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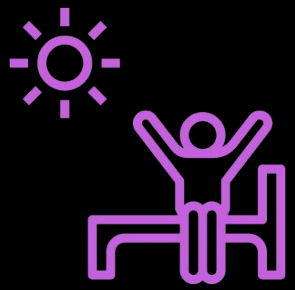
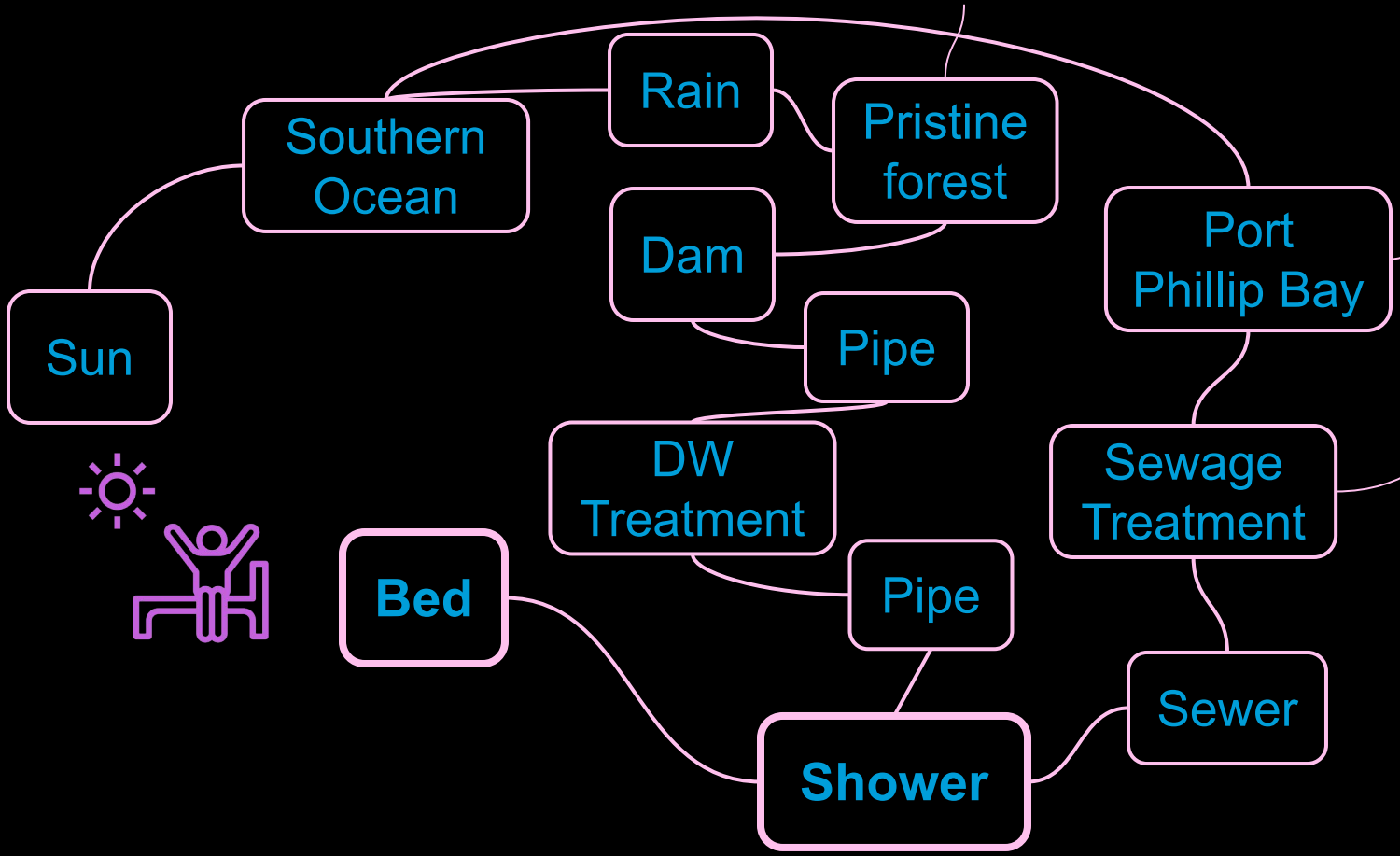
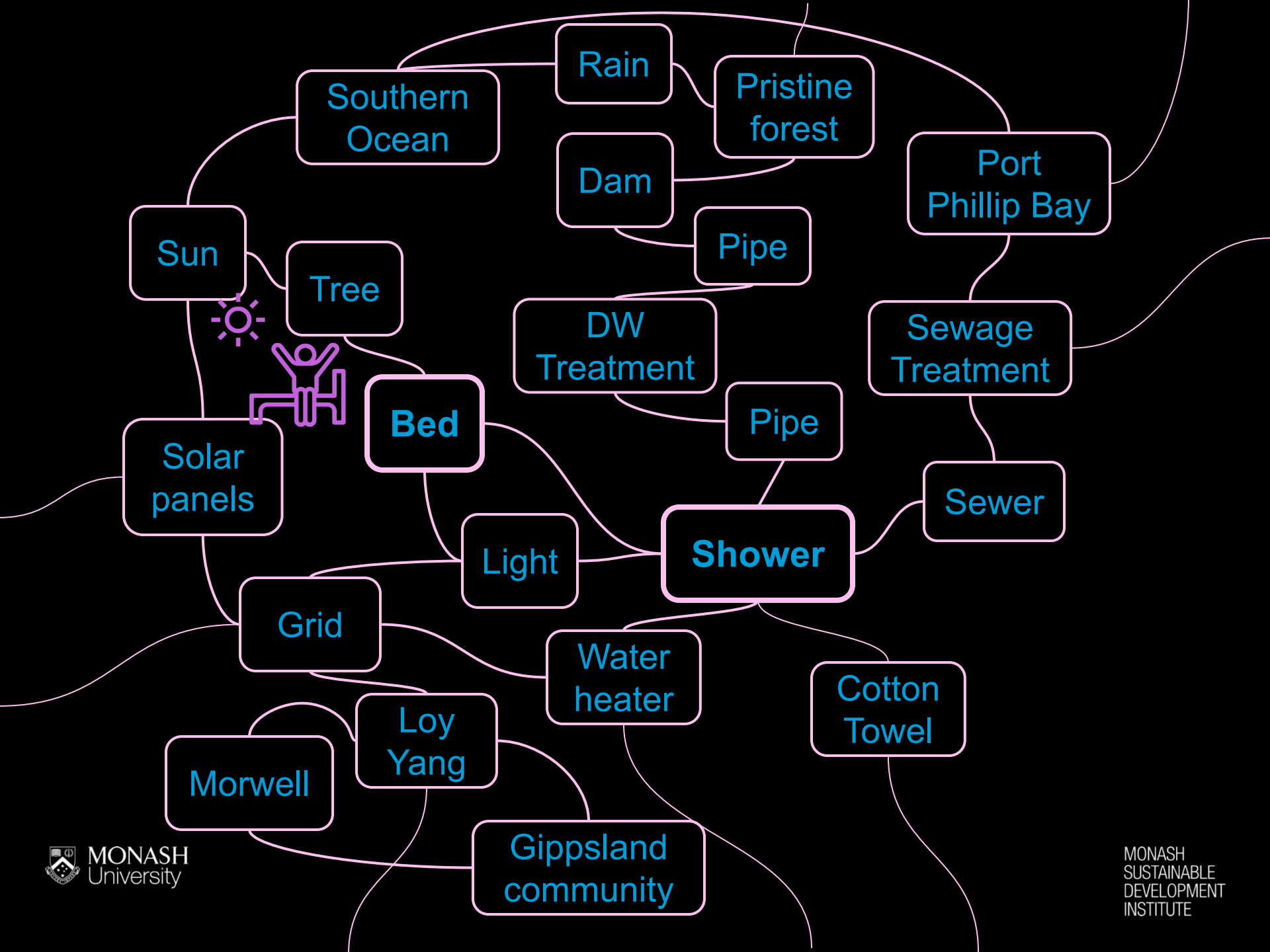


Bed

Shower

Know it or not, you’re part of complex systems.


Rain
Southern Ocean
Pristine forest
Dam
Port Phillip Bay
Sun
Pipe
DW Treatment
Sewage Treatment
Bed
Pipe
Sewer
Shower



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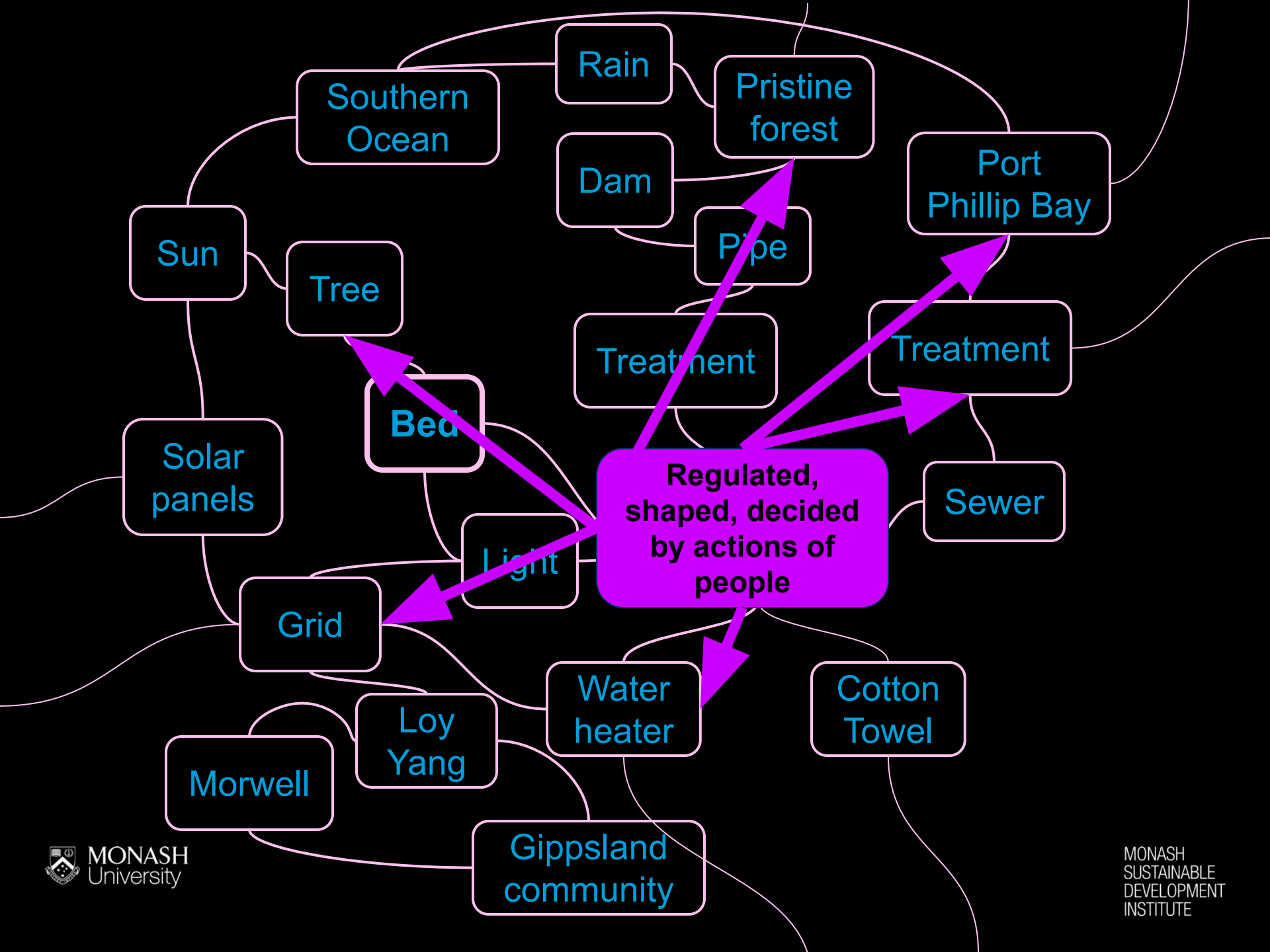
Complex systems are alive, messy, ever-changing, and you'll never know everything about them.

Diagramming creates a partial, simplified, visual and shareable representation of the system.


Rain
Southern Ocean
Pristine forest
Dam
Port Phillip Bay
Sun
Pipe
Tree
Treatment
Treatment
Bed
Solar panels
Regulated, shaped, decided by actions of people
Sewer
Light
Grid
Water heater
Cotton Towel
Loy Yang
Morwell
Gippsland community
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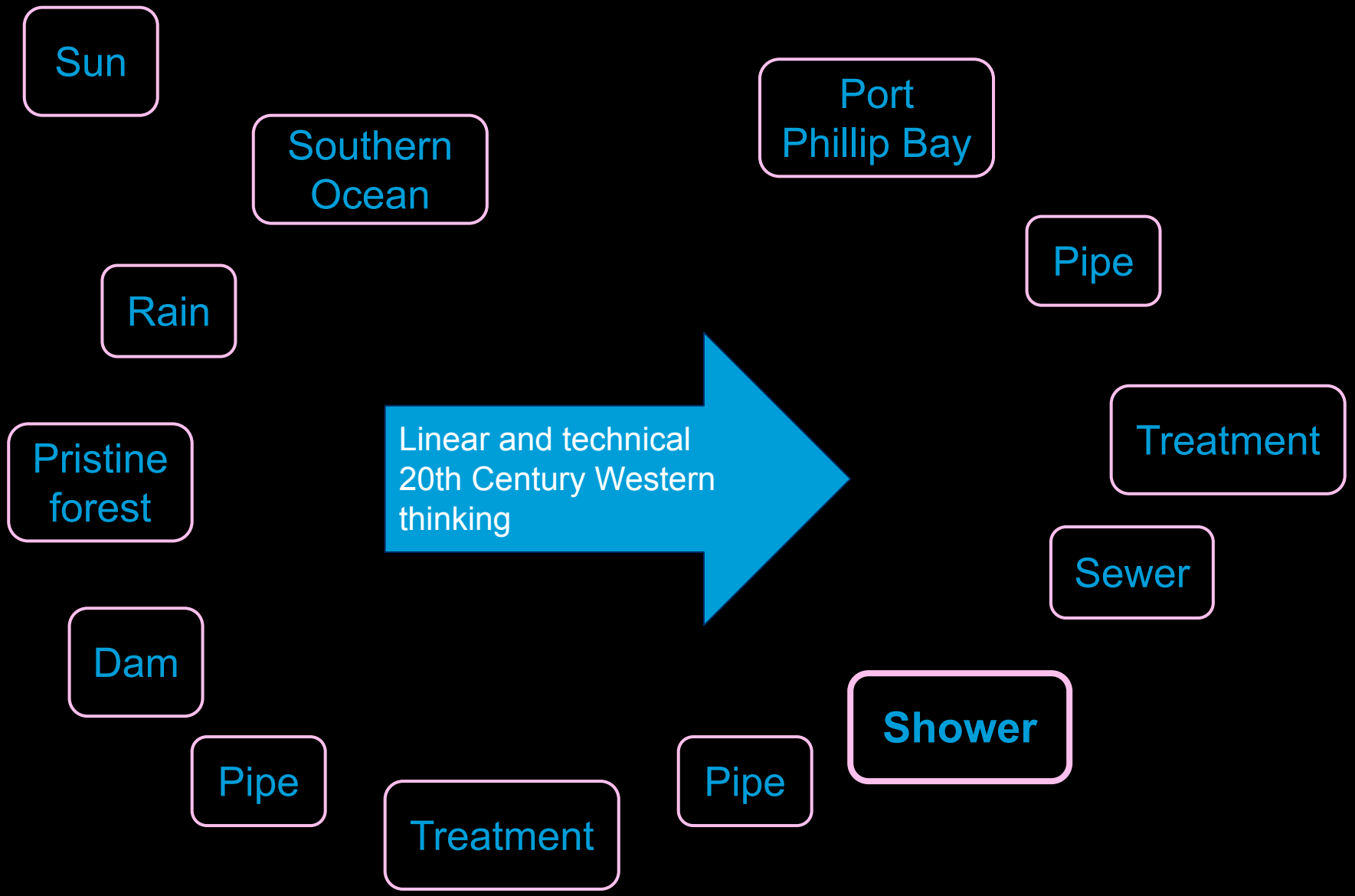
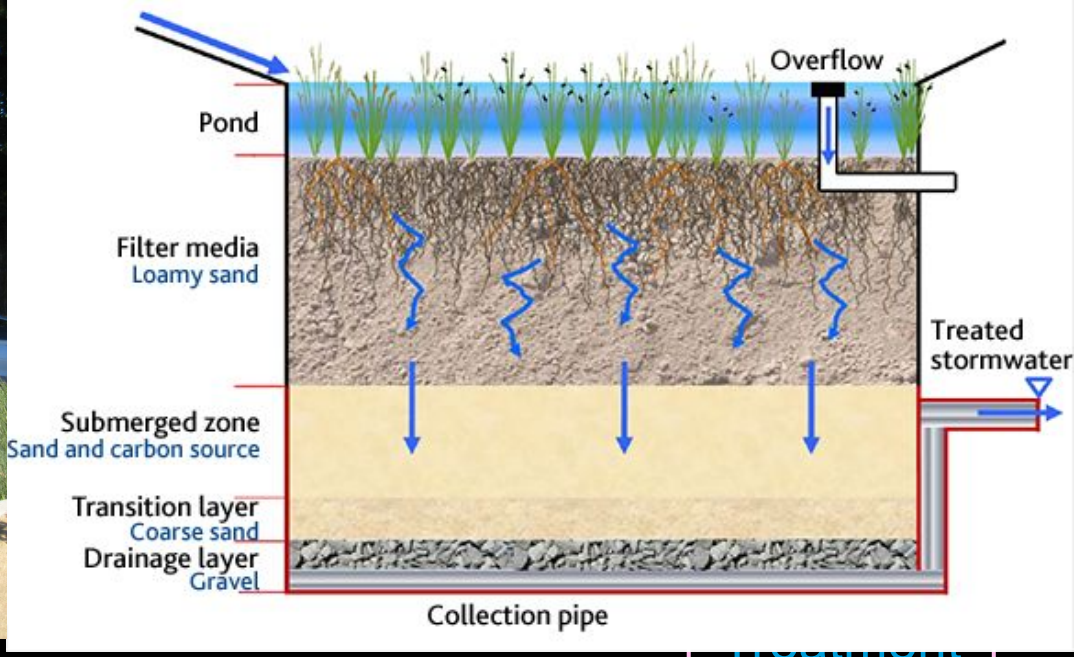
People's thinking (mental models) and actions influence parts of these complex systems.

Innovation can help to change some of the undesirable qualities of systems, to better ones.


Sun
Southern Ocean
Port Phillip Bay
Pipe
Rain
Treatment
Pristine forest
Linear and technical 20th Century Western thinking
Sewer
Dam
Shower
Pipe
Pipe
Treatment

People's thinking (mental models) and actions can change.

Innovation can re-shape parts of systems, and eventually, transform whole systems, for the better.



Pristine forest

Sewer

Dam

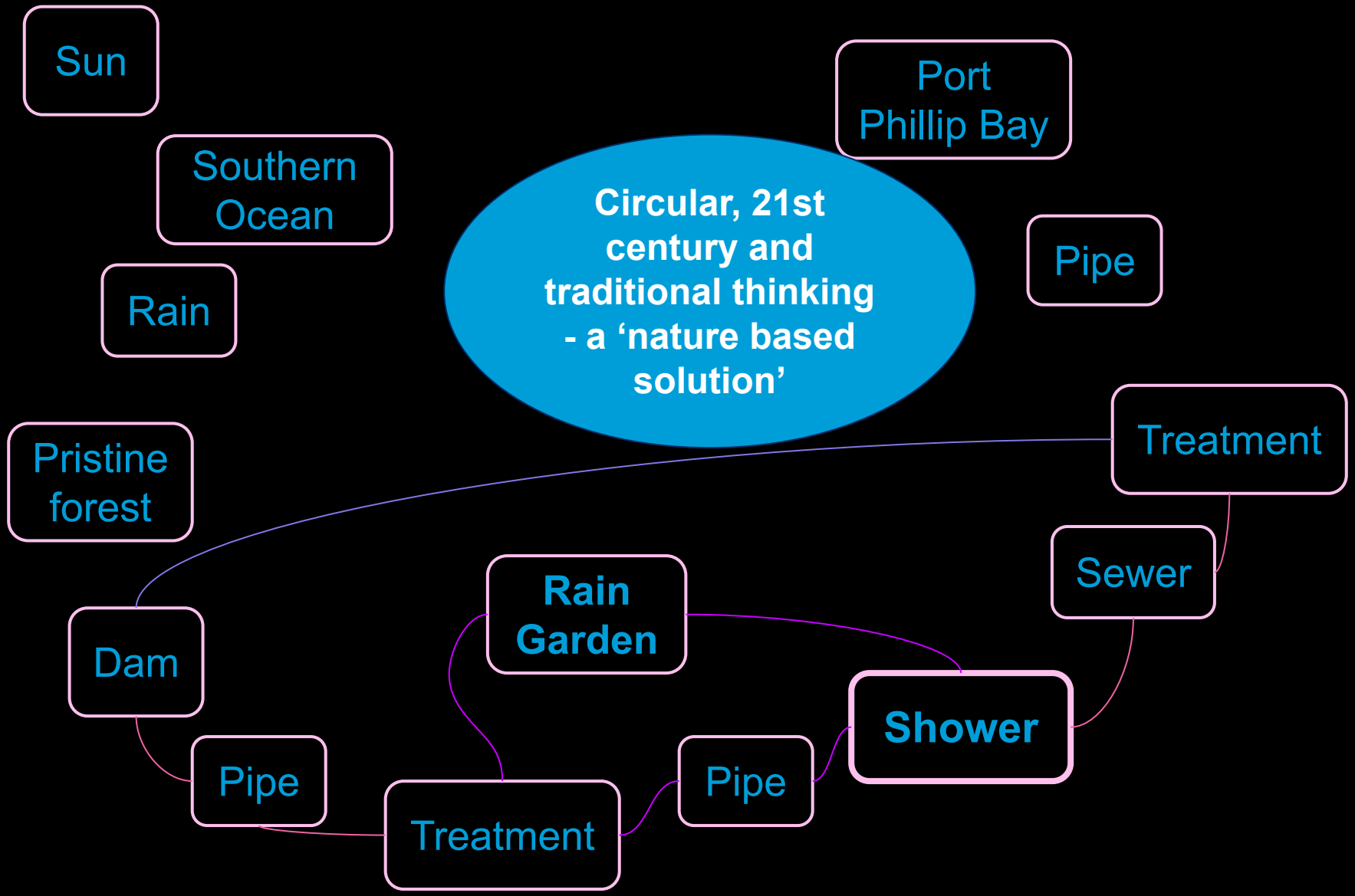
Rain Garden

Shower

Pipe

Pipe

Treatment



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Not all innovations are technical.

They can be social, cultural and more.

Innovation in systems is driven by questions - these also underpin ‘systems thinking.’

Diagramming is a great tool to help you think in systems.

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THINKING IN SYSTEMS

David Robertson
Monash Sustainable Development Institute

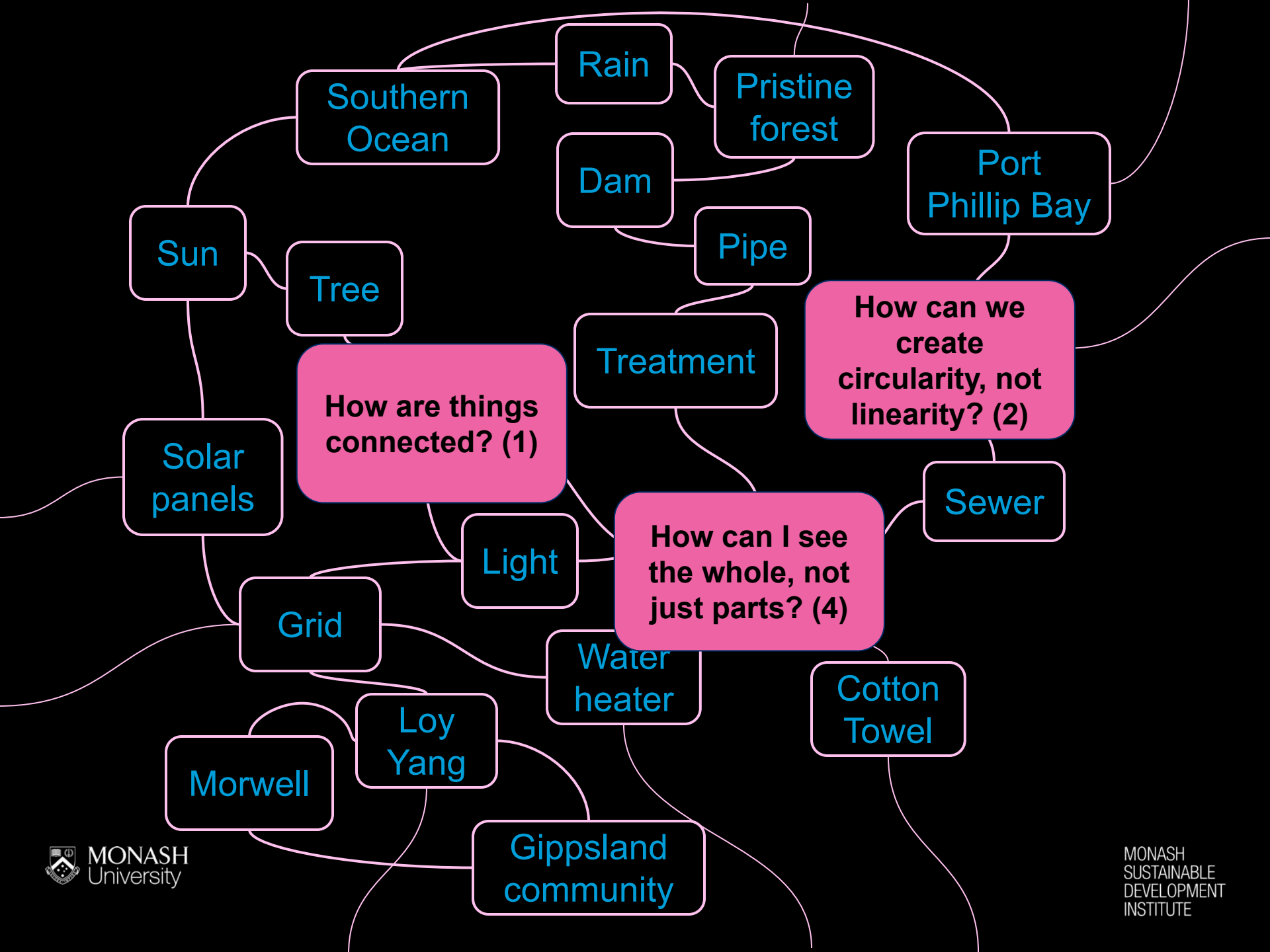
2023

Twitter: **@MonashMSDI**

What’s a system?

This presentation is informed by my own experience, practice, colleagues and past readings.

Key questions in the pink bubbles are inspired by Lynch, Andersson and Johansson (2021), who identified links between systems thinking and entrepreneurship.



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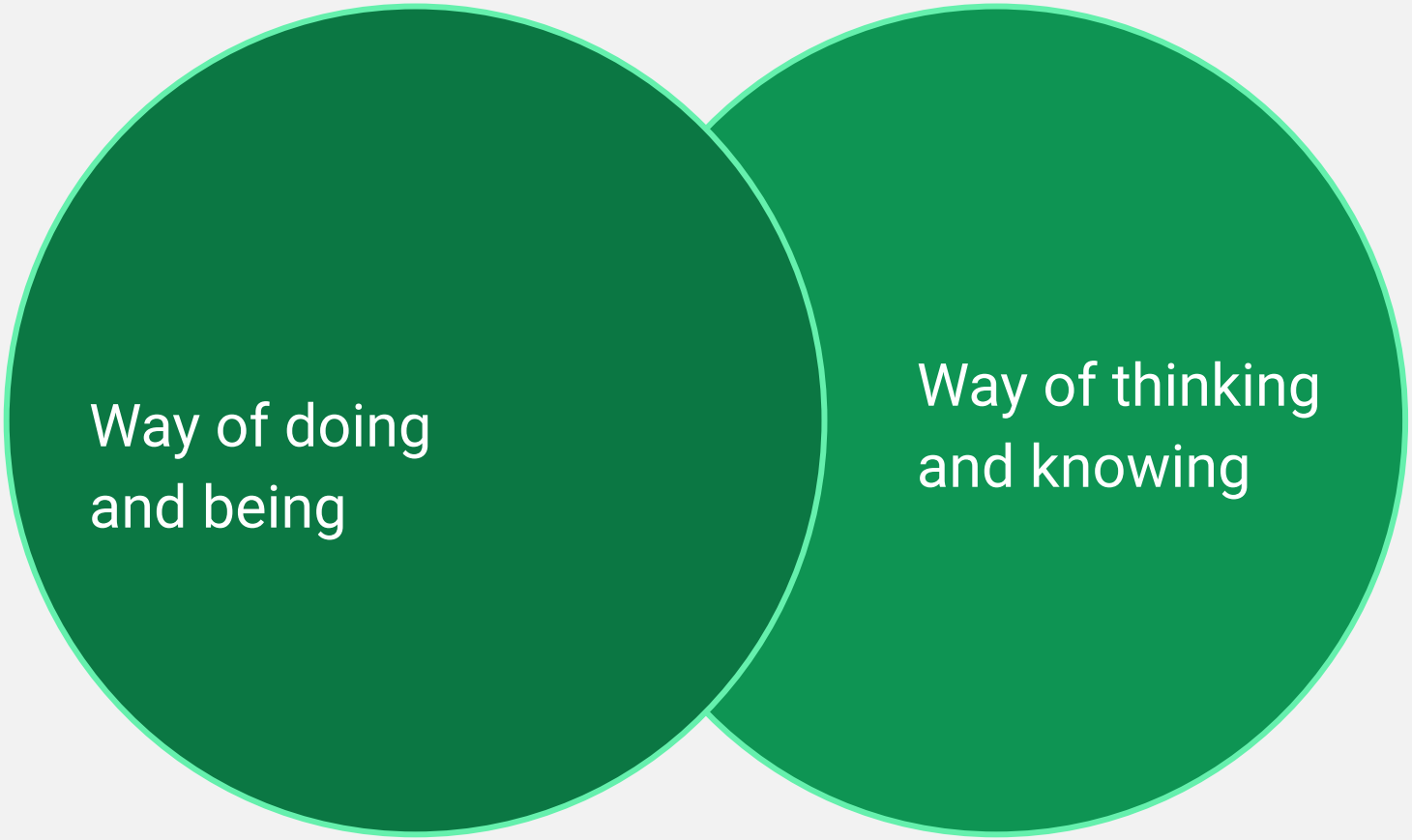
You live in a world of (flawed) complex systems

Complex systems are *hard* to think about and change

Diagramming, individually and socially, helps you think about systems so you can innovate

Your actions **can change** complex systems


Way of doing
and being
Way of thinking
and knowing

Step 1: Embrace Humility

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Lessons from the Millenium Drought

- Western expertise is not always right
- The past is not always a reliable guide
- Technical solutions are not always resilient

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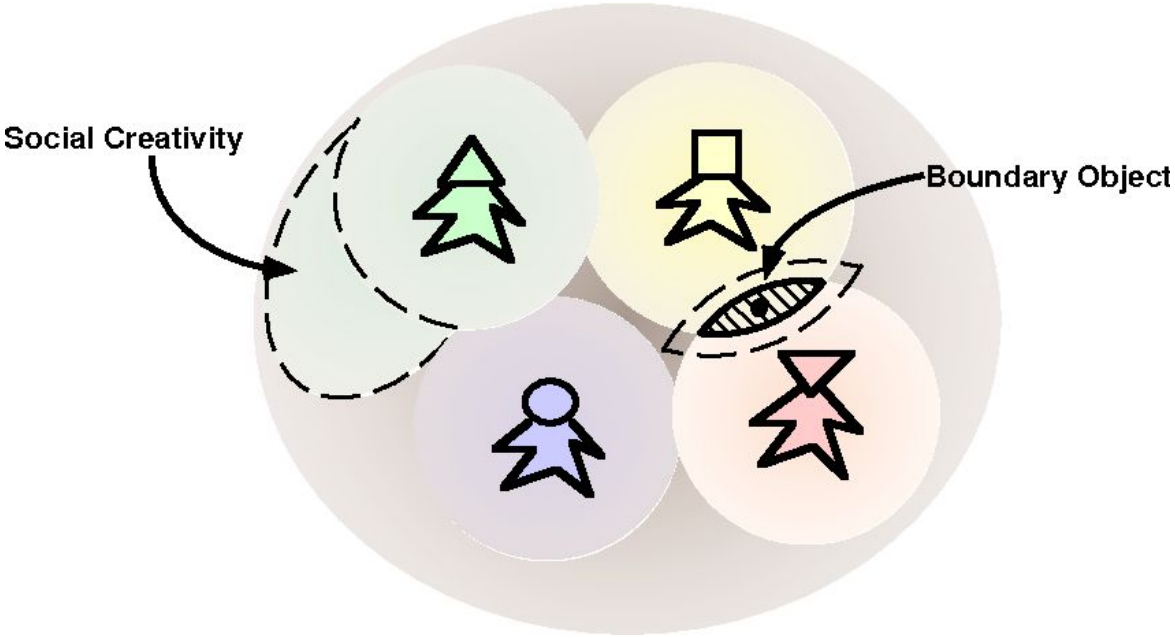

Fischer (2001)

How can we work together, outside silos, so new innovations emerge? (3)

When people holding different knowledges work together in shared 'grey areas', knowing that **none hold authoritative knowledge**, new methods and innovations can emerge.

Step 2: Love Problems

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Water, food, energy, health, mobility, equality - perpetual problems…

Meeting essential needs, securely and sustainably, for all, will *always* be a problem to manage.

If you learn to love these ‘challenges’, you will have a career for life.

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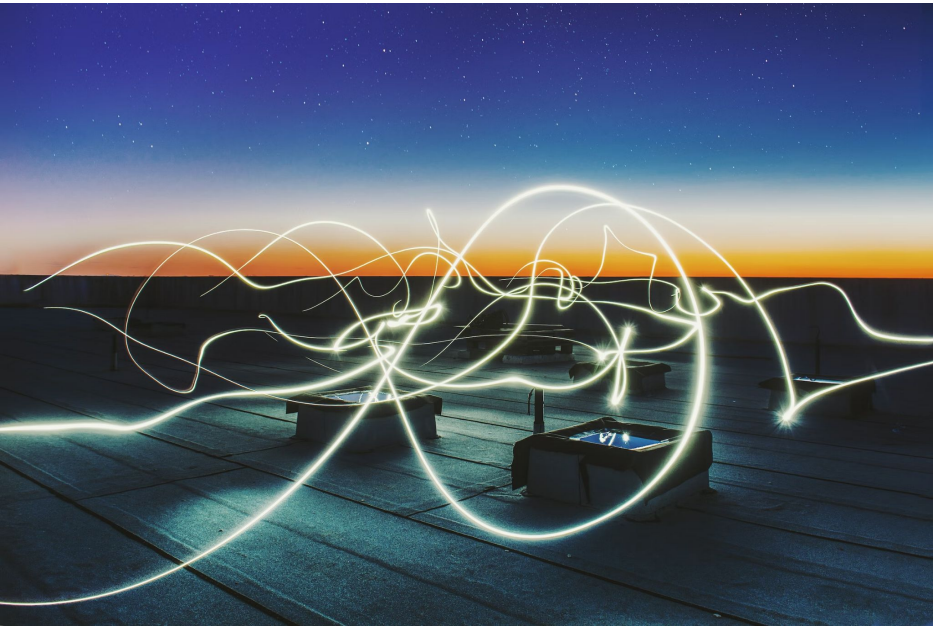
Solve vs Manage



‘Wicked’ or ‘complex’ problems will never be ‘solved’ by one idea - and many ideas will fail.

Nobody can ‘solve’ the problem of how best to raise a child, but many good practices can manage parenting with great outcomes!

When you learn to love problems - be intrigued by them, interested in how they work, passionate to address them, curious about what’s possible - you open up opportunities for positive and informed action.

Step 3: Ask Questions

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SEEKS TO UNDERSTAND
THE BIG PICTURE

A Systems Thinker focuses on the forest as well as the details of any one tree.

Questions to Ask

How can I maintain balance between the big picture and important details?

What time frame should be considered as I view the system?

Am I keeping my focus on areas of influence, rather than on areas of concern that I cannot influence?

MAKES ***MEANINGFUL CONNECTIONS***
WITHIN AND BETWEEN SYSTEMS

A Systems Thinker sees how concepts, facts, and ideas link together, which can lead to new learning, discoveries, and innovations.

Questions to Ask

What are the relationships among the parts of the system and how do they affect the behavior of the system?

How can recognizing the many aspects of a system create a better understanding of the system as a whole?

How does understanding of one system transfer to understanding of another system?

IDENTIFIES THE ***CIRCULAR NATURE***
OF COMPLEX CAUSE AND
EFFECT RELATIONSHIPS

A Systems Thinker sees the interdependencies in a system and uncovers circular causal connections.

Questions to Ask

How do parts affect one another?

Where does circular causality/feedback emerge?

Is one feedback loop more influential over time than another? If yes, how?

"Habits of a systems thinker" - Meadows Institute

These are my "Top 3 Habits" to start exploring the system surrounding a problem or brief.

They call for thinking about relationships, not things in isolation. (6)

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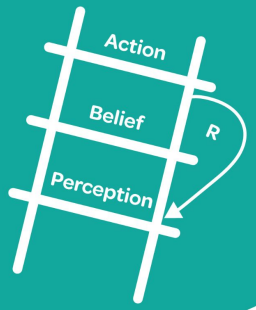
If you want to stretch yourself, here are the next 3 I'd move on to. There are 14 in total!

SURFACES AND ***TESTS ASSUMPTIONS***



A Systems Thinker actively tests theories and surfaces assumptions, perhaps with others, in order to improve performance.

Questions to Ask

How do my past experiences influence the development of my theories and assumptions?

How well does my theory or model match or differ from other views of the system?

When considering a possible action, do I and those I work with ask "What if" questions?

CHANGES PERSPECTIVES TO INCREASE UNDERSTANDING

A Systems Thinker increases understanding by changing the way they view aspects of the system.

Questions to Ask

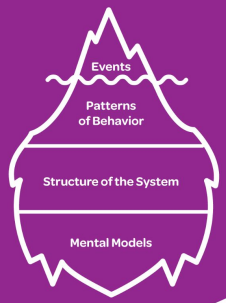
Am I open to other points of view?

How do different points of view influence the way I understand the system?

Who should I approach to help me gain new perspectives on an issue?

As I learn about new perspectives, am I willing to change my mind?

CONSIDERS HOW ***MENTAL MODELS*** AFFECT CURRENT REALITY AND THE FUTURE



A Systems Thinker is aware of how beliefs and attitudes influence the way a system behaves.

Questions to Ask

How are the current mental models (i.e. attitudes, beliefs) advancing or hindering our efforts to achieve desired results?

How am I helping others see the influence that mental models have on our decision-making?

How could my own mental models be barriers to what I am trying to achieve?

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Step 4: Take Action

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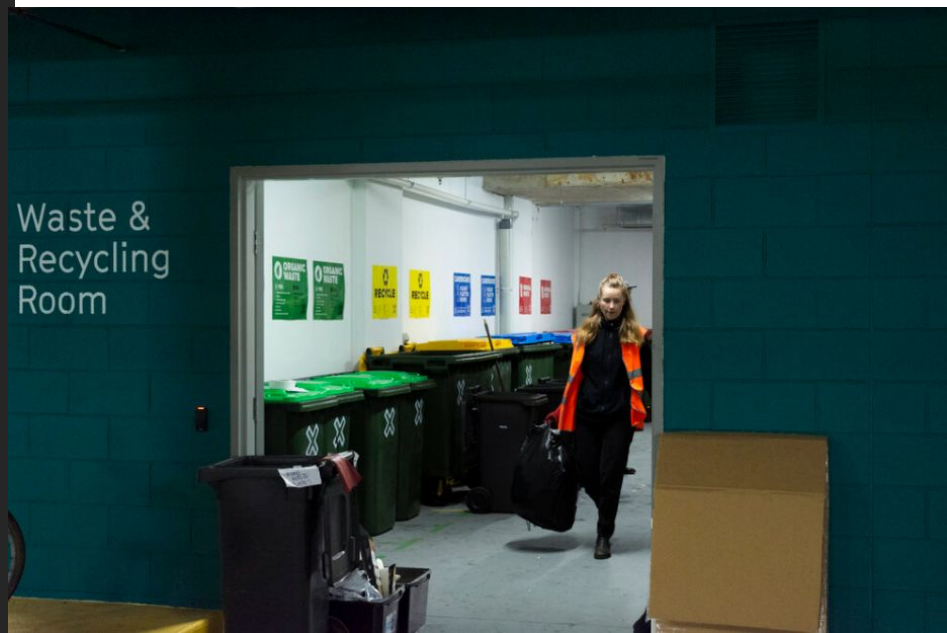
Reground

Small, Local, Entrepreneurial, Circular…

"By keeping our waste systems local, we keep the resources and energy consumed to operate them low. Sound waste systems will be specific to the environment and people they operate in and with. That's simply not possible if waste systems aren't local. The environment is big, but the solutions can be small!"

- Reground (2022)



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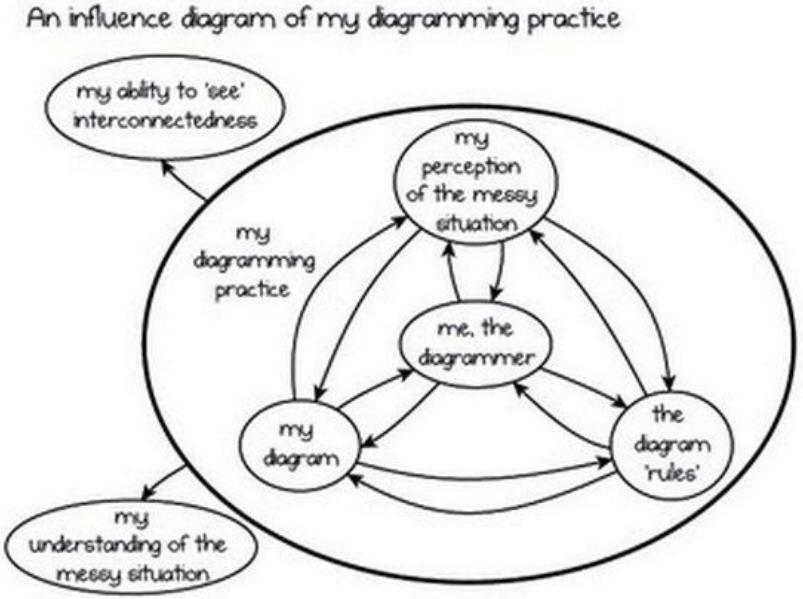
How? Diagram and visualise!

Visualising systems can be quick and easy (sketching) or technical and complicated (system modelling) - lots of ways exist. Try simple ones out!



How? Discuss and listen!

It is impossible to address complex problems or innovate alone. Respectful and open discussion and exchange of ideas is essential for innovation in systems.

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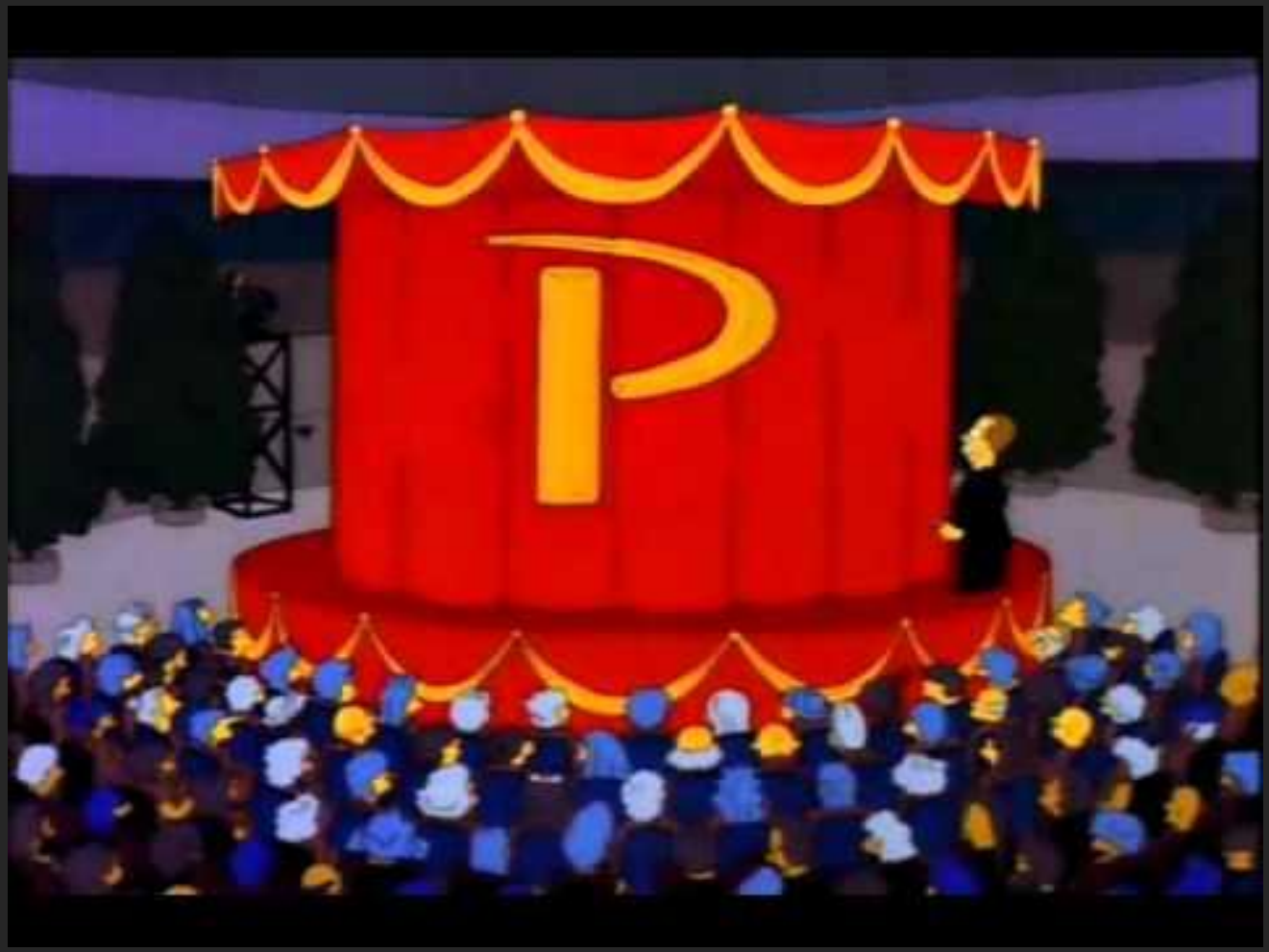
Caution: The Customer is Not Always Right



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Rain

Southern Ocean

Pristine forest

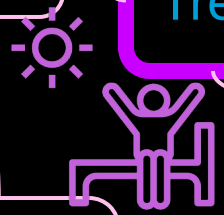
Dam

Port Phillip Bay

Pipe

Sun

Tree



Bed

Solar panels

L

Grid

Water heater

Cotton Towel

Loy Yang

Morwell

Gippsland community

"Customer testing" usually doesn't include asking the opinion of the natural systems on which we depend, or the communities further 'away' in the system. Innovation is not always a positive word - many innovations have exploited these.

You should always have these in mind.

But wait, you haven't told us how to do system thinking diagrams!

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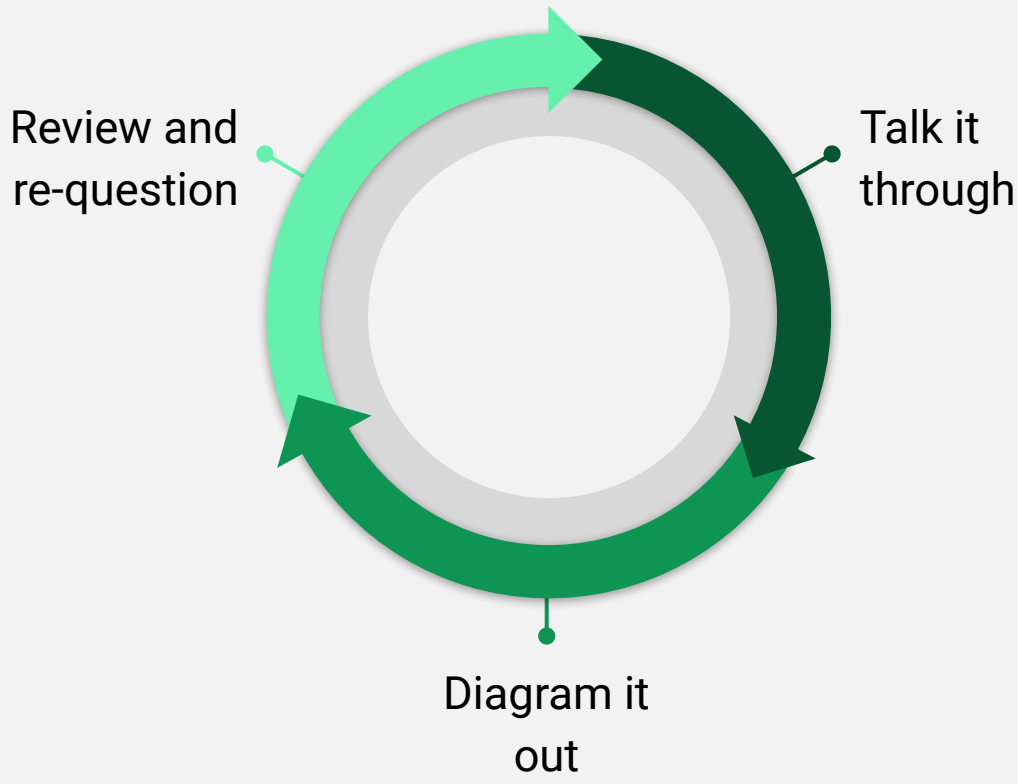

Review and
re-question
Talk it
through
Diagram it
out

But wait, you haven't told us how to do system thinking diagrams!

How are we keeping the big picture in mind?

How are we making meaningful connections?

How are we exploring circularity and cause/effect?

Top Habit 1

Top Habit 2

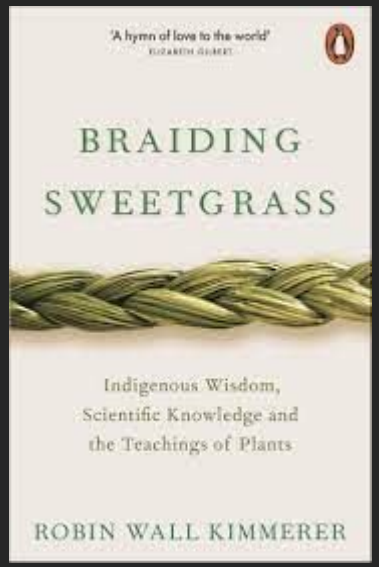
Top Habit 3

You live in a world of (flawed) complex systems

Complex systems are *hard* to think about and change

Methods exist to think about and change systems, and diagramming is a helpful one

Your actions **can change** complex systems for the better!



Good luck!

david.robertson1@monash.edu

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"Habits of a systems thinker" - Meadows Institute