E / S / R
Science for Communities

Sustainable Development Goals Summit Series

Thursday 2 September, 12.45 (for 1 pm) – 2.15 pm, via Zoom

Utilising systems thinking to address waste minimisation and support SDG localisation – led by ESR Social Systems Lab

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Aims of the workshop

This workshop was aimed at introducing participants to Systems Thinking as a tool for understanding wicked problems, which the SDGs are trying to address. It was based on an example of solid waste, a wicked problem that – literally – keeps on growing. Our history, way of life, societal expectations, political processes, public awareness and motivation for change (or not), and negative environmental impacts of the growing mountain of waste are all inter-related factors which make it difficult to address our current unsustainable waste system. Yet sustainability is at the heart of the SDGs, and the government of Aotearoa New Zealand has committed to implementing the SDGs. It is time for action at government and local levels.

Tackling wicked problems like the growing waste mountain and factors that work to keep the status quo require a holistic, systems approach. The ESR Social Systems Lab wanted to support community organisations and local government to use Systems Thinking approaches to identify actions that would be effectively reduce rather than simply manage waste.

Within the short time frame of one hour, it was not possible to develop a shared understanding of the waste system and create a comprehensive action plan. Our aim was therefore to introduce some Systems Thinking tools and to support participants to think about dealing with solid waste from a systems perspective. Participants identified some different problems concerning the waste system. Six priority 'problems' were used in small groups to draw Connection Circles. These circles consisted of causal factors that contributed to the problem, either directly or indirectly, and connections were made between them.

The second breakout sessions discussed potential strategies for action. A framework was used to prompt for different layers of actions. The top layer was explicit structural change, focusing on policy, practice and resourcing. The middle layer was semi-explicit changes, that were less easy to identify or quantify, focusing on relationships and the dynamics of power, control and decision-making. The lower layer related to transformational change, where the system orientation would be shifted (towards sustainability). This required changes to deeply held values, beliefs and assumptions that influence the actions and decisions the people take. It would take a longer time, and more workshops to fully realise the potential of the systems thinking approach to develop an action plan.

Causal Loop Diagramming

In the Systems Dynamics approach a Connection Circle is used to develop a Causal Loop Diagram (CLD). A CLD is a visual model of a system, to analyse how feedback loops work to stabilise or shift the system. There are often set patterns (archetypes) that can be identified which help predict behaviour of the system and how implement changes might result in desired outcomes. There are many ways of interpreting and building a CLD from any Connection Circle, as any system model is only a partial view of reality highly influenced by our assumptions and beliefs. The value of a CLD is as a tool to develop insights into a system that can guide decisions about actions to change the system.

There was no time for drawing CLDs in a one-hour workshop, but to illustrate how this process might work, Figure 1 shows an example developed from one of the Connection Circles. The problem perspective was a lack of product stewardship. The elements in the Circle were based on market economics ideas, where the lack of regulations around product stewardship was seen to result in large amounts of cheap consumable products with the few reusable alternatives that were available being expensive. This was a system that generated waste to meet the goal of economic growth.

The CLD in Figure 1 shows a simple CLD pattern that can be drawn from the circle that emphasises how the pricing differential between consumable and reusable products favours consumables. Decisions were made in the past to allocate industry and business resources to consumables, as a strategy for economic growth. These resources allowed for consumables to be mass produced at a low quality, and therefore sold cheaply. This strategy proved profitable, which reinforced the decision to invest in the production of consumables, in a continual cycle.

Given that there are limited resources, the strong investment in consumables leaves few resources left for developing, producing and marketing reusable alternatives. The dotted line shows that when more resources are directed towards consumables, reusable alternatives will be less competitively priced. Without competitive pricing, then profits will move in the same direction – downwards. Falling profits will again reinforce the original decision to allocate resources to the (profitable) production of consumables. And the waste mountain continues to grow.

How could product stewardship make a difference, and interrupt the functioning of this system? It would do this by adding an extra cost to producing consumables, and therefore making it harder to price them competitively. At the same time, incentives would be given to industry to develop and promote reusable alternatives, making their pricing more able to compete with consumables. The CLD shows that this change would not occur without intervention.

This CLD is only a partial model which could be extended by adding in factors such as "ease of dumping waste" and how convenience affects our behaviours. It could be further extended by adding in factors from the other Connection Circles, based on different perspectives of the waste problem. We might also like to consider what might happen if we change the basis of the system from market economics to circular economics (or other variations).

Figure 1 Converting Connection Circle (left) to a Causal Loop Diagram (right)
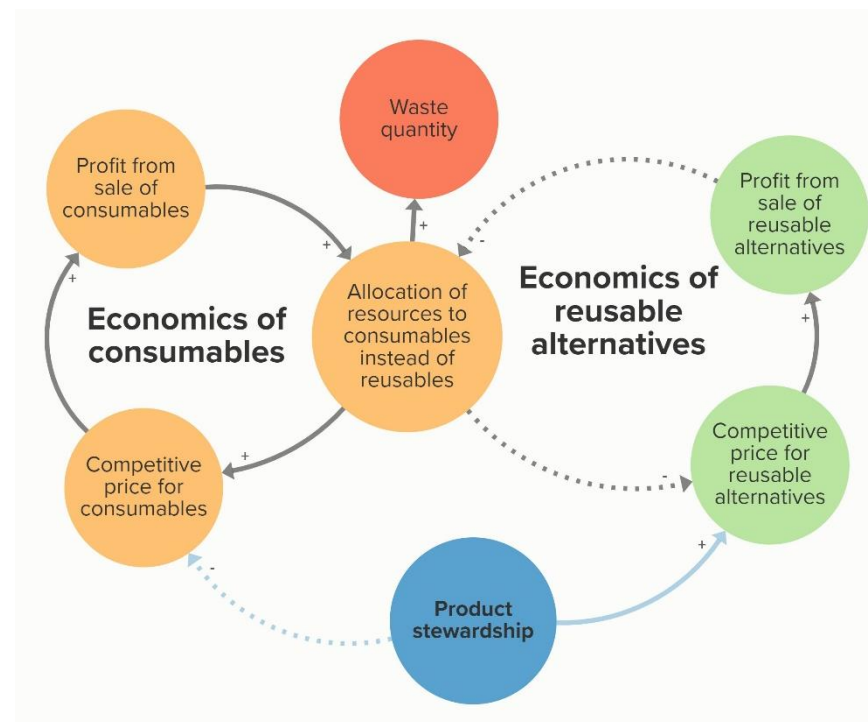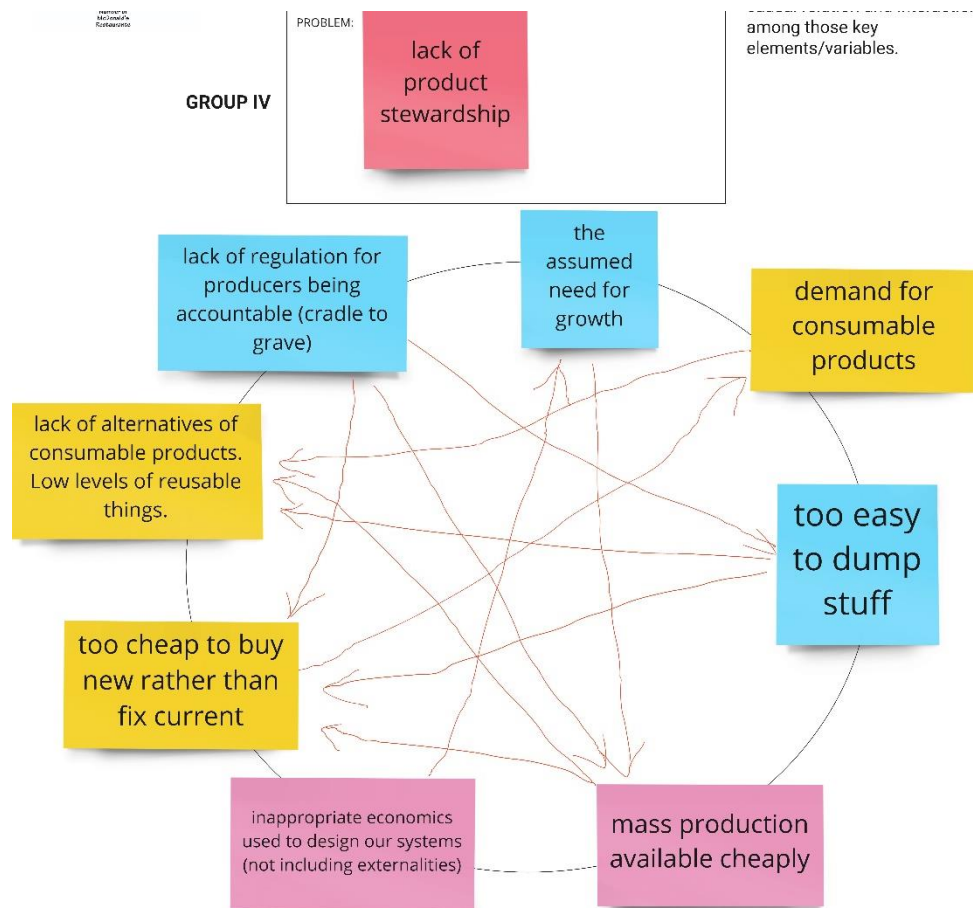
MIRO Board – attachment and themes

The MIRO Board has been exported and is attached as a pdf. This shows the Connection Circles and Strategies developed by each of the six groups. There is a lot of information and ideas collated here as well as a large amount of overlap, and we hope also that participants benefitted from the discussions that went on in the groups. We attempt here to provide a broad-brush summary.

A fundamental worldview was that of a society based on capitalism, where capitalist economics are a major driver of decisions and actions. Capitalism is based on the belief that continual economic growth is both possible and desirable, and leads to things such as GDP being a major measure of society success, profit being the measure of business success, and rampant consumerism. Changing this worldview was suggested in a variety of actions, much of which centred on education – such as educating people about other possible worldviews, including te ao Māori and kaitiakitanga which are inherently about sustainability; embedding sustainability in our compulsory education sector; and changing the way economics is taught. A shift of worldview towards sustainability also deals with those who feel "it's not my problem", because sustainability and reciprocity work together. This makes it everyone's problem.

Within the strategies section, categories of relationships, power, control and decision-making, participants recognised that everyone is part of the waste system: public (consumers in a capitalist worldview), businesses and industries, local and central governments. There was a strong theme of community engagement, and supporting and empowering communities to make decisions regarding waste in their local area. Coordination by central or regional authorities was seen as helpful, as opposed to control and decisions taken by people who do not know the local conditions. Supporting networks of organisations such as SCIRT and WasteMINZ was seen as a useful way of involving communities. On a negative side, it was noted that industry pressure generally works against change towards sustainability (because of a focus on profit – capitalism again). Public feedback also can influence government settings, obviously this can work in a positive or negative fashion depending on the priorities and concerns of the majority. Therefore working to educate and convince the public of the necessity and urgency of the waste problem is critical, and we must build on the work already started.

There were many suggestions for changes to policies, practices and resourcing, and a lot of these suggestions were aimed at changing worldviews, or influencing relationships and decision-makers. This illustrates the interconnectedness of causal factors in the system. Resourcing suggestions included investing in developing sustainable alternatives and new technologies that enables these, and government prioritising waste minimisation over waste disposal and other management.

Changes to practices included supporting community composting initiatives, auditing businesses for sustainability performance and offering recognition to those businesses with high standards for sustainability, and consistency of practices (such as for recycling) to make it easier for people to use. Measuring government and society success through the

introduction of Wellbeing Indicators instead of the flawed GDP measure is a positive change in practices. There were also calls to return to past practices which were more sustainable, including a culture of repair and reuse, and kaitiakitanga.

Policy changes included reform of the Resource Management Act, improving the Emissions Trading Scheme and the Waste Levy, Full cost pricing, regulations that provided both incentives and penalties for industries and businesses to be sustainability, and raising minimum standards.

This summary by no means contains all of the points raised, so we would encourage you to look at the pdf of the whole MIRO board for more detail.

Invitation to collaboration through the ESR Social Systems Lab

The Social Systems Lab is a new initiative from ESR, that aims to promote system thinking for addressing wicked problems in fields such as environmental, public health, justice and social services. We can support organisations to use Systems Thinking through workshops, research collaborations and sharing resources. Please contact us if you have a problem or a project that you would like to discuss: social.systems.lab@esr.cri.nz

Systems Thinking resources

Abercrombie, R., Boswell, K., & Thomasoo, R. (2018). Thinking big: how to use theory of change for systems change. *UK: Lankelly Chase Foundation*. https://www.thinknpc.org/resource-hub/thinking-big-how-to-use-theory-of-change-for-systems-change/

Allen & Kilvington (2018) Summary: An introduction to systems thinking and systemic design – concepts and tools (Presentation). Based on material for an introductory workshop. Available online https://learningforsustainability.net/post/systemicdesign-intro/

Hernández, A., Ruano, A. L., Marchal, B., San Sebastián, M., & Flores, W. (2017). Engaging with complexity to improve the health of indigenous people: a call for the use of systems thinking to tackle health inequity. *International Journal for Equity in Health*, *16*(1), 1-5. https://equityhealthj.biomedcentral.com/articles/10.1186/s12939-017-0521-2

Meadows, D., Sweeney, L. B., & Mehers, G. M. (2016). The Systems Thinking Playbook for Climate Change A toolkit for interactive learning. GIZ. https://klimamediathek.de/wp-content/uploads/giz2011-0588en-playbook-climate-change.pdf

Midgley G. (2006). Systemic intervention for public health. *American journal of public health*, *96*(3), 466–472. https://doi.org/10.2105/AJPH.2005.067660.

Oetzel, J., Scott, N., Hudson, M., Masters-Awatere, B., Rarere, M., Foote, J., ... & Ehau, T. (2017). Implementation framework for chronic disease intervention effectiveness in Māori and other indigenous communities. *Globalization and health*, *13*(1), 1-13.

https://globalizationandhealth.biomedcentral.com/articles/10.1186/s12992-017-0295-8

Senge, P. (2006). *The fifth discipline: The art and practice of the learning organization*. Currency.

Stevens, Kaye. (2020). Rich Picture. BetterEvaluation.Accessed 25 August, 2021. https://www.betterevaluation.org/en/evaluation-options/richpictures

Waters Center For Systems Thinking. (2021). Tools of Systems Thinking Courses. Thinking Tools Studio. https://thinkingtoolsstudio.waterscenterst.org/courses/tools

Williams B. (2011).All methods are wrong. Some methods are useful. Systems Thinker. https://thesystemsthinker.com/%EF%BB%BFall-methods-are-wrong-some-methods-are-useful/

🕐 **10 mins**

1

No clear incentives

No clear barriers e.g. waste levy

No incentives to change

2

Linear not circular

Not a circular system

waste is a resource

3

Lack of knowledge, not unified

4

Lack of education/ awareness

No stewardship

Externalities e.g. Pollution

5

Not sustainable - too much waste!

6

poor recycling rates - not a long term solution

Everything ends up in landfill

Too much plastic

Unnecessary "waste"

disposable society

High consumerism

Old waste being exposed through climate change

Unsustainable

Over-packaging

We don't need to produce waste

Councils paying for waste disposal, not producers

Profit driven

Ignoring Indigenous knowledge for sustainability

Co

No incentives to change

GROUP I

- Cost of the waste not shared by business
- Disconnect between policy and practice
- short term thinking
- Motivate behaviour change
- Not in my backyard
- Not on track and actions missing
- Reusable thrown to landfill
- People unaware
- Socio-economic status and packaged food
- Business packing determine by cost
- Alternatives to plastic not cheap

Shift of mindset of business, govt, everyone about urgency

Understand who are key players and hold power (business,

Families ability to purchase

Mountain of waste

Waste infrastructure that promotes recycling and buy back scheme

High price of sustainable items

People unaware/lack motivation

People being waste fatigue

Government policies gap

Lack of incentives to producers

TAKING ACTION:
ACTIVATING LEVERAGE POINTS AND KEY STAKEHOLDERS

🕐 **10 mins**

New table

Systems change conditions	What strategies can help advance our systems change efforts?Who would need to be involved?
Policies, rules, regulations and priorities	Looking at policy gaps;
Practices around addressing problem	Community based approach; Education/Motivation to families; Going back to sustainble practices
Resource allocation and distribution	
Relationships and connections among actors	Working with businesses
Decision making power, authority and influence	Addiction to growth, capitalism paradigm- collaborate with WEALL alliance; try and get different conversation about whats important; other alliance GDP obsession- alternative approaches in collaborative space; pursue PPP; Govt. stakeholders more inclusive
Deeply held beliefs and assumptions	

Connection Circle

🕐 **20 mins**

List key elements or variables that are acting as barriers and enablers to address the systemic problem. Brainstorming about causal relation and interaction among those key elements/variables.

PROBLEM:

GROUP II

Linear not circular

Limited budget

Economically viable production

Huge Amount of people & processes involved

Options for dealing with waste

Mindset of people

Incentives

Technology

Capitalism - continual growth

TAKING ACTION:
ACTIVATING LEVERAGE POINTS AND KEY STAKEHOLDERS

🕑 **10 mins**
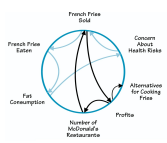
New table

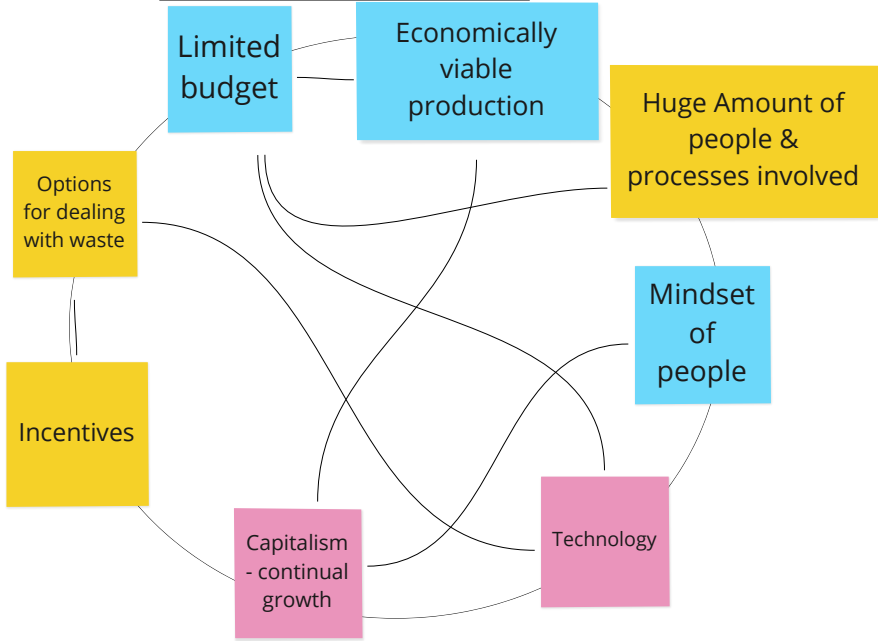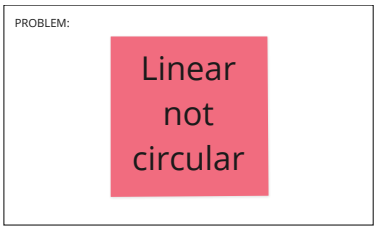| Systems change conditions	What strategies can help advance our systems change efforts? Who would need to be involved?
Policies, rules, regulations and priorities	Incentives for producers to use recyclable/ reusable materials Incentives for (small) business tech innovation Business auditing including Sustainability Performance
Practices around addressing problem	
Resource allocation and distribution	
Relationships and connections among actors	Localised Networks eg SCIRT, WasteMINZ
Decision making power, authority and influence	Provide recognition of waste minz good practice
Deeply held beliefs and	Educate on different approaches to sustainability - other cultural knowledges Change the way economics is taught - eg Doughnut Eco

Connection Circle

🕐 **20 mins**

List key elements or variables that are acting as barriers and enablers to address the systemic problem. Brainstorming about causal relation and interaction among those key elements/variables.

GROUP III

Lack of education/ awareness

Lack of knowledge, not unified

systemic issues - capacity onshore, different between cities e.g. capacity between different waste streams

continuity between systems, cities, e.g. kerbside, events

influence of marketers (consumerism), consumption

perception that the rules are always changing

construction and demolition waste (50%) in some cities

education needs to embed sustainability

connecting to industry, learning from other cities, reusing as alternative material

underpins everything

limit the change, changes are clearly communicated, postive reinforcement

orgs. having CE values to begin with

lack of drive to make more circular economy in curriculum (all ages)

lack of consistency is confusing - even within the same region

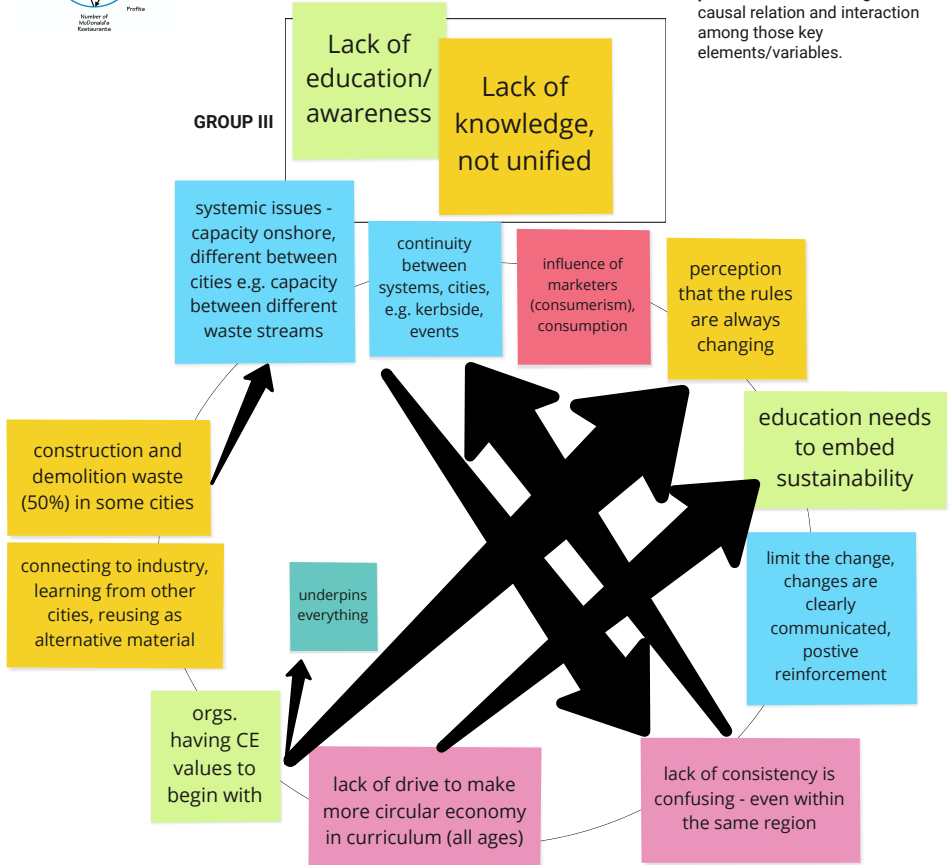# TAKING ACTION:
ACTIVATING LEVERAGE POINTS AND KEY STAKEHOLDERS

🕐 **10 mins**
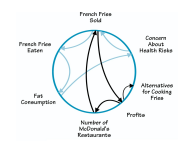
New table

Systems change conditions	What strategies can help advance our system change efforts? Who would need to be involv				local authorities
Policies, rules, regulations and priorities	MoE - inc. more about waste in curriculum	Min regulations for waste retrieval and disposal or expand if they already exisit (volume, and how). Needs improving! RAISE THE BAR	orgs. having CE values to begin with		waste companies
Practices around addressing problem	Waste levy discrepencies				produce stewardship (packaging etc) + end of life
Resource allocation and distribution	engagement				just transition to CE
Relationships and connections among actors				responsibility of waste producers, manufacturers, retailers, consumers - more leadership	circular economy transitioning from linear system through e.g. education
Decision making power, authority and influence	RMA reform	Feedback on strategies (e.g. ETS)	distribution of power		
Deeply held beliefs and assumptions	orgs. having CE values to begin with				iwi/Maori

Connection Circle

🕐 **20 mins**

GROUP IV

List key elements or variables that are acting as barriers and enablers to address the systemic problem. Brainstorming about causal relation and interaction among those key elements/variables.

PROBLEM:

lack of product stewardship

the assumed need for growth

lack of regulation for producers being accountable (cradle to grave)

demand for consumable products

lack of alternatives of consumable products. Low levels of reusable things.

too easy to dump stuff

too cheap to buy new rather than fix current

inappropriate economics used to design our systems (not including externalities)

mass production available cheaply

TAKING ACTION:
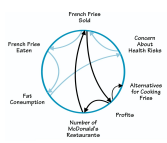# ACTIVATING LEVERAGE POINTS AND KEY STAKEHOLDERS

🕐 **10 mins**

New table

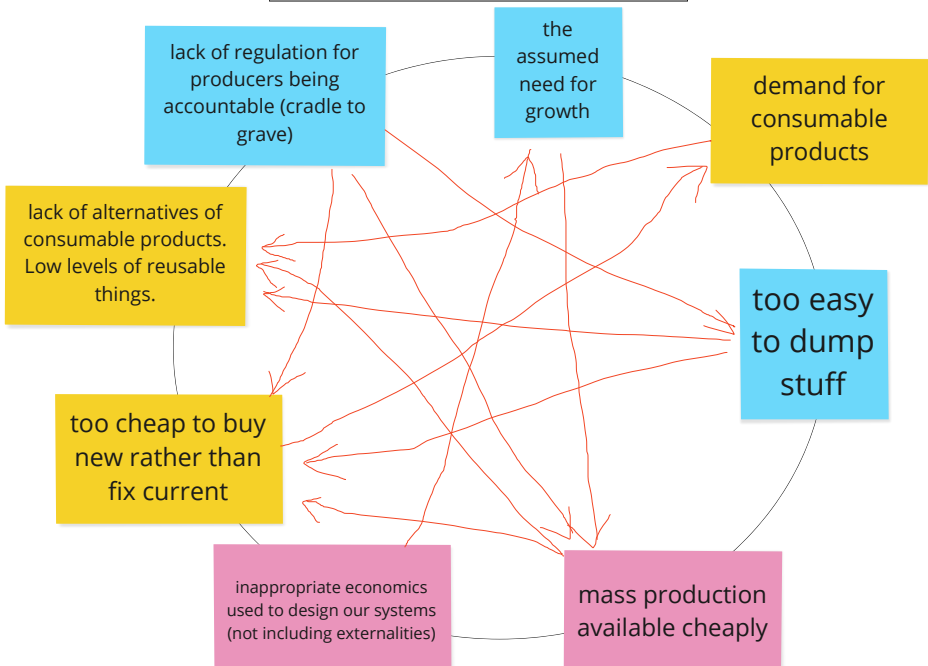| Systems change conditions	What strategies can help advance our systems change efforts? Who would need to be involved?
Policies, rules, regulations and priorities	lobbying govt for legislative change (product packaging etc) · Promote products that are cheaper if they are reused, to move focus away from cheaper because they get used once. · full cost pricing · Legislate for The right to repair
Practices around addressing problem	Making the recycling alternative a lot easier.
Resource allocation and distribution	R&D investment for finding alternative uses for waste · A programme of adult education, communication and engagement to help people understand what it being proposed in terms of waste minimisation activities
Relationships and connections among actors	Promote products that are cheaper if they are reused, to move focus away from cheaper because they get used once.
Decision making power, authority and influence	Making the recycling alternative a lot easier. · Legislate for The right to repair · R&D investment for finding alternative uses for waste · lobbying govt for legislative change (product packaging etc) · full cost pricing (this is both a lobbying thing to change views, and achievable once people have changed views)
Deeply held beliefs and assumptions	

Connection Circle

PROBLEM:

GROUP V

List key elements or variables that are acting as barriers and enablers to address the systemic problem. Brainstorming about causal relation and interaction among those key elements/variables.
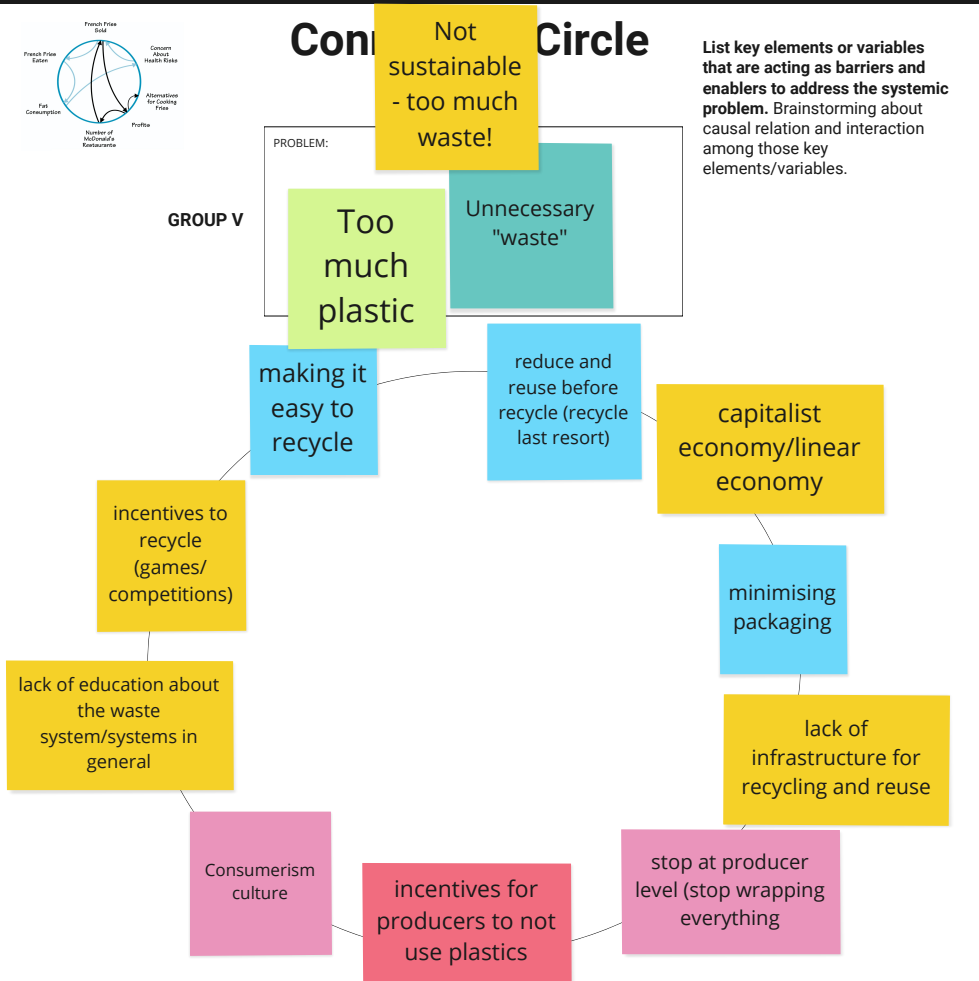
Not sustainable - too much waste!

Too much plastic

Unnecessary "waste"

making it easy to recycle

reduce and reuse before recycle (recycle last resort)

capitalist economy/linear economy

incentives to recycle (games/ competitions)

minimising packaging

lack of education about the waste system/systems in general

lack of infrastructure for recycling and reuse

Consumerism culture

incentives for producers to not use plastics

stop at producer level (stop wrapping everything

TAKING ACTION:
ACTIVATING LEVERAGE POINTS AND KEY STAKEHOLDERS

🕐 **10 mins**
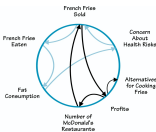
New table

Systems change conditions	What strategies can help advance our systems change efforts? Who would need to be involved?			
Policies, rules, regulations and priorities	having a government prioritse reusing and reduce rather than recycling	regulations from govt to companies to be more sutainable	infrastructure supporting a circular economy - sustainable values underpinning our economy	consistency across Aotearoa
Practices around addressing problem		community composts and workshops so people know how to do it at home		
Resource allocation and distribution				carrot and stick approach
Relationships and connections among actors	More support for organisations or people who are trying to make change		actions and advocacy needs to come from the people	
Decision making power, authority and influence		local communities able to make decisions around their waste e.g. delegating money for local infrastructure		
Deeply held beliefs and assumptions	education around how people can reduce thier waste		Define what we want to do as a country and then start acting - use our values as a framework	

Connection Circle

🕐 **20 mins**

GROUP VI

PROBLEM:

poor recycling rates - not a long term solution

List key elements or variables that are acting as barriers and enablers to address the systemic problem. Brainstorming about causal relation and interaction among those key elements/variables.

Poor uptake, due to lack of knowledge

Lack of education

Waste fatigue

Lack of access (rural, cost)

Illegal dumping

Poor compliance

Little incentive

Lack of options - Plastic dominant (supermarkets)

Lack of packaging options

Lack of follow through

TAKING ACTION:
ACTIVATING LEVERAGE POINTS AND KEY STAKEHOLDERS

🕐 **10 mins**

New table

Systems change conditions	What strategies can help advance our systems change efforts? Who would need to be involved?
Policies, rules, regulations and priorities	e.g. Plastic bags replaced with reusable bags • Nationwide Standardisation • Regulate the production of packaging • Mandates.
Practices around addressing problem	Integrating into all levels of education • e.g. Community lead Wanaka. No single cups • Providing incentives. Monetary. (e.g collecting bottles and cans (kids))
Resource allocation and distribution	Education health system (nationally)
Relationships and connections among actors	Govt, local bodies, communities etc • manufacturers • Consumers • Suppliers
Decision making power, authority and influence	Govt. • Influence: Social media. Education • Influencial partners. Primary industries • Influence: Telling the stories of successful recycling • Pro-environment packaging
Deeply held beliefs and assumptions	Lack of transparency of recycling results • Alternatives to plastic wrap. e.g wool, biodgradable etc. • It's not my problem