is based on a review of existing knowledge on how progress on gender equality can support delivery of the transformative vision of the 2030 Agenda, compiled and distilled by Beales and Gelber 2017.
Notes: The infographic draws from over 600 English language publications and articles published since 2010. The width of the SDG 5 rays in the graphic correspond to the number of articles reviewed. While not a comprehensive mapping of all potential gender-relevant interactions, it aims to represent a starting point for further work towards a more complete understanding of the catalytic role gender equality plays in accelerating progress across the SDGs. Findings and summaries for each article, study and report reviewed are available upon request.

Interlinkages between addressing unpaid care and domestic work and the achievement of other Goals



Interlinkages between ending violence against women and girls and the achievement of other Goals



Interlinkages between empowering women to build climate resilience and reduce disaster risks and the achievement of other Goals



