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Behavioural Science for Climate Technology Innovation and Action

Report on 2025 Global SIDS Capacity Building Program on Co-creation for System Transformation

Background

At the twenty-eighth session of the Conference of the Parties (COP28), Parties highlighted persistent barriers that developing countries face in accessing climate finance, particularly for least developed countries (LDCs) and small island developing states (SIDS). They called for enhanced efforts - especially by the operating entities of the Financial Mechanism - to simplify access and strengthen knowledge sharing, partnerships, and co-creation processes to accelerate climate-resilient, low-emission development pathways (UNFCCC 2023). In response, the Climate Technology Centre and Network (CTCN) Advisory Board agreed to establish a dedicated SIDS Forum for National Designated Entities (NDEs), with a pilot planned for 2025, reflecting a shift toward more integrated and collaborative implementation approaches.

Scientific evidence reinforces this direction. The Intergovernmental Panel on Climate Change concludes that limiting global warming to 1.5°C requires not only rapid deployment of mitigation and adaptation technologies but also systemic shifts in behaviours, lifestyles, and social norms (IPCC 2022). Behavioural and demand-side measures can deliver substantial mitigation potential, particularly in resource-constrained contexts such as SIDS, and are most effective when supported by enabling policy frameworks, institutional arrangements, and participatory approaches.

Within this context, CTCN's capacity-building programs aim to strengthen ownership across policymakers, technical institutions, and communities through co-developed, context-specific solutions aligned with national priorities. Decision 10/CP28 further encourages collaboration between the Technology Executive Committee (TEC), CTCN, and the Financial Mechanism to support technology development and transfer at scale (UNFCCC 2023). This is particularly relevant for advancing technologies across Technology Readiness Levels (TRLs) 7 to 9, where significant investment is required to move from demonstration to widespread deployment.

At these stages, however, success depends not only on technical readiness but on effective uptake within complex socio-technical systems. Three interrelated factors are critical: **localisation**, to adapt solutions to specific socio-economic and cultural contexts; **co-creation**, to engage stakeholders and strengthen ownership; and **systems thinking**, to align technologies with broader policy, market, and social dynamics.

Insights from behavioural science are therefore essential. As an applied approach within this field, social marketing offers practical methods and tools to support localisation, co-creation, and systems thinking by focusing on voluntary behaviour change and value creation (Kotler and Zaltman 1971; Lee, Kotler and Colehour 2023). By complementing technological and financial support with demand-side and behavioural considerations, it helps ensure that innovations reaching TRLs 7-9 are not only deployed but adopted, sustained, and scaled - contributing to system-level transformation in SIDS contexts.

This report draws on approaches, methods, and tools from behavioural science to strengthen climate technology innovation and transfer. It synthesises key messages and insights delivered to 15 NDEs from SIDS through an in-person programme held in Brisbane in December 2025. The report is structured around four sessions conducted over two days, capturing the main concepts, practical applications, and reflections shared during the programme. The five sessions and appendices are listed next.


EXIT

Contents

Note: *Parts of this report were prepared with the help of the Microsoft AI tool: Co-Pilot. The authors ensured the accuracy of the content.*

Session 1: Overview of Behaviour Change Technologies

A Primer on Behaviour Change Technologies

As an introduction to behaviour change, this session discussed the seven principles for effective behaviour change, grounded in social marketing theory and illustrated through global case studies. It emphasised moving beyond information-only approaches and adopting strategies that reshape environments, motivations, and opportunities.

1. Be the Change You Want to See

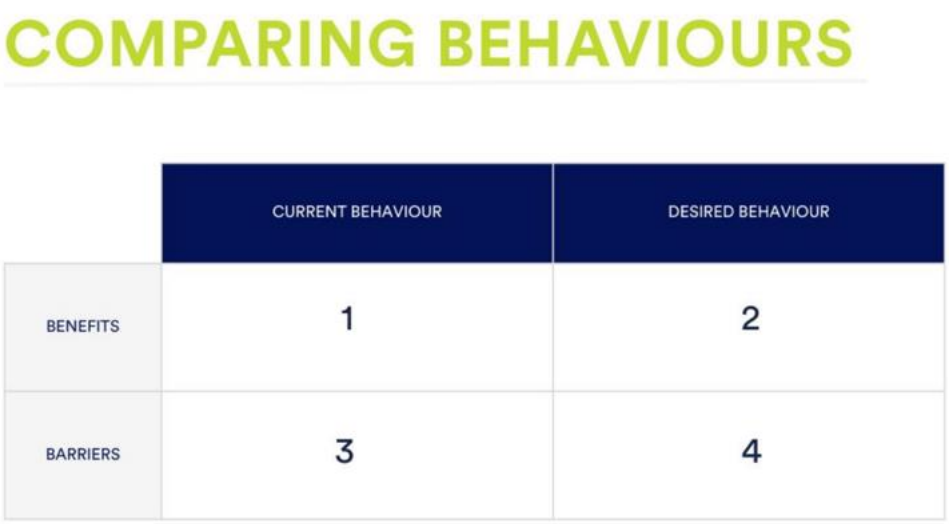
Behaviour change begins with understanding the audience's self-interest (so-called "What's In It For Me," WIIFM), conducting research, co-creating solutions, and localising interventions. It is imperative that we, as social change managers, deeply understand the audience we seek to influence.

Many options are available to gain insights about the audience. We describe some of them in detail later in the document.

As an example, a group of researchers in Papua New Guinea conducted a household survey across three provinces to understand "how weather and climate information services can better cater to farmers' needs when modifying and adapting their goals, risk management, and farm practices" (Friedman, Mackenzie, Baiga, Inape, Crimp and Howden 2022, p. 1). The findings helped the researchers to tailor information services specific to various farmer groups categorised by demographic and other variables.

2. Use the Benefits-Barriers Framework

One of the key, yet simple, tools to analyse the target audience is the 2 by 2 table proposed by McKenzie-Mohr and Smith (1999), which compares the benefits and barriers of current and desired behaviours to diagnose, especially at the formative stage, why people act as they do and how to shift their choices. The table should be filled out by the audience themselves, not by the organising team, although the organising team will be tempted to do so! Once diagnosed, the table also helps to produce strategies to influence behaviour change.



Source: McKenzie-Mohr and Smith (1999)

At the diagnostic stage, once the table is filled out, it essentially explains why audience members engage in the current behaviour (cell 1) and why they do not engage in the desired behaviour (cell 4). These two cells are important. At this stage, the audience may

perceive the benefits of the desired behaviour (cell 2) and the barriers to the current behaviour (cell 3) as minimal.

At the strategic stage, managers should develop strategies that convince the audience that the desired behaviour offers benefits (borrowed from cell 1) without the costs of the current behaviour, reducing the need to engage in that behaviour. For example, a pregnant professional may decide she doesn't need to drink during pregnancy if she can socialise and maintain her career without alcohol. Similarly, offering healthy options that taste like junk food can lessen the desire for unhealthy foods. Though it may seem simple, believing in this logic can significantly help managers craft effective behaviour change strategies.

For example, Adrid et al. (2023) investigated in Samoa and Vanuatu why certain groups do not access climate information services, resulting in lower climate resilience among communities. The authors conducted literature review and 38 interviews and revealed four major barriers: “limited institutional capacity, women's unequal role in decision-making, limited and vulnerable physical infrastructure, and disparities between Western scientific knowledge and traditional knowledge.” To overcome these challenges, the authors recommend “tailoring forecasts for local, non-technical users, improving communication networks, and strengthening community-based disaster risk management” (Adrid et al. 2023, p. 5).

Unfortunately, most efforts focus on highlighting costs/consequences from current behaviours (e.g., scare smokers of health consequences from tobacco consumption), which highlights cell 3 and end up overusing fear appeals rather than focusing on cells 1 and 2. Use of fear appeal is important, but it is an incomplete solution. Managers must combine fear (the negatives of cell 3) with the benefits the audience perceives from the current behaviour they would expect to receive from the desired behaviour (cells 1 and 2). Research supports the effectiveness of combining the fear of current behaviour with the benefits of desired behaviour (Basil, Basil, Deshpande, and Lavack 2013).

For example, around 2023, the government of Suriname (Eyes on Suriname, 2026) undertook several initiatives to promote recycling behaviour. These included:

- National awareness campaigns

- The introduction of recycling bins
- Partnerships with international organisations to tackle plastic waste.
    - Incentivising businesses
    - Collaborating with local institutions
    - Fostering a national culture of sustainability to improve waste management and environmental protection.

Managers should also minimise cell 4 barriers so that overall, the audience receives strong benefits and few barriers.

Lastly, the table helps managers determine how to position the new behaviours and their associated products and services.

3. Design an Irresistible Exchange Offer

Behaviour change works when the benefits of the desired behaviour increase, barriers decrease, and barriers to current behaviour increase. This leads to exchange offers: “Your priority group cannot resist.”

The Palau government provides a good example of such an effort by launching the "Ol'au Palau" program in 2022 (Galloway 2022). It was an innovative approach to enhance excitement among eco-conscious travellers by rewarding them, as the author describes, “earn points via an app for actions like using reef-safe sunscreen, eating local food, and visiting cultural sites”.

4. Fun Works When Combined with Fear

People respond better to fun, easy, and popular approaches when combined with fear appeals than to fear-only messages. The three words embody what we all, as lay consumers, seek: benefits from the products and services, ease and convenience, and popularity among family and friends. To make a behaviour, product, or service fun, managers provide community awards, aspirational positioning, and positive incentives. Such efforts, although unusual, need to be undertaken because if we keep doing what we have been doing, we will get the same results. In simple words, effective solutions deliver moderate threats with clear solutions.

There are many types of behaviour change strategies available to social change managers. These include marketing, education, nudging, and law. Most situations warrant combining two or all three of these tools to be effective. If we wish individuals to quit smoking, for example, we need to highlight the health consequences of smoking, ban smoking in public buildings, communicate this policy at the right time, offer nicotine replacement therapies, provide counselling services, and offer incentives to quit, so that we exploit the strengths of multiple tools and achieve our behaviour objectives. Unfortunately, too many efforts rely on education and regulatory changes but ignore powerful tools such as marketing and nudging strategies. In other words, do not just highlight the consequences of climate change; also highlight the importance of "good" behaviours that reduce the carbon footprint.

5. Information Alone Has Limited Impact

Pamphlets, brochures, and awareness campaigns rarely change behaviour. However, they work only if audience members are motivated to adopt the new behaviour, possess the skills to do so, and perceive attractive opportunities in their immediate environment; all they lack is awareness of the benefits of the desired behaviour (Rothschild 1999). However, such a situation is rare. In most situations, the audience lacks one or more of these three critical attributes (motivation, ability, and opportunity). In such situations, managers must go beyond messaging-only approaches and integrate them with marketing (which enhances opportunities in the environment by providing products and services) and regulatory measures (which enhance motivation to adopt the behaviour).

The application of policy approaches is common among SIDS government agencies.

For example, the Marshall Islands enacted regulatory initiatives, including the National Building Act and the Decentralized Autonomous Organization Act, to promote climate-resilient technologies among businesses and communities. The acts introduced climate-resilient standards, streamlined permit processes for renewable energy projects, and encouraged the development of future infrastructure to support new technologies (World Health Organization 2022; Martinez 2019).

However, relying solely on policy and messaging approaches is insufficient. Many recent studies (Xia et al. 2016; Braithwaite et al. 2025; Kaur et al. 2026) support the idea that the more marketing elements a behaviour change initiative includes, the more effective it will be at changing behaviour. Promoting a behaviour in its tangible form (as a product or service) is particularly useful. In other words, do not just promote behaviour; promote its tangible form, i.e., promote products and services that, when adopted, would address climate change.

The Ministry of Climate Change, Environment and Energy of the Maldives did just that. They went beyond an education-only approach. The Ministry launched the 'Magey Solar Programme in 2024' to promote solar energy to Maldivian households. The audience was asked to apply to the Fenaka Corporation's website to install solar photovoltaic (PV) systems (Corporate Maldives 2024).

6. Focus on Realistic, Incremental Change

Effective change is gradual (e.g., 5% goals vs. unrealistic 50% targets). For example, Seychelles has set a target of 15% of renewable energy by 2030. To achieve this goal:

1. start with the segments that are most enthusiastic to adopt change
2. promote single, simple, doable behaviours (for example, Seychelles Switch to LED Campaign)
3. partner with community influencers (e.g., to promote a culture of climate-friendly behaviours in Seychelles, Sustainability for Seychelles (s4s) works with artists, teachers, the cycling association, environmental groups, and octopus divers, among others).

Source: Sustainability for Seychelles (n.d.); Swiss-Led Seychelles Ltd. (2017).

7. Create Lasting Legacy

Behaviour change requires institutionalisation, prompts, and environment design that make desired actions habitual. Examples include sustainability prompts, policy integration, and community stewardship programs.

Turtle conservation efforts by Hipólito Lima and communities in São Tomé and Príncipe (Tusk 2020; Dulisse 2024) ensured long-term effects.

Conclusion

Effective behaviour change requires a strategic social marketing approach, not merely communication. Key takeaways include:

- empathise with your audience
- go beyond brochures
- tangibilise behaviour in the form of products and services
- create supportive environments
- combine fear with efficacy
- make change enjoyable
- build systems that sustain change over time.


BARRIERS TO INNOVATION
REFLECTION
HOW DO DESIGN METHODS
TEAM ①: Plastic Power Brokers
TEAM ②: Plastic Seekers Fun
TEAM ③: Plastic-Free Christmas
TEAM ④ – Clean Water Warriors

Session 2: Impact Mapping and Social Return on Investment

Benefits of taking Behavioural Change Angle: Evaluating an Impact and Segmentation

Session 2 of the program focused on three connected aspects of social change work: impact, audience orientation, and segmentation. The session aimed to build participants' capacity to understand and measure social impact, support them in articulating the value of their work, and build knowledge of principles for designing behaviour-change strategies that resonate with specific communities. The session emphasised putting people at the centre of program design and evaluation, ensuring social change initiatives are both meaningful and measurable.

Understanding Social Impact

The session began by defining social impact as:

> *The societal and environmental changes - positive or negative, intended or unintended - that result from investments or interventions.*

These include environmental impacts (such as water quality, pollution, biodiversity, and energy use) and societal impacts (such as equality, livelihoods, health, nutrition, poverty, security, and justice).

A key emphasis was that impacts differ from outcomes: impacts are long-term, compounding, and influenced by forces beyond the initial activity. They unfold like ripples becoming waves over time, underscoring the dynamic, temporal nature of social change.

The social impact chain provides a structured way to understand how impact occurs:

- **Inputs**: investments or resources such as funding, time, infrastructure
- **Activities:** tasks undertaken, including planning, budgeting, meetings, and analysis
- **Outputs:** tangible products or services such as events, trainings, communications
- **Outcomes:** immediate changes in behaviour, awareness, attitudes
- **Impact:** long term societal or environmental changes that accrue over time

This social impact chain was the foundation for later discussions of mapping, measurement, and value estimation.

Source: Authors

Mapping and Measuring Social Impact

Impact mapping enables practitioners to connect activities to outcomes and ultimately to the societal changes they aim to achieve. A workbook exercise encouraged participants to distinguish short term outcomes from longer term impacts and to identify an “end point” that clarifies what success looks like for their initiative. Outcomes are described as measurable shifts in behaviour, attitudes, or awareness, while impacts are broader societal changes such as reduced hospitalisations or community level cost savings.

Value Estimation and Social Return on Investment (SROI)

The session introduced Social Return on Investment (SROI) as a framework for quantifying the social, environmental, and economic benefits generated by a program relative to its investment. Participants learned that SROI is not only a calculation but also a deliberative process guided by principles such as involving the right people, understanding what changes, valuing what matters, avoiding overclaiming, and maintaining transparency. This emphasises that impact measurement is both technical and interpretive, requiring evidence, clarity, and informed judgment.

The workshop materials emphasised that social impacts, though often intangible, are highly valuable. Value estimation allows practitioners to:

- Identify what contributes to impact (effectiveness)
- Maximise impact (efficiency)
- Justify future investment
- Communicate broader benefits

The session explored a detailed case example involving indoor sensor installations to reduce mould and improve health outcomes. Using indicators such as the probability of asthma linked to mould exposure and per-person healthcare costs, participants reviewed how value can be estimated based on assumptions and evidence. The example illustrated how intended change, assumptions, indicators, and monetised values can be combined into an SROI model that demonstrates impact and places a monetised value on these benefits.

Audience Orientation

The second half of the session shifted towards behaviour change and the importance of audience orientation. Audience orientation places people at the centre of decision-making. Social marketers seek to understand the values, beliefs, motivations, and lived experiences of the individuals or communities they aim to influence.

An activity prompted participants to explore how audience orientation enhances program design, by focusing on an environmentally supportive behaviour and examining community-specific motivators and constraints, asking questions such as:

- What does the audience value?
- What motivates them to change?
- What barriers do they face?
- What message or approach would resonate?

Segmentation

The session then explored segmentation, a core marketing concept that acknowledges people are diverse and respond differently to programs. Segmentation involves dividing a broad population into smaller, more similar groups based on characteristics such as attitudes, behaviours, or needs. This enables more targeted and personalised strategies, leading to greater uptake and population level impact.

Participants learned that segmentation seeks an optimal balance: not so broad that messaging becomes ineffective, and not so personalised that it becomes inefficient. Exercises in the workbook guided participants in identifying and describing segments using a provided dataset and in developing tailored strategies for each segment. The session emphasised that segmentation is both strategic and ethical, recognising diversity within communities while designing interventions that resonate and support voluntary behaviour change.

Conclusion

Throughout Session 2, participants developed an understanding of social impact, value estimation, and behaviour change design. They applied practical tools for mapping impact, applying SROI principles, and developing audience-centred and segment-specific strategies. Collectively, these frameworks enable practitioners to articulate the value of their work, design more effective interventions, and enhance the societal and environmental outcomes they seek.

Session 3: Using Theories and Models to Increase Climate Technology Uptake (Why People Change and Why They Do Not)

Theories are useful for measuring change resulting from your project. A two-time-point measurement (before and after a project) of factors is recommended.

Session 3 introduced participants to selected behavioural foundations underpinning technology adoption, highlighting why people choose to embrace or reject new tools, systems, and innovations. The session introduced the Unified Theory of Acceptance and Use of Technology (UTAUT) as an entry point for understanding the drivers of technology-related decisions. Beginning with the original UTAUT model and progressing to its contemporary extensions, the session examined how factors such as performance expectancy, effort expectancy, social influence, and facilitating conditions shape technology uptake. Building on this foundation, participants explored additional determinants including cultural norms, perceived risk, trust, personal innovativeness, and contextual moderators, recognising that technology adoption is rarely driven by technical merit alone.

The HITS framework - Help, Inform, Train, and Sell - provides a practical, systems oriented approach that can be applied to design behaviour change interventions that move beyond traditional "telling" strategies. HITS guides practitioners to build comprehensive solutions which ensure that people are supported through tangible aids and environmental restructuring (Help), provided with clear and relevant information or restrictions (Inform), equipped with the skills and social models needed to perform new behaviours (Train), and motivated through incentives and persuasive, value driven communication (Sell). By integrating these four domains, HITS encourages programs that enable, empower, and motivate communities, ensuring that climate technologies are not only understood but are also desirable, accessible, and easy to adopt. Each framework is detailed in turn.

The Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT framework explains why people adopt or reject technology. The original model was developed by Venkatesh et al. (2003) and summarises the core determinants of technology acceptance. In the Brisbane session, we explained the model using the example of influencing shopkeepers' adoption of mobile payment services.

The model proposes that four main things influence whether someone will use a technology:

1. Performance Expectancy

"Will this technology help me?"
People are more likely to use a technology if they believe it will improve their work or daily life.

2. Effort Expectancy

"Is it easy to use?"
If something feels simple and requires little effort, people are more open to adopting it.

3. Social Influence

"Do people important to me think I should use it?"
Friends, family, coworkers, and community members can all shape someone's willingness to try a technology.

4. Facilitating Conditions

"Do I have the resources and knowledge to use it?"
This includes things like having the right phone, internet access, or training.

In summary, UTAUT posits that people use a technology when it is useful, easy, socially supported, and resource-supported, with additional factors depending on context.

UTAUT Extended Model

The UTAUT-Extended Model was later presented, citing a 2022 meta-analysis by Blunt et al., which challenges aspects of the original model and proposes new research directions. The UTAUT Extended Model is an updated version of the original UTAUT framework. It was developed after researchers reviewed many studies and concluded that technology adoption is more complex than the original model suggested. Think of it as UTAUT 2.0—it retains the original ideas while adding more factors and challenging some assumptions.

What is new in the UTAUT Extended Model?

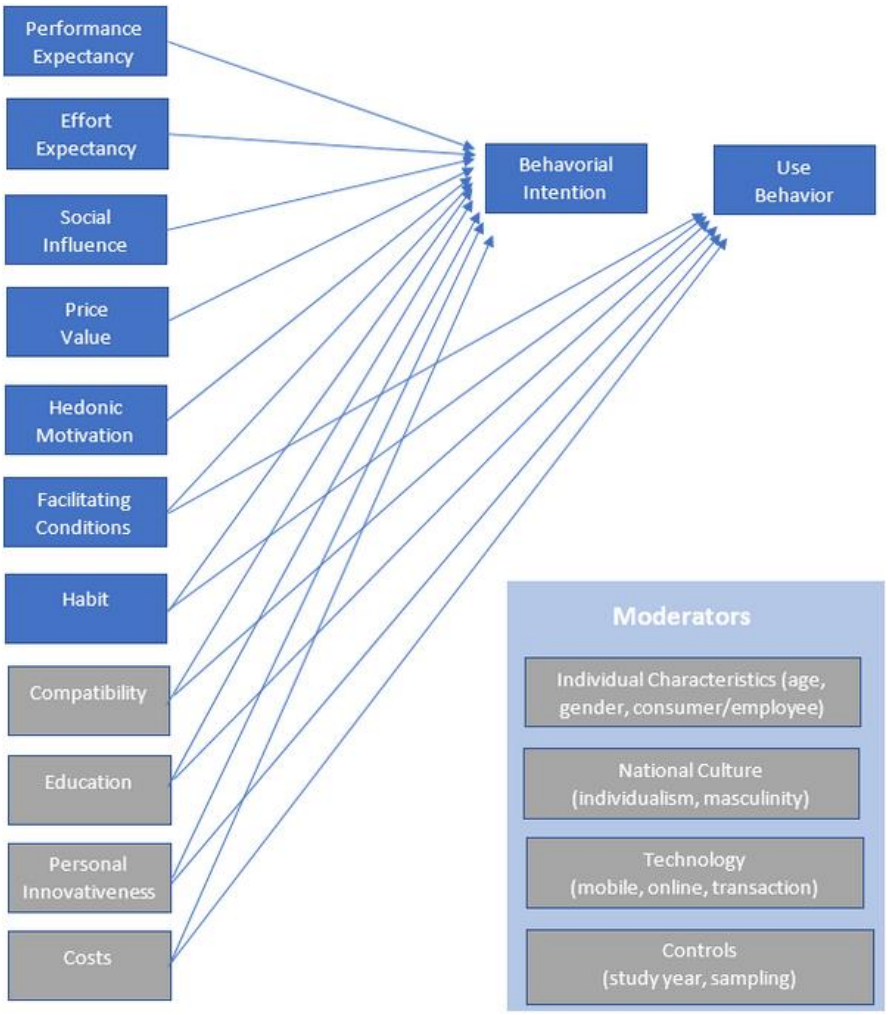
1. **More Influencing Factors:** Beyond usefulness, ease, social influence, and resources, the extended model adds more variables, such as:
    - **Price value** (Is it worth the cost?)
    - **Hedonic motivation** (Is it enjoyable?)
    - **Habit** (Do people already use similar technologies?)

2. **More Contextual Moderators:** The extended model recognises that cultural and technological context matters, including things like:
    - Is the culture more individualistic or collectivistic?
    - Is the technology mobile or non mobile, online or offline?
    - Is it for transactions (like payments) or not?

The researchers argue that future technology adoption research should look beyond the original model, testing new variables, new cultural contexts, and more diverse technologies.

In Simple Terms

The UTAUT-Extended Model posits that technology adoption depends not only on usefulness, ease, and social factors, but also on factors such as cost, enjoyment, habits, culture, and the type of technology, because real-world adoption is more complex than originally thought.



The UTAUT-Extended Model (Blunt, Chong, Tsigna, Zayyad, Tsigna and Venkatesh 2022)

The COM B Model

The COM B model, developed by Susan Michie and colleagues (2011), is a widely used framework for diagnosing the factors that shape human behaviour and identifying what needs to change for a new behaviour to occur. At its core, COM-B proposes that Behaviour (B) results from the dynamic interaction among three essential conditions: Capability (C), Opportunity (O), and Motivation (M). To change behaviour, whether adopting a climate technology, shifting farming practices, or improving environmental management, interventions must strengthen one or more of these three components. COM-B is used globally in health, environmental, and development contexts because it offers a simple yet powerful diagnostic tool for designing targeted, evidence-based behaviour-change strategies.

Capability

Capability refers to whether a person has the knowledge and skills required to perform a behaviour.

- Psychological capability (Knowledge) includes assessing whether a person understands how something works (e.g., how to operate a solar irrigation pump or interpret an early warning forecast).
- Physical capability (Skills) includes assessing whether a person has the physical skills or strength to carry out the behaviour (e.g., being able to install equipment or maintain a filtration system). When capability is low, solutions may include training, guidelines, demonstrations, or hands on support.

Opportunity

Opportunity refers to the external factors that make a behaviour possible or prompt it. These may be social (norms, cultural expectations, peer support) or physical (infrastructure, access to tools, access to finance, supply chains).

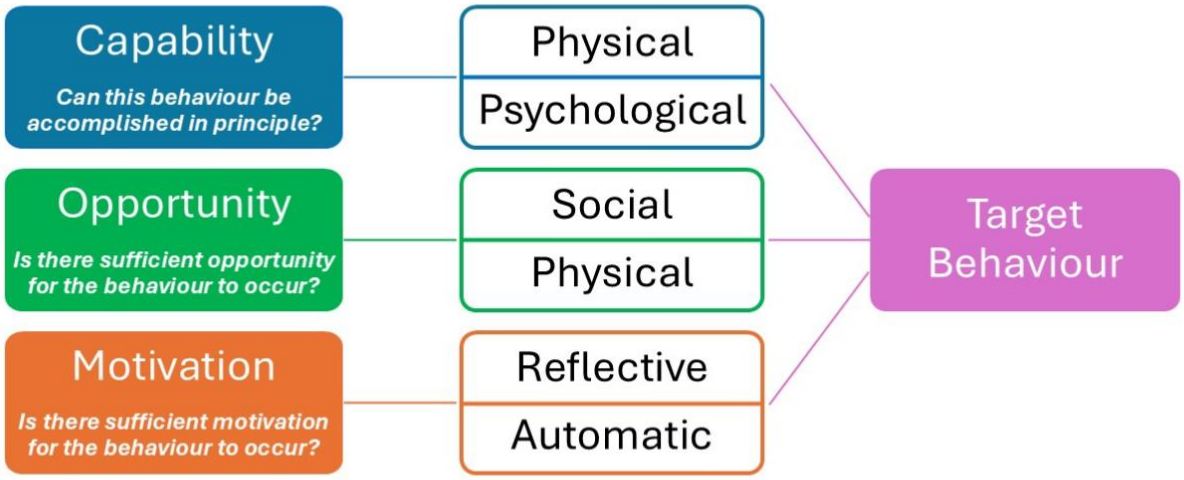
- Physical opportunity includes access to equipment, spare parts, grid connections, market access, or enabling policies.
- Social opportunity includes encouragement from community leaders, peer examples, or norms that support adoption. If opportunity is constrained, interventions may focus on improving access, restructuring environments, updating policies, or strengthening supply chains.

Motivation

Motivation refers to the internal processes that influence decision making, including beliefs, emotions, intentions, and habits.

- Intrinsic motivation includes conscious evaluation, such as believing a technology will save money, improve yields, or protect the community.
- Extrinsic motivation refers to external drivers that influence whether a person chooses to adopt or maintain a behaviour. In technology adoption, extrinsic motivators are especially powerful because they help reduce risk, offset upfront costs, or create tangible, immediate value for users. These may include:

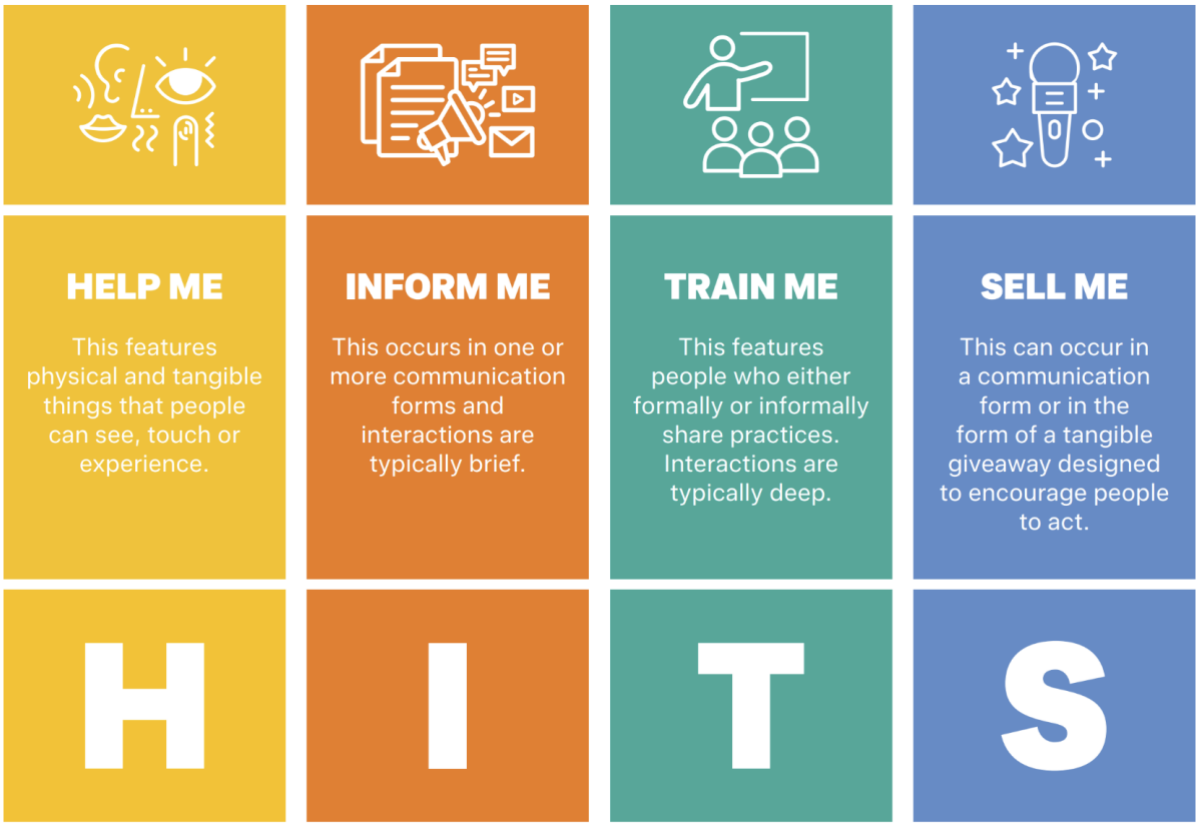
- Financial incentives: subsidies, rebates, micro loans, grants, or reduced tariffs to lower upfront investment costs.
- Performance based rewards: payments for ecosystem services, results based financing, or discounts linked to verified use.
- Risk mitigation mechanisms: warranties, maintenance guarantees, insurance schemes, or community repair cooperatives that reduce fear of system failure.
- Market incentives: improved market access, productivity gains, or cost savings demonstrated through pilot trials. Interventions that strengthen extrinsic motivation make technology solutions more attractive, lower perceived risk, and increase willingness to invest or try new practices. When motivation is low, solutions may emphasise incentives, persuasive communication or risk reduction mechanisms.



Source: Authors

The HITS Framework

The HITS framework—Help, Inform, Train, and Sell—provides an implementation guide outlining what needs to be built to deliver a compelling offering.



HITS shifts its focus from diagnosing individual behaviours to identifying actionable strategies to drive measurable change. HITS comprises four domains and eight sub-domains: Help (aids, environmental restructuring), Inform (information, restrictions), Train (training, modelling), and Sell (incentives, persuasion).

HELP ME

Help: physical and tangible things that people can see, touch or experience. Supports and enables repeated behaviour.

Aids: funding, products, product or people services (e.g., delivery, repairs, transportation) that make it easier for someone to undertake the intended action (e.g., provision of a limousine service to prevent drunk driving).

Environmental restructuring: space or place (re)design that facilitates enduring behaviour change through the installation of structures in the built or natural environment (e.g. installation of shade areas, walking paths, safety lights).

INFORM ME

Inform: one or more communication forms. Interactions are usually brief, and engagement is often very low, with only a few people engaging more deeply based on information provision.

Information: provision of factual or descriptive information to ensure people know what they should do. Content is delivered to people without being tailored to individual needs and interests. Expert-derived and typically focused on outcomes to be achieved (e.g., Eat 2 fruit and 5 vegetables a day).

Restrictions: rules, principles, policies, or guidelines that reduce options for continuing problem behaviour.

TRAIN ME

Train: features people who either formally or informally share practices. Interactions are typically deep, supporting habit formation.

Training: skills or ability-based training capable of equipping people with the skills they need to perform new behaviours (e.g., wildlife aversion training for dog owners).

Modelling: provide examples of the behaviour within people's social sphere, so that others can copy or imitate (e.g., champion farmer or fishing influencer).

SELL ME

Sell: can take the form of communication or a tangible giveaway designed to encourage people to act. Interactions are typically brief, and engagement is usually medium to high when delivered by experienced sales personnel.

Incentives: a payment, concession or gift that stimulates behaviour (e.g., provision of a free leaf bag in autumn to store leaves in).

Persuasion: engaging communication that quickly attracts and keeps attention. Content is tailored to meet people's needs and interests. Derived from people's needs and wants, and typically focused on what concerns them.

Table 1: The HITS Dictionary

H	**Help** – physical and tangible things, that people can see, touch or experience. Supports and enables repeated behaviour. **Aids:** funding, products, product or people services (e.g. delivery, repairs, transportation) that make it easier for someone to undertake the intended action (e.g., provision of a limousine service to prevent drunk driving). **Environmental restructuring:** space or place (re)design that facilitates enduring behaviour change through the installation of structures in the built or natural environment (e.g. installation of shade areas, walking paths, safety lights).
I	**Inform** – one or more communication forms. Interactions are usually brief and engagement for most people is often very low with only a few who engage more deeply based on information provision. **Information:** provision of factual or descriptive information to ensure people know what they should do. Content is delivered to people, and is not tailored to individual needs and interests. Expert-derived and typically focused on outcomes to be achieved (e.g., Eat 2 fruit and 5 vegetables a day). **Restrictions:** rules, principles, policies, or guidelines reducing the options to continue with problem behaviour.
T	**Train** – features people who either formally or informally share practices. Interactions are typically deep supporting habit formation. **Training:** skills or ability-based training capable of equipping people with the skills they need to perform new behaviours (e.g., wildlife aversion training for dog owners). **Modelling:** provide examples of the behaviour within peoples' social sphere, so that others can copy or imitate (e.g., champion farmer or fishing influencer).
S	**Sell** – can occur in a communication form or in the form of tangible giveaway designed to encourage people to act. Interactions are typically brief, and engagement is usually medium to high if delivered by personnel with experience selling. **Incentives:** a payment, concession or gift that stimulates behaviour (e.g., provision of a free leaf bag in autumn to store leaves in). **Persuasion:** engaging communication that quickly attracts and keeps attention. Content is tailored to meet people's needs and interests. Derived from people's needs and want and typically focused on what concerns them.

Unlike traditional theories that emphasise how individuals think, feel and behave (e.g., UTAUT-Extended Model and COM-B), HITS is systems-oriented and implementation-

focused. HITS encourages you to consider environmental support, skill-building, and persuasive engagement alongside traditional approaches to telling, such as education and policy. HITS offers a practical checklist for designing comprehensive approaches that can initiate behaviour change and ensure lasting change.

HITS empowers practitioners to plan and evaluate interventions that are inclusive, scalable, and responsive to real-world contexts, tackling health, social and environmental issues.

Traditional approaches have relied on telling. Most approaches provide information in the hope that people will act. Research shows that education alone influences only a small portion of the population (e.g. Snyder et al. 2004). To drive real behaviour change, implementation approaches that incorporate HITS help you move beyond telling and embrace strategies that sell. Selling involves understanding what people value, what they are willing to support, and/or how to motivate them to act.

Maximising engagement means moving beyond informing to empowering. The CBE framework (see Section 4) emphasises co-creation, stakeholder collaboration, and strategic communication to ensure programs resonate with target audiences. Education alone influences only 8–12% of the population. To reach the remaining 88%, we must design programs that "sell". To sell, you need to ensure you offer value, support, and motivation.

Effective engagement begins with understanding what matters to people. This includes identifying barriers, motivators, and preferred communication channels. To maximise engagement, you can apply the HITS framework. HITS ensures you cover all bases: Help, Inform, Train, Sell. You are encouraged to ensure that you are providing tangible support (Help), clear and relevant information (Inform), skill-building opportunities (Train), and persuasive, incentive-driven messaging (Sell). Engagement is not a one-time event; it is a continuous process of listening, adapting, and improving. Together, these domains create conditions that enable and encourage technology adoption and use over time.

HITS shifts your strategic and operational plans away from passive awareness to active engagement. HITS empowers communities, builds trust, and delivers measurable

outcomes. This integrated approach is essential for effectiveness in tackling complex social, health, and environmental challenges.

Session 4: Creating Collective Solutions (CCS) — A Process to Guide Technology-Based Climate Action

How to validate your assumptions with people

The Creating Collective Solutions (CCS) process is a practical, step by step way to bring many different people together to solve complex problems. CCS is especially useful for climate related challenges, where solutions depend not only on technology, but also on people, systems, and everyday practices. CCS helps groups move from understanding a problem to agreeing on concrete actions that can be implemented in the real world. What makes CCS particularly useful for technology deployment is that it helps identify the system level supports, barriers, and responsibilities needed to make technological solutions work.

CCS combines ideas from systems thinking, participatory design, and collective intelligence. In simple terms, CCS brings the “whole system in the room”. Participants in the CCS process may include experts and policymakers, as well as users, operators, and community members. This allows everyone to see how their experiences connect, and

the process encourages people to work together to find solutions that support all or most of them.

Where CCS comes from

CCS evolved from earlier Collective Intelligence methods, which focused on identifying and structuring barriers. CCS adds a final step that uses co-design methods to generate realistic, actionable solutions. This makes CCS quicker than older system mapping methods and more solution-focused than many traditional and current system mapping approaches.

Why CCS Matters for Climate Technology Solutions

Climate technologies, such as battery recycling systems, renewable energy infrastructure, water quality monitoring tools, and emissions-reducing innovations, almost always succeed or fail depending on the systems around them. This includes:

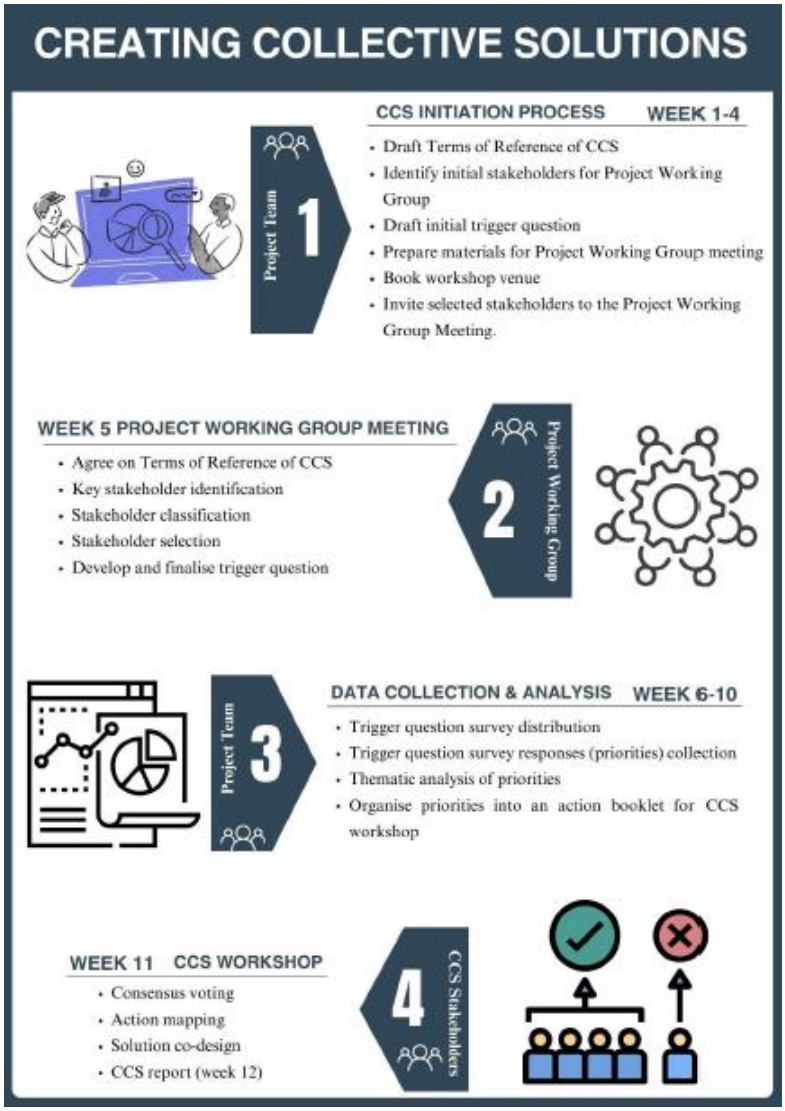
- supporting infrastructure
- regulations and standards
- user behaviours
- information and training
- funding structures
- coordination among actors.

CCS is designed to uncover all these system interactions. Rather than assuming technical solutions will work on their own, CCS brings stakeholders together to identify what is needed to ensure successful, fast, and sustainable adoption.

For example, in one application focused on safe battery disposal, CCS revealed that stakeholders did not see “training users” as the main need; they prioritised infrastructure and information systems, such as drop off points, containers, signage, and communication. This is valuable for climate technology planning because it highlights the system supports required for the proper handling of clean tech waste streams.

The Core Steps of CCS

The essential CCS process contains four core stages that can be applied to any climate technology context.



Source: (Xi et al. under review)

1. Initiation and the Trigger Question

The CCS team begins by forming a project working group. This small group usually includes experts, government staff, and practitioners who understand the issue. Their job is to draft a trigger question—a clear, simple question that guides the entire process.

A trigger question is framed so that people can give short, actionable answers. It can focus on **barriers** ("What stops people from…?") or **priorities** ("What can we do to support…?").

Examples have included:

- *"How can we work with the local community to identify practical solutions that will enable safe battery disposal?"*
- *"What is preventing farmers from permanently reducing runoff?"*

For climate technology planning, a trigger question might be:

- *"What can be done to support widespread uptake of community scale renewable energy technologies?"*

This question sets the direction for everything that follows.

2. Stakeholder Identification and Engagement

CCS does not assume who the "right" stakeholders are. Instead, stakeholders are identified by the project working group that is formed at the start of the CCS process.

Using simple activities like brainwriting, participants generate long lists of people and groups who affect or are affected by the issue. This might include:

- technology providers
- regulators
- communities
- operators
- repair and recycling industries
- emergency services
- supply chain actors
- and many more.

In past CCS projects, this step produced 80–120 stakeholders in a short workshop. The group then votes on which stakeholders should participate in the final workshop. The goal is diversity across the system, not just experts or decision makers.

3. Collecting and Organising Ideas

Once stakeholders are identified, CCS collects their responses to the trigger question. This is done through surveys, meetings, or online forms. Each stakeholder can usually contribute up to five ideas.

These responses are then cleaned, combined, and reduced into a manageable set of unique actions or priorities. For example:

- In the water quality case, 220 barriers became 12 key barriers.
- In the battery safety case: 283 ideas became 131 unique actions, which in turn were condensed to 12 priorities for action.

Ideas are sorted into categories. You could choose to use the HITS framework to organise ideas (see Session 3).

This step shows the full scope of system needs, including technical, social, and institutional elements, and provides a platform to start moving towards consensus.

4. The CCS Workshop: Building Consensus and Co-Designing Solutions

The workshop is the heart of CCS. Here, stakeholders come together to:

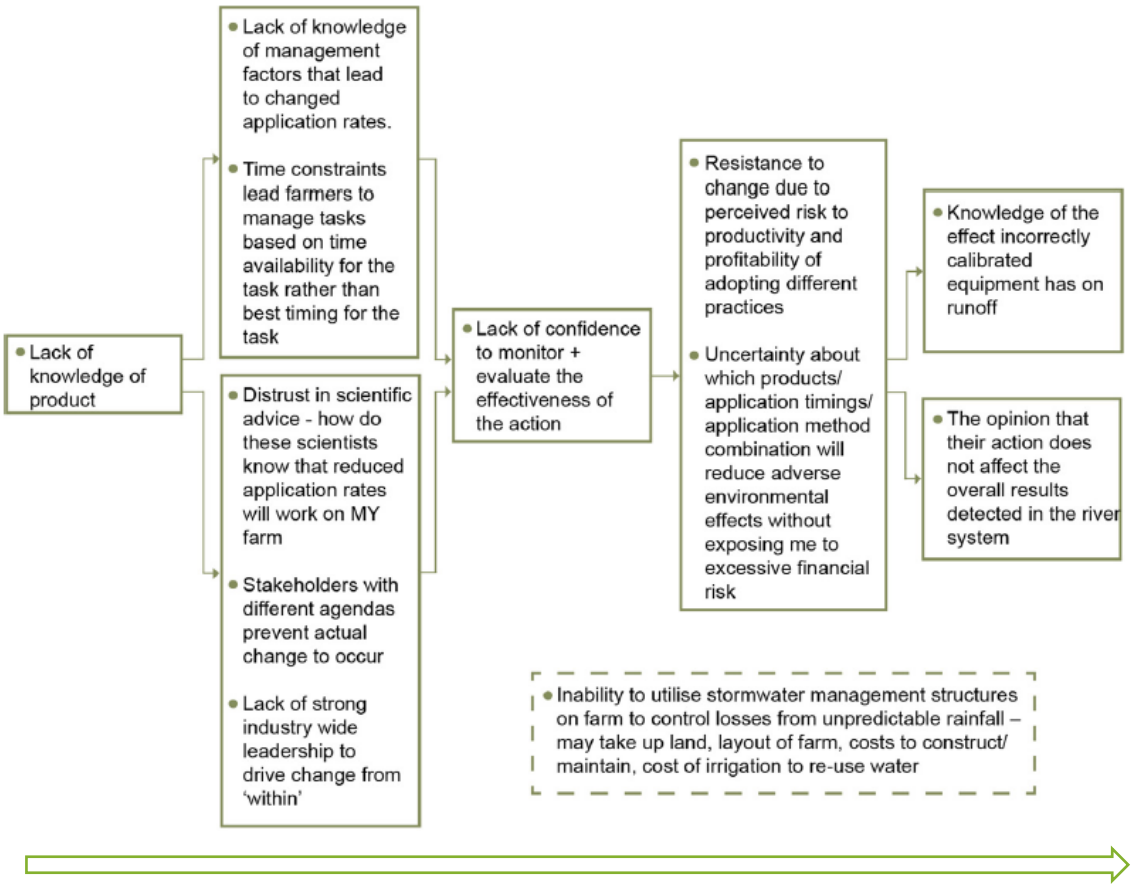
a) Prioritise actions through voting

Participants vote on the most important actions in each category. This democratic process narrows the list to the top 10–12 actions.

b) Map relationships between actions

Using a structured voting process supported by software, stakeholders answer relational questions such as:
"Would solving Action A help solve Action B?"

This creates an **action map** (see Figure X) showing which actions are foundational (should be done first) and which depend on others. The action map helps prioritise system level interventions rather than isolated fixes.



If you address these factors first, the rest will be easier to address

Source: Roemer et al. (2025)

(c) Co-design solutions

Finally, participants form small, diverse groups and design practical, implementable solutions informed by the action map.

Examples include:

- technology enabled disposal systems for batteries
- environmental changes (e.g., new drop off locations)
- communication tools, digital apps, or sensors
- cross agency coordination plans
- new workflow or regulatory processes.

This step ensures that solutions reflect communities' lived experience, are technically feasible, and reflect institutional realities.

What CCS Produces

Across applications, CCS consistently delivers:

1. A prioritised list of actions

These reveal what matters most to the whole system, not just to one group.

2. An action map

This shows the order in which actions should be addressed—for example, developing shared information systems before rolling out new technology.

3. Co-designed solutions

These are ready for piloting, policy development, or funding proposals.

In technology focused climate contexts, these outputs help decision makers understand:

- which infrastructures must be built first
- what information systems need updating
- where public awareness is lacking
- who must coordinate across sectors
- how technology will interact with human behaviour and institutions.

This prevents the common problem of “technical fixes” failing because system needs were not considered.

Why CCS Works

CCS helps avoid the typical pitfalls in technology implementation efforts:

- Lack of stakeholder alignment
- Underestimating system constraints
- Over reliance on user behaviour change
- Solutions that work in theory but not in practice

By building consensus, CCS increases the chance that solutions will be accepted, supported, and implemented across the system.

CCS also makes hidden barriers visible, and the consensus processes used during CCS ensure that a majority agreement on next steps for your project is reached.

Applying CCS to your next Climate Technology Projects

For UN supported climate technology initiatives, CCS can:

- accelerate effective deployment
- reduce resistance from overlooked stakeholders
- ensure local ownership
- identify enabling environments for new technologies
- prevent waste, safety risks, and unintended consequences
- support long term adoption rather than short lived pilots.

CCS is particularly relevant for areas such as:

- renewable energy transitions
- electrification of transport
- battery recycling and end of life management
- water quality monitoring and environmental sensing
- nature based solutions supported by digital tools
- circular economy infrastructure.

Conclusion

The Creating Collective Solutions process is a practical, structured way to tackle complex climate technology challenges. It helps diverse people work together, surfaces hidden system needs, and generates implementable solutions backed by broad support. For climate technologies in which technical success depends on social, institutional, and infrastructural factors, CCS offers a simple yet powerful pathway for designing solutions that work in the real world.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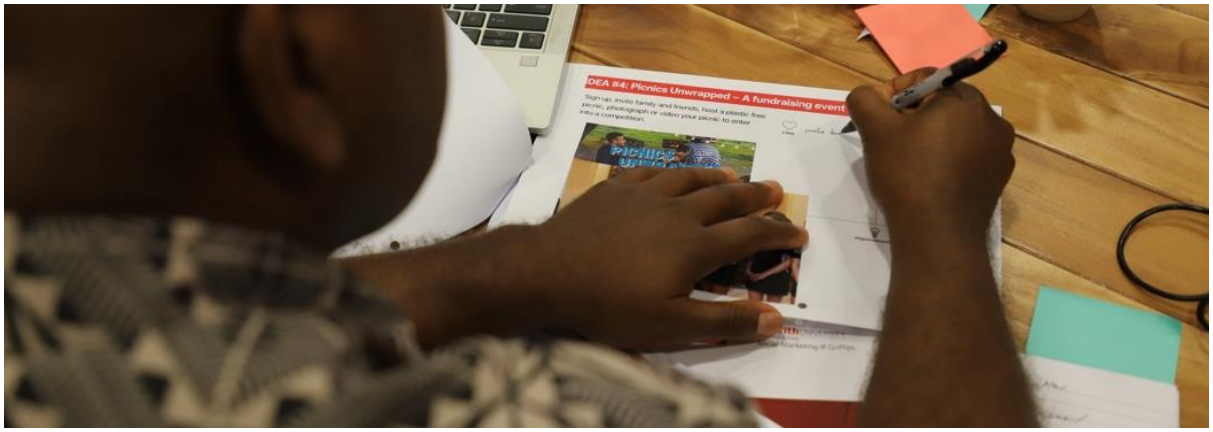
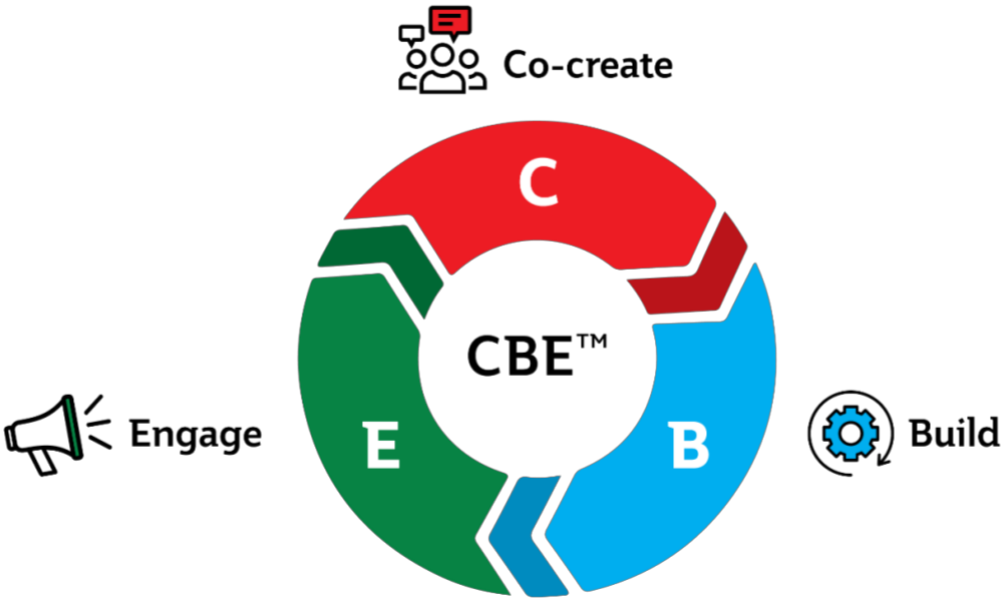
Session 5: Co-creating With People for the Impact

Ways to start with people by asking sharp questions that reveal their taste, lifestyle, and solutions

The Co-create–Build–Engage (CBE) process (Rundle-Thiele et al. 2021) is a strategic framework developed to guide the design and implementation of effective technology implementation programs.





Source: Authors

Rooted in social marketing principles, CBE places people and the planet at the heart of strategy and operations, ensuring technology and solutions are not only impactful but also scalable and sustainable.

Co-create involves working directly with stakeholders and target audiences to understand their needs, barriers, and motivations. This phase uses segmentation, theory, and competition analysis to generate deep insights that inform program design.

Build focuses on developing a value-driven offering using the HITS framework. The goal is to create technology solutions that people voluntarily choose because they see clear benefits and are supported in their technology uptake and use.

Engage ensures that technologies reach and resonate with community members. This phase includes awareness-building, trial facilitation, and ongoing evaluation to support technology adoption and long-term use.

By integrating eight core social marketing principles into a clear, step-by-step process, CBE empowers practitioners to move beyond education and awareness, delivering technology solutions that achieve measurable outcomes and foster lasting change.

Click here to explore the CBE process

CBE CASE STUDY

Lee et al. (2022) applied the Co-create–Build–Engage (CBE) framework to design and implement an intervention that significantly increased seasonal influenza vaccination rates among university students in Hong Kong. The process began with co-creation, involving systematic literature reviews, stakeholder interviews, segmentation analysis, and co-design sessions with students. This phase identified four student segments and focused on those most receptive to vaccination.

In the build phase, a tailored marketing mix was developed, including free or subsidised vaccines, peer referral incentives, and multi-channel promotion using student-designed visuals. The intervention addressed barriers and leveraged motivators such as convenience, peer influence, and financial incentives.

The engagement phase implemented a five-week campaign across digital channels, including e-learning portals and email, which proved most effective. A difference-in-difference analysis showed a 343% increase in vaccination rates on intervention campuses compared to controls. Most vaccinations occurred within the first two weeks, highlighting the importance of early engagement.

This study demonstrates how CBE can guide the development of targeted, evidence-based health interventions that achieve measurable behaviour change through stakeholder collaboration, audience segmentation, and strategic communication.

Let us take a deeper dive into the Co-Create, Build and Engage process

Co-create: Designing Solutions With, and Not For, Community

Co-creation is a participatory, human-centred process that places communities, end-users, and stakeholders at the centre of technology solution development. Rather than designing for people, co creation involves designing with them to ensure solutions reflect lived experiences, contextual realities, and genuine user needs. Evidence across multiple applications shows that co creation begins with a rigorous formative research phase that combines mixed methods, which may include (but are not limited to) systematic literature reviews, expert interviews, stakeholder workshops, ethnographic observations, surveys, co-design sessions (or the deeper design thinking or Creating Collective Solutions participatory design methods) to generate deep insight into the behavioural, social, cultural, and technological factors shaping the problem context. Through these diverse inquiry methods, you can identify barriers, enablers, and user preferences that are often overlooked in expert-only or top-down design approaches. This approach ensures that the early phases of technology planning are grounded in stakeholder orientation, segmentation, and an evidence-based understanding of the system in which the technology will operate.

These insights then directly inform the build phase, where technology or program components are designed, refined, and aligned to real user needs. The Co-create–Build–Engage (CBE) framework demonstrates how insights generated through mixed-methods co-creation activities translate into actionable design specifications, functional requirements, and implementation pathways for scalable and sustainable solutions. In practice, this means that co-created ideas, whether related to digital platforms, data collection tools, reporting interfaces, training modules, or engagement mechanisms, are iteratively shaped through stakeholder feedback before broader deployment. The result is a technology solution with stronger community fit, reduced implementation risk, and improved adoption potential because it reflects end user priorities, ensures usability, and strengthens long term community ownership. Co creation thereby provides a robust foundation for technology solutions that are socially legitimate, context specific, and capable of delivering enduring climate, environmental, or social outcomes.

Build

The Build phase of the CBE process translates the insights generated during the co creation into practical, valued solutions that people can voluntarily choose and adopt. In this phase, designers, practitioners, and stakeholders work together to shape an offering, whether it is a program, service, product, or system intervention, to ensure the final solution is relevant, convenient, and compelling. Build activities focus on transforming insights into design specifications, establishing the bundle of benefits the solution will provide, identifying delivery channels, determining appropriate pricing or effort expectations, and ensuring supportive processes and policies are developed. By doing so, the Build phase ensures that solutions are not merely communicative or educational but structurally support the new behaviour through accessible alternatives, supportive environments, and clear value propositions. The HITS framework (see Section 2) can be used to ensure that solutions move beyond telling people what to do and instead motivate and support them in adopting and using proposed technology solutions.

A central outcome of the Build phase is the creation of an exchange proposition. That is, a solution that people willingly opt into because it aligns with their needs, reduces barriers, and offers meaningful advantages over the current alternative. This phase emphasises practicality, feasibility, and system alignment by involving partners and delivery organisations to confirm resource availability, capability, and operational fit. Partnerships, funding models, implementation logistics, staff training, and policy alignment are solidified to ensure the solution can be delivered at scale and sustained over time. By grounding design choices in co-created insights and ensuring that the offering is both functional and valued, the Build phase lays the foundation for successful engagement and long-term behavioural change once the solution enters the Engage phase.

Engaging Community and Stakeholders to Drive Action

The Engage phase activates the solution developed during Build by ensuring that the intended audience is aware of it, can access it, and is motivated to trial and adopt it. Engagement focuses on maximising both mental availability (awareness and salience) and physical availability (ease of access), recognising that even the best designed

solution cannot create change unless people know it exists and can interact with it easily. During this phase, organisations deploy communication, outreach, and promotional activities designed to prompt trial, support early adoption, and create positive user experiences. The aim is not only to introduce users to the new product, service, or behaviour, but also to create the conditions for them to choose it voluntarily. The Engage phase is consistent with marketing's emphasis on value driven exchange (selling) rather than coercion (telling or informing).

As users begin interacting with the newly available technology solution, the Engage phase also emphasises continuous monitoring, feedback collection, and iterative refinement. In this phase, you track awareness levels, uptake, trial rates, repeat engagement, and user satisfaction to ensure that the technology solution is resonating and delivering its intended benefits. Engagement is not a static step; it is an adaptive process in which real-time learning informs adjustments to messaging, delivery mechanisms, or support structures. By maintaining a focus on user experience and behaviour over time, the Engage phase helps to sustain participation, strengthen value perceptions, and progress toward long term behavioural and systemic change outcomes.

COMPARISON OF CCS AND CO-DESIGN METHODS

ASPECT	CCS (CREATING COLLECTIVE SOLUTIONS)	CO-DESIGN
PROCESS TYPE	Structured, multi-phase	Iterative, user-centered
PARTICIPANTS	Stakeholders ($n=152$)	End users (early career personnel, $n=73$)
FACILITATION	Research team-led, structured voting	Research team-facilitated, creative ideation
CONSENSUS MECHANISM	Interpretive Structural Modelling (ISM)	Group discussion and design pitches
SENSITIZATION ACTIVITIES	Not included	Included (idea cards, warm-up tasks)
PRIMARY FOCUS	System-level change	User-centered innovation
KEY OUTPUTS	Action map, stakeholder designed solutions	User-designed healthy eating program ideas and actions
POWER DYNAMICS ADDRESSED	Power dynamics are proactively addressed through deliberate recruitment of a diverse range of stakeholder types, ensuring balanced representation. End users contribute early via surveys and are also present in the workshop, promoting inclusivity and shared decision-making.	Power dynamics are inherently addressed by positioning end users as central contributors in the design process. Their lived experiences guide ideation and solution development, ensuring that those most affected by the outcomes have a direct voice in shaping them.
TENSIONS OR DISAGREEMENTS	Managed through structured voting	Discussed within small design teams which reach consensus

Source: Authors

Appendix 1: Reading list

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Appendix 2: Breakout Activities

Session 1: Overview of Behaviour Change Technologies

1. Get into groups of four/five
2. Pick one social topic
3. Select a behaviour you want your target audience to carry out
4. Pick one audience segment. Define the audience in demographic and psychographic terms as narrowly as possible.
5. For the audience segment selected during the first session, develop a marketing campaign. Please consider the following:
    a. What is the competition?
    b. Competitive Analysis: Compare behaviours from the audience perspective

	Current Behaviour	**Desired Behaviour**
Benefits		
Barriers		

6. Outline how you would approach the 4 Ps of marketing (product, price, place, promotion). In other words, create an exchange offer that your audience cannot resist. One approach to addressing the 3 Ps (product, price, and place) is by creating a competitive advantage:

Current Behaviour	**Desired Behaviour**	
	Increase Benefits	Decrease Barriers
Decrease Benefits		
Increase Barriers		

Session 2: Impact Mapping and Social Return on Investment

Social impact refers to the societal and environmental changes—both positive and negative, intended and unintended—that result from investments. These impacts are long-term, compounding, and influenced by multiple factors beyond the initial activity. Like ripples that grow into waves, impacts evolve and interact with other forces.

To understand and measure this change, we can use the social impact chain:

Inputs: Resources invested (e.g., funding, time, infrastructure)

Activities: Tasks undertaken to achieve objectives (e.g., planning, analysis)

Outputs: Tangible products or services (e.g., events, training, communications)

Outcomes: Immediate changes in behaviour, attitudes, or awareness

Impact: Broader societal or environmental changes

Activity: Link the outcomes to the impact. Consider which are shorter-term measurable changes (outcomes), and which are longer-term, compounding or manifesting changes (impact)

Outcomes	Impact

Social Return on Investment (SROI) is a framework for measuring and accounting for the broader social, environmental, and economic value created by a project, organisation, or initiative—not just the financial return.

SROI tells you how much **social value** is created for every unit of investment. For example, an SROI ratio of 3:1 means that for every $1 invested, $3 of social value is generated.

Consideration Points in Applying SROI

SROI can be applied,

- To estimate the projected value of expected outputs;
- To evaluate the actual value of completed outputs.

Regardless of when it is used, SROI serves as a tool to communicate the broader social value generated by a project.

To ensure transparency and accountability, it is essential to clearly **disclose key attributions**—that is, how much of the impact can reasonably be credited to the intervention—as well as any **associated risks**. These risks include deadweight (what would have happened anyway), displacement (whether benefits come at the expense of others), and drop-off (how the impact diminishes over time). Addressing these considerations helps stakeholders understand the scope and limitations of the reported impact, thereby strengthening the credibility of the SROI findings.

Audience orientation

Putting people at the heart of what you do.

Audience orientation is a foundational principle in social marketing that emphasises understanding the people whose behaviour you aim to influence. Rather than assuming we know what is best for the community, social marketers invest time in understanding the audience's values, beliefs, motivations, and barriers and facilitators to the behaviour. This insight helps design tailored strategies that resonate and encourage voluntary behaviour change. In environmental contexts, such as energy conservation or biodiversity protection, it helps ensure that messages and solutions are aligned with the audience's lived experiences and capabilities. Ultimately, audience orientation increases the likelihood of engagement, adoption, and sustained impact, making it a critical step before developing any behaviour change program.

Activity: "Walk in their shoes."

The community:
The behaviour:
What might motivate them to change?
What barriers might they face?
What kind of message or approach would resonate with them?

Segmentation is a strategic process in social marketing that involves dividing a broad audience into smaller, more defined groups based on shared characteristics such as demographics, behaviours, attitudes, or needs. This approach recognises that people are diverse and respond differently to programs. By identifying distinct segments, social marketers can tailor messages, delivery channels, and incentives to better resonate with each group. This increases the relevance and effectiveness of behaviour change programs, making them more likely to be adopted and sustained. Segmentation also supports efficient use of resources by focusing efforts on groups most likely to benefit or engage. Ultimately, segmentation enhances impact by enabling more personalised, targeted, and ethical approaches to social change – and by increasing the likelihood of change within each group, it supports greater uptake across the group as a whole.

Activity: Identify and describe segments

Segments	1	2	3
Name			
Characteristics			

Activity: Propose strategies for segments

Segments	1	2	3
Name			
Strategies			

Session 3: Using Theories and Models to Increase Climate Technology Uptake (Why People Change and Why They Do Not)

Case Study: Great Barrier Reef Water Quality: Measuring Effectiveness of Lasting Behaviour Change for the Great Barrier Reef

This case study will discuss the intersection of tourism, sustainability, and behaviour change, with particular focus on the Great Barrier Reef (GBR), one of the world's most treasured tourism destinations. This natural wonder, which draws millions of visitors annually, faces a significant threat from water-quality issues stemming from farming practices in nearby catchments. The health of the GBR is crucial not only for the environment but also for tourism and the region's economy.

To safeguard the GBR, behaviour change is key. Griffith University's Social Marketing recently undertook a comprehensive three-year project to evaluate behaviour change programs aimed at reshaping farming practices to enhance water quality. This project aligns with the Reef 2050 Water Quality Improvement Plan (WQIP) and seeks to reduce harmful pollutants, including nitrogen, pesticides, and sediment, in waterways that flow into the reef.

As many of you know, tourism and the reef are deeply interconnected. The Great Barrier Reef supports over 64,000 jobs and contributes approximately $6.4 billion annually to the Australian economy, much of it from tourism. However, without a healthy reef, these numbers are at risk. This is why sustainable practices that protect the reef are vital not only for environmental reasons but also for the tourism industry.

Over three years, our research team analysed ten key initiatives supported by the Australian and Queensland governments. These initiatives aimed to reduce pollutants in the waterways surrounding the GBR, aligning with the broader goals of the Reef 2050 WQIP.

Our evaluation involved a range of research activities, including assessing the effectiveness of these programs, identifying barriers to success, and evaluating cost-effectiveness. We employed a mixed-methods approach—combining social assessment techniques, evidence reviews, and cost assessments—to understand the complex dynamics that influence behaviour change within the farming community. This holistic approach ensured that we measured short-term success and the potential for lasting, sustainable behaviour change.

The research drew on over 500 sources, including interviews, surveys, workshops, and direct observations, as well as secondary data from 200 surveys and 6,000 records. This extensive data collection identified over 200 factors influencing engagement and behaviour change. These factors were categorised into seven groups: enabling factors that foster engagement, and the absence of these factors that pose significant barriers.

One of this project's most important findings was the identification of 11 key barriers to practice change in the farming community. These barriers included a lack of resources, resistance to change, and limited access to knowledge and support. The success of any behaviour change program depends on recognising and addressing these barriers. Removing these obstacles is critical to ensuring that efforts to reduce pollutants in the GBR are successful and sustainable.

Another important finding was the role of cost-effective methods in nitrogen and pesticide reduction. The project emphasised the need to continue promoting these practices while learning from past experiences. By identifying what works—and what

does not—we can refine our approach and achieve greater success in protecting the reef.

The success of these programs depends not only on individual farmers but on the entire community—including government, businesses, and the tourism industry. The project underscores the importance of involving on-the-ground stakeholders in planning, decision-making, and implementing solutions. Collaboration is key to achieving lasting results.

Additionally, shared responsibility through ongoing monitoring and evaluation is vital. To ensure accountability, we recommend introducing key performance indicators (KPIs) for funded stakeholders. These KPIs will help track progress and ensure that everyone involved is working toward the same goals.

Now, you might wonder, how does all of this tie back to tourism? The health of the Great Barrier Reef is not just an environmental issue; it is an economic one. The tourism industry depends on a vibrant, thriving reef. Visitors come from all over the world to experience the natural beauty of the GBR, and if that beauty is diminished, so too is the appeal of the destination.

The findings from this research project are not just about farming practices—they are about protecting the future of tourism in the region. By ensuring sustainable farming practices and improved water quality, we protect the asset that draws tourists to Australia's shores. This is why the tourism industry is committed to supporting and promoting behaviour-change programs that protect the reef.

In conclusion, preserving the Great Barrier Reef is a shared responsibility. It requires commitment from governments, businesses, communities, and the tourism industry. Lasting behaviour change is not easy, but it is essential. By addressing barriers, promoting enabling factors, and fostering collaboration, we can create a sustainable future for the reef and tourism.

Key finding: Research identified 11 key barriers and over 200 factors across these three domains, highlighting why single-solution approaches have been unsuccessful.

Activity 1

Task: Complete a COM-B diagnostic

Desired Behaviour: [What specifically do you want people to do?]

CAPABILITY Analysis:

- What knowledge/skills are needed?
- What capability barriers exist?
- How could we address these?

OPPORTUNITY Analysis:

- What physical resources/infrastructure are needed?
- What social factors influence this behaviour?
- How could we address these?

MOTIVATION Analysis:

- What beliefs/attitudes affect this behaviour?
- What habits/emotional factors are involved?
- How could we address these?

Activity 2: Interview Role-Play Exercise

Participants pair up. Assign roles:

- Interviewer: CTCN technical assistance coordinator or NDE representative
- Interviewee: Takes on one of these personas:

PERSONA OPTIONS – please build out in infographic style

1. SMALLHOLDER FARMER - Climate-Smart Agriculture

- 5-hectare farm growing root crops and vegetables
- Current practices: Traditional methods, rainfall-dependent
- Aware of: Drip irrigation, climate-resistant crop varieties, soil moisture sensors
- Challenges: Irregular rainfall, soil degradation, market access
- Concerns: Upfront costs, learning curve, whether it will work here

5. SMALL BUSINESS OWNER - Energy Efficiency/Renewable Cooling

- Runs a small grocery store with refrigeration
- Current situation: Diesel generator for cooling, very expensive
- Aware of: Solar-powered cooling, energy-efficient appliances
- Challenges: High upfront cost, needs reliable cooling 24/7
- Concerns: What if it fails during the hot season? Can I afford it? Who fixes it?

Interview Guide: Climate Technology Adoption in SIDS

Opening: "I am working to understand barriers to climate technology adoption in [your sector]. I want to learn from your real-life experience. There are no right or wrong answers. I need to understand the actual challenges you face."

Background:

- "Tell me about [your current farming/energy/water/fishing/business] practices?"
- "What climate challenges are you experiencing?"
- "Have you heard about [specific technology relevant to their context]?"

CAPABILITY Questions:

- "What do you know about how [technology] works?"
- "What skills or knowledge would you need to use it?"
- "Who could teach you? Where would you learn?"
- "How confident would you feel operating/maintaining it?"

OPPORTUNITY Questions:

- "What infrastructure exists to support this technology here?"
- "Where would you get the equipment? Spare parts?"
- "What do others in your community/sector think about this?"
- "What financial support is available?"
- "Are there policies that help or hinder this?"

MOTIVATION Questions:

- "How important is this technology to solving your problems?"

- "What concerns do you have about adopting it?"
- "What would convince you it is worth the change?"
- "How much risk can you afford to take?"
- "Does this fit with how you see yourself/your work?"

Closing: "What is the biggest barrier preventing you from adopting this technology right now? If you could change one thing, what would it be?"

Capture 3-4 key insights on butcher's paper under CAPABILITY / OPPORTUNITY / MOTIVATION headings.

Activity 3: Design Your Intervention

CLIMATE TECHNOLOGY INTERVENTION DESIGN FOR SIDS

STEP 1: DEFINE YOUR FOCUS

Technology: _____ (e.g., solar home systems, drip irrigation, early warning systems, climate-resilient seeds, rainwater harvesting, energy-efficient cooling)

Target Users: _____ (e.g., smallholder farmers in [island], fishing communities, rural households, water utilities, small businesses)

Desired Behaviour: _____ (Be specific: "Install and maintain solar home systems" or "Use seasonal climate forecasts for planting decisions")

Current Situation: _____ (What do they do now? What climate challenge does this address?)

STEP 2: COM-B BARRIER ANALYSIS Based on your interview, list key barriers:

CAPABILITY Barriers:

1. _____

2. _____

3. _____

OPPORTUNITY Barriers:

1. _____

2. _____

3. _____

MOTIVATION Barriers:

1. _____

2. _____

3. _____

STEP 3: CO-CREATE APPROACH

Who MUST be involved in designing this intervention?

- End users (farmers/fishers/households)
- NDE representatives
- Local government
- Community/traditional leaders
- Private sector (suppliers, installers)
- CTCN Network members with relevant expertise
- Financial institutions
- Regional organisations (for supply chain)
- Other: _____

How will you engage them?

- Community workshops in the local language
- Demonstration sites with peer learning
- Co-design sessions with visual tools (for low literacy)
- Technical working groups
- Other: _____

What local knowledge/practices should inform the design?

_____

STEP 4: BUILD - Design Intervention Components

For EACH COM-B barrier, design a solution:

CAPABILITY Solutions:

Barrier 1: _____ → Solution: _____ (e.g., hands-on training by local champions, visual manuals, apprenticeship model, demonstration farms, peer mentoring)

Barrier 2: _____ → Solution: _____

Barrier 3: _____ → Solution: _____

OPPORTUNITY Solutions:

Barrier 1: _____ → Solution: _____ (e.g., establish local spare parts hub, coordinate regional procurement, link to Green Climate Fund, create maintenance cooperatives, negotiate bulk purchasing)

Barrier 2: _____ → Solution: _____

Barrier 3: _____ → Solution: _____

MOTIVATION Solutions:

Barrier 1: _____ → Solution: _____ (e.g., risk-sharing mechanisms, payments for ecosystem services, highlight early adopter success stories, address cultural concerns, demonstrate cost savings with local examples)

Barrier 2: _____ → Solution: _____

Barrier 3: _____ → Solution: _____

STEP 5: TECHNOLOGY-FINANCE LINKAGE

How will you address the TRL 7-9 financing gap?

- Link to GCF readiness program
- Blended finance approach
- Results-based payments
- Revolving loan fund
- Crowdfunding/community investment

- Link to NDC implementation budget
- Other: _____

What makes this financially sustainable long-term?

_____

Session 4: Creating Collective Solutions (CCS) — A Process to Guide Technology-Based Climate Action.

Wicked problems are complex, ill-defined challenges that resist straightforward solutions due to their interconnected nature and ***the presence of multiple stakeholders with conflicting values***. The term was coined by Horst Rittel and Melvin Webber in 1973, who identified characteristics that distinguish wicked problems from "tame" or benign problems. These characteristics include the inability to formulate the problem definitively, the lack of a stopping rule (you never know when you have solved it), ***solutions that are not right or wrong but rather better or worse***, and the fact that each attempt at a solution counts significantly because there is no opportunity for trial-and-error learning. Classic examples include climate change, poverty, healthcare reform, and urban planning; challenges where every intervention creates ripples of unintended consequences.

Systems thinking is an approach to problem-solving that views issues as parts of an overall system rather than isolated components. It emphasises understanding the relationships, patterns, and structures that connect elements within a whole, recognising that changing one part of a system affects other parts in often unpredictable ways. Systems thinking emerged from general systems theory, developed by biologist Ludwig von Bertalanffy in the 1940s and 1950s, and has since evolved into various schools of thought, including system dynamics, soft systems methodology, and complexity theory. The approach focuses on feedback loops, delays, non-linear relationships, and emergent properties that arise from interactions rather than from individual components.

Wicked problems and systems thinking have become increasingly vital as our societies become more interconnected and complex. Modern challenges rarely respect disciplinary boundaries or geographical borders: pandemics, economic crises, and environmental degradation demonstrate how local actions can cascade into global consequences. Traditional approaches, which break problems into manageable parts, often fail when dealing with wicked problems because the whole is genuinely greater than the sum of its parts. Systems thinking provides frameworks for understanding these interdependencies and for anticipating consequences. It acknowledges that stakeholders may legitimately disagree not just on solutions, but on what the problem actually is. This recognition ***shifts the focus from finding "the answer" to facilitating ongoing dialogue, adaptive management, and iterative learning***. Organisations that embrace systems thinking are better equipped to navigate uncertainty, identify leverage points for intervention, and avoid the trap of solving one problem while inadvertently creating others.

Activity: Imagine you are going to conduct a CCS process. Choose an issue to focus on (one issue per table) and draft a trigger question. The question must be capable of initiating thinking, reflection, and discussion. It can be priority- or barrier-driven. It must be open-ended.

Issue
Trigger question:
Refined trigger question:
Refined trigger question (again):

Stakeholder Identification and Classification

Stakeholder identification is the systematic process of discovering and documenting all individuals, groups, or organisations that can affect or be affected by a project, policy, or organisational decision. This process goes beyond the obvious participants to uncover hidden or marginalised stakeholders whose interests might not be immediately visible, but who nonetheless have legitimate stakes in the outcome.

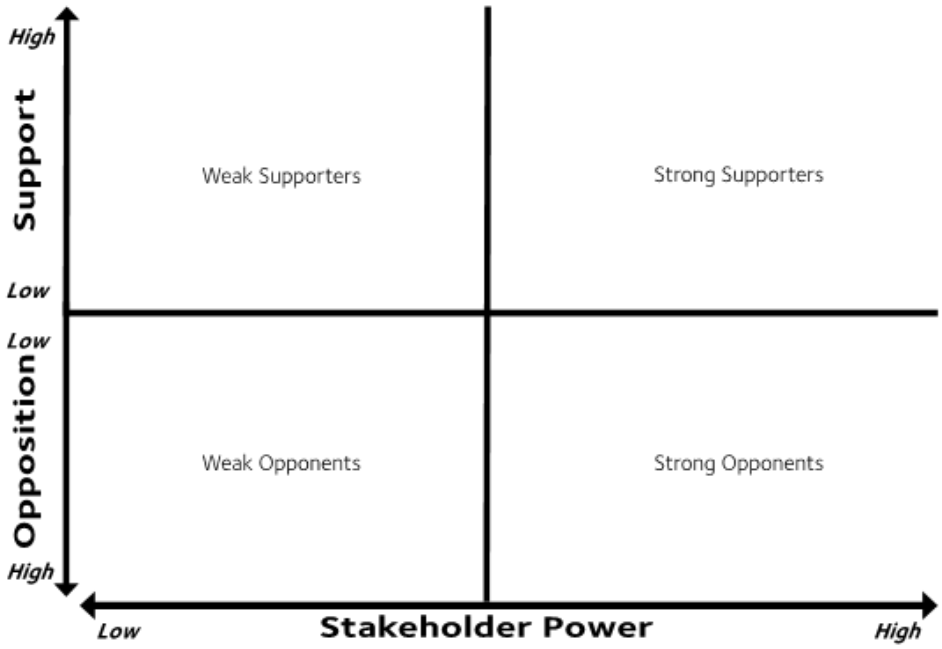
Effective stakeholder identification requires looking across multiple dimensions: those with formal authority, those with technical expertise, those who will experience direct impacts, those with resources to contribute, and those who might act as spoilers or champions. It may also involve recognising internal versus external, primary versus secondary, and active versus passive stakeholders. The process is iterative and dynamic; stakeholders can emerge or recede in importance as contexts change, and initial identification efforts often miss important actors who only become visible later in the process.

Stakeholder classification is the analytical process of organising identified stakeholders into meaningful categories based on attributes, relationships, or characteristics relevant to the issue at hand. Classification schemes help manage the complexity of multiple stakeholder relationships by providing a structured understanding of how different actors relate to the problem and to one another. Various frameworks exist for classification, each emphasising different dimensions. The power-interest grid maps stakeholders along two axes: their level of power or influence and their degree of interest in the issue. The choice of classification framework should align with your specific objectives; a power-influence matrix is particularly useful for understanding political dynamics and determining engagement strategies.

Activity: Continue as if you are planning a CCS process. Using the post-it notes, generate lists of stakeholders. Use the following to record details to keep after this session.

Stakeholder	Role

Activity: Using the post-it notes generated in the previous activity, classify them using the power and interest matrix.



Activity: Experience the voting rounds and then view the structural map. At your tables, decide which part of the map you would choose to develop (co-design) a solution for.

Session 5: Co-creating With People for the Impact

1. What first comes to mind when you hear the word innovation?

2. Write down 2-3 barriers that often impede innovation.

3. Fill in the Following:

How Might We _____ *Action*
_____ *What*
For _____ *Stakeholder*
To _____ *What change?*

4. Write your design objective (e.g., what problem do you need solved?).

5. Think about the different types of people (e.g., professions) you want to design your solutions for. Create your ideal design team.

6. Which design tool would you use to solve your problem?

The following authors, affiliated with UNEP-CTCN and Social Marketing @ Griffith, wrote the report:

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The Climate Technology Centre and Network (CTCN) is the operational arm of the UNFCCC Technology Mechanism, hosted by the UNEP. Since 2013, the CTCN has been promoting the accelerated transfer of environmentally sound technologies for low-carbon and climate-resilient development at the request of developing countries. CTCN delivers technology solutions, capacity building, and advice on policy, legal, and regulatory frameworks tailored to the needs of individual countries by harnessing the expertise of a global network of technology companies and institutions.

More information on CTCN's work globally: www.ctc-n.org

At Social Marketing @ Griffith, Griffith University, we lead the way in delivering transformative change. For over a decade, we've challenged the status quo. We have developed, delivered, and evaluated behaviour change programs. We have helped our partners build capacity and capability by sharing all that we know works. Our mission is clear: we are committed to making the world a better place. We ensure that people and our planet always come first. As we continue to deliver improved health and well-being, environmental, and social outcomes both in Australia and internationally, we look forward to partnering with you to shape a better future for all.

More information on Social Marketing @ Griffith's work: www.griffith.edu.au/social-marketing-griffith