Applying Behavioural Science to Advance Environmental Sustainability

An overview for policymakers

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Abstract

Applying behavioural science to environmental challenges can help policymakers better target and redirect unsustainable behaviours. This report draws on published work to provide an overview of behaviourally informed interventions, why they should be considered by governments and how they can be devised and applied. This is followed by an outline of the areas of opportunity in the environmental context and ends with a brief discussion of the challenges tied to applying behaviourally informed interventions. Given the urgency of changing trajectory of environmental degradation, this paper concludes that behavioural science presents an important opportunity to strengthen environmental policymaking in a wide range of contexts and deserves further investment by national governments in the environmental policy community.

KEYWORDS

Behavioural science, environmental sustainability, sustainable development, policymaking.

I. Introduction

BACKGROUND

This working paper responds to the urgent need to shift entrenched patterns of human behaviour that underlie the sustainability challenges facing the Asia-Pacific region.

Behavioural science has been applied in a variety of countries. Since 2010, the Governments of Australia, Canada, Denmark, Singapore, the United Kingdom, and the United States of America have set up dedicated entities for behavioural insight.[1] While much of the research and knowledge-production has taken place in developed countries or international entities, there is significant opportunity for expanding the application within developing country contexts.

Exploring the applications of behavioural science provides the opportunity to improve outcomes for sustainable development in ESCAP member states, aligns with the ESCAP secretariat's work to promote innovations in programme design and delivery – and responds to calls from United Nations leadership (see box 1).

Behavioural science promotes understanding of behaviour and decision-making, barriers to behaviour change and ways to overcome them. With this understanding, policies and interventions to address environmental challenges can be designed to steer individual decision-making and behaviour in more "sustainable" directions.

Policies and programmes designed with the inputs of behavioural science can prompt changes in public choice, driving changes on multiple environmental fronts.

Behavioural science has been used to reduce energy and water consumption, manage overfishing and reduce wildlife trade.[2] Behavioural science can be considered an essential tool for promoting environmental sustainability because environmental problems are largely human-induced and result from culture, policies and other factors. Its application helps policymakers understand why and how people do the things they do, enabling the targeting of those specific motivations or barriers when designing and implementing policy.

Behavioural science has been applied to directly support the environmental SDGs in the following ways.[3]

- **Affordable and clean energy (SDG 7):** by encouraging energy saving with regular feedback on usage and comparison to peers.
- **Sustainable cities and communities (SDG 11):** by broadening public transportation usage through live schedules and timely messages.

1. Nudge to action: Behavioural science for sustainability. unep.org. (2017). Retrieved 10 August 2021, from https://www.unep.org/news-and-stories/story/nudge-action-behavioural-science-sustainability

2. Behavioural Science | Guidance Note Secretary-General's Guidance on Behavioural Science. United Nations (2021). Accessed on 10 August 2021, from https://www.un.org/en/content/behavioralscience/assets/pdf/UN%20Secretary-General's%20Guidance%20on%20Behavioural%20Science.pdf

3. United Nations Behavioural Science Report. Uninnovation.network. (2021). Accessed on 10 August 2021, from https://www.uninnovation.network/assets/BeSci/UN_Behavioural_Science_Report_2021.pdf

- **Responsible production and consumption (SDG 12):** kickstarting recycling through targeted digital "nudges."
- **Climate action (SDG 13):** advancing climate action through public pledging.
- **Life on land (SDG 15):** placing garbage bins in convenient locations to decrease littering and promote proper waste disposal.

This paper outlines how behavioural interventions have, and can, empower policymakers in developing and implementing more impactful policy and programmatic interventions for the environment.

Box 1: Applying behavioural science in the work of the United Nations

United Nations Secretary-General António Guterres has called for the exploration and application of behavioural science in programmatic and administrative areas of the United Nations work. Building on the work that started in 2016 with the establishment of an Advisor on Behavioural Science, the UN Innovation Network brings staff together towards this aim. **"The Secretary-General's 2021 Guidance Note"** explores use-cases and applications of behavioural science in the UN system while the **"United Nations Behavioural Science Report"**, led by the UN innovation network provides a comprehensive review of the UN's involvement in behavioural science initiatives.

2. What are behavioural interventions?

Behavioural interventions are policy and other initiatives developed with the input of insights on human behaviour derived from the application of behavioural science.

The demand for more efficient and effective government interventions has led to a surge in interest in behavioural interventions. Behavioural interventions find their origins in the nexus between psychology, cognitive science and economics. They involve the use of experimentation and observation to identify patterns of behaviour within specific groups of individuals.

Behavioural insights are evidence-based; observed behaviour of specific targeted actors inform the design of behavioural interventions and policy, rather than leaving this critical design input to assumptions, models or calculations.[4,5] It is an approach towards policy that is more "people-centered".[6]

Whether the targeted behaviour is wasteful energy or water use, pollution, or causing unsustainable land use change, behavioural insights help to target the driving forces of environmental challenges. The potential for long-term positive change is maximized as behavioural science interventions work to first, understand the nature-society interface and second, reframe it towards a more sustainable trajectory.

One simple but powerful intervention informs consumers how their energy or water use compares to that of their neighbours' use, in order to prompt competitive behaviour to reduce energy or water consumption. This approach has been deployed in Costa Rica and elsewhere.

Another example from Montenegro is targeted at reducing carbon footprints by tourists through increased donations to environmentally friendly technologies such as solar-powered water transportation or solar-powered phone charging stations in city centres, etc.

A few behavioural interventions help produce this target outcome. First, tourists are offered a choice of technology that can be supported by their donation. Research shows that giving people agency over how tax dollars are invested increases tax compliance; therefore, the above intervention leverages this behavioural tendency. Second, removing small barriers to action can make desired actions easier. As such, tourists are given the option to make cash donations when they pay for their stay. Lastly, an online carbon footprint calculator allows tourists to donate in line with their climate impact.

This example brings together two types of approaches to shaping behavioural interventions – nudges and boosts. "Nudges" aim to change behaviour by changing the choices available, while "boosts" elevate competencies to evaluate options and choose more favourable behaviours (see Box 2).

4. OECD (2017), Behavioral Insights and Public Policy: Lessons from Around the World, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264270480-en

5. There are two technical types of behavioural interventions that are the outcomes of deliberate efforts to consider behavioural insights when developing or implementing policies. Behaviourally tested interventions are initiatives based on an ad-hoc test or scaled out after an initial experiment. Behaviourally informed interventions are initiatives designerd explicitly on previously existing behavioural evidence. OECD (2017), Tackling Environmental Problems with the Help of Behavioral Insights, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264273887-en

6. UNDP Innovation Facility. (2021). Behavioural Insights at the United Nations Achieving - Agenda 2030 [Ebook]. Accessed on 10 August 2021, from https://www.undp.org/publications/behavioural-insights-united-nations-achieving-agenda-2030

Box 2: Nudges and boosts are two common approaches to shaping behavioural interventions

"Nudges" aim to change behaviour by changing the choices available and making a specific (sustainable) choice more desirable, while "boosts" aim to elevate competencies to foster behaviour change.

Nudges

Nudging is based on understanding the psychology behind decision-making. The mental short-cuts that individuals mean that human behaviour can be highly context-dependent. Designing an intervention to overcome or harness cognitive biases that generally go undetected is referred to as *choice architecture*.[7] Thaler and Sunstein (2009) pioneered the idea of nudging and define nudges as "any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives".[8]

Boosts

"Boosting" requires leveraging and enhancing the natural competencies of individuals to create behavioural change. It assumes that individuals have the motivation to engage in the desired behaviour, but lack the means to do so.[9] The objective of boosts is to allow people to exercise their own agency in the decision-making process by fostering individuals' own decision-making competencies and helping them develop new ones. "Boost interventions" target skills and knowledge, the environment in which decisions are made and the available decision-making tools. Boosts enable individuals to translate their preferences and intentions into behaviour.[10] Examples of impactful "boosts" include initiating plan-making exercises for future goals to encourage long-term thinking, value-affirmation exercises to empower people to reframe their identity, and training around rules of thumb and personal initiative. Boosting can also encompass presenting information in an understandable format. For example, a technique that has been used to improve statistical reasoning when assessing risk is presenting information in absolute frequencies (for example, "one out of every three persons will typically…") rather than using percentages (33.33 per cent).[11]

7. Grüne-Yanoff, T., Hertwig, R. (2016). Nudge Versus Boost: How Coherent are Policy and Theory?. Minds & Machines 26, 149–183 https://doi.org/10.1007/s11023-015-9367-9

8. Hertwig, R., & Grüne-Yanoff, T. (2017). Nudging and Boosting: Steering or Empowering Good Decisions. Perspectives On Psychological Science, 12(6), 973-986. https://doi.org/10.1177/1745691617702496

9. Krüger, C., & Puri, J. (2020). Going the last mile: behavioural science and investments in climate change mitigation and adaptation. Ieu.greenclimate.fund. Accessed on 10 August 2021, from https://ieu.greenclimate.fund/sites/default/files/document/201123-going-last-mile-top.pdf.

10. Hertwig, R. (2017). When to consider boosting: Some rules for policy-makers. Behavioral Public Policy, 1(2), 143-161. Doi:10.1017/bpp.2016.14

11. Krüger, C., & Puri, J. (2020). Going the last mile: behavioural science and investments in climate change mitigation and adaptation. Ieu.greenclimate.fund.

3. What does behavioural science bring to the policymaker's table?

Behavioural interventions are designed specifically to target the identified behaviours which are driving factors for negative environmental outcomes.

Decisions spanning from what kind of vegetables to buy, to what kind of infrastructure to invest in, can be influenced by irrational mental shortcuts.[12] Behavioural biases can also affect the actual outcomes of policies which are designed to tackle environmental problems – and these outcomes can differ dramatically than the intended impacts.

By relying on knowledge derived from observation, testing or informed assumption about human behaviour, behavioural insights are more likely to change undesirable decisions. They are therefore likely to be more impactful, efficient and cost-effective in the long run.[13] The emphasis on evidence of changes in targeted behaviour opens opportunities for understanding long term policy impact – but in a reasonable time scale. Multiple policy options may be tested at the same time, on a small scale (and in similar, or differing contexts), to understand which policy option and human responses will provide the greatest benefit on a larger scale. By creating room for various experiments and trials, behavioural insights limit the risk of allocating resources to the full implementation of a set policy approach, which may be deemed as ineffective on a later date once the costly commitment has already been made.[14]

Behavioural interventions can add value at each stage of the policy cycle. Table 1 below explains how policy design; implementation and monitoring and evaluation can be made more effective through behavioural insights.

It should be recognized that policymakers are subject to the same kinds of cognitive biases that they seek to shift in others.[15] Cognitive bias within policymakers can lead to flawed policy and decision-making and wasted public resources.

A landmark study by the Behavioural Insights Team on behavioural science within government indentifies a few cognitive biases may be especially relevant to policymakers dealing with complex sustainability challenges: (1) the human tendency to rely on personal beliefs when interpreting information and (2) responsiveness to data that confirms existing understanding and assumption, and (3) the assumption that the public shares the same action-beliefs/ opinions and fully realizes and is ready to act on securing benefits of policymakers ideas.[16]

The tendency to rely on personal beliefs and assumptions for interpreting information is referred to as confirmation bias. This bias

12. Some examples include bounded rationality - limited human cognitive functions that affect and constrain problem solving abilities, bounded willpower which involves the human tendency to make decisions that are not compatible with long-term interests, and bounded self-interest which reflects the fact that individuals will at many times be willing to compromise their own interests to help others. OECD (2017), Tackling Environmental Problems with the Help of Behavioral Insights, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264273887-en

13. OECD (2017), Tackling Environmental Problems with the Help of Behavioral Insights, OECD Publishing, Paris.

14. OECD iLibrary | OECD Regulatory Policy Outlook. Oecd-ilibrary.org. (2018). Accessed on 10 August 2021, from https://www.oecd-ilibrary.org/sites/9789264303072-10-en/index.html?itemId=/content/component/9789264303072-10-en

15. Hallsworth, M. and Egan, M., 2018. Why Governments Need to Nudge Themselves. [online] Behavioural Scientist. Available at: <https://behavioralscientist.org/why-governments-need-to-nudge-themselves/> [Accessed 10 August 2021].

can be overcome by requiring transparency around the evidence base that informs policy decisions. Transparency could come in the form of publishing data to demonstrate why a certain policy or intervention is being implemented. This creates room for external evaluations of planned policy interventions.

The assumption held by policymakers that the public shares the same opinions as them and are just as enthusiastic as they are about their proposed policy plans is referred to as the illusion of similarity. A preventative method that can help policymakers overcome the illusion of similarity is asking: "What happens if there is zero interest or enthusiasm from the public for what we are doing or offering?" This strategy can filter out policy propsals that are informed by the illusion of similarity and help determine what polices or interventions may the be the best-fitted solutions. In addition, this strategy will also help policymakers prepare for any potential negative responses or compliance issues that may follow once the policy is in action.

Social-comparison bias can be successfully leveraged in policymaking - even to address corruption. In one case in Indonesia, a randomized control trial was conducted to study the effectiveness of an anti-corruption programme in road building. Bureaucrats were randomly selected to read audit results at community meetings, which would monitor and potentially reveal any theft in previous road construction projects.

The hypothesis of the study was that social sanctions may be strong enough to reduce corruption, even in the absence of formal institutional sanctions. The results of the trial confirmed this proposal, as publicizing the audits led to concrete reductions in corruption. Audited communities saw up to eight per cent of reduction in missing expenditures, when comparing the allocated funds to the required materials and labour costs.[17]

In the context of sustainability, the decisions of local governments have been influenced by publishing performance ratings. Pegging local government performance against sustainability indicators that are shared across a whole country has leveraged social bias to motivate change that secures results.

16. Bi.team. 2018. Behavioural Government. [online] Available at: <https://www.bi.team/publications/behavioural-government/> [Accessed 10 August 2021].

17. Olken, Benjamin A. "Monitoring corruption: evidence from a field experiment in Indonesia." Journal of political Economy 115.2 (2007): 200-249.

Table 1: Opportunities for applying behavioural science can be identified across all stages of the policy cycle

Policy Design	**New policies:** Behavioural insights may be **derived and then a pilot policy or regulation empirically tested in the policy context**. Behavioural insights can **fine-tune existing policy by providing information to assess whether or not the desired/needed changes in behaviour** are being prompted. **Existing policies:** Observations of responses to policy, **regulation or incentives can help to redesign or improve existing policy or interventions.**
Policy Implementation	Behavioural insights **can provide an understanding of the kinds of "nudges" and "boosts"** that might enable success in policy implementation. For example, municipal policy to reduced water use may be supported by both "nudges" and "boosts" directed at households. Behavioural insights **provide ways to localize policies**. As human responses may differ from location to location (depending on infrastructure, time use patterns, socio-cultural and other factors) understanding the different behaviours of target groups in different cities or communities that should respond to the policy, can help avoid the normal downfalls of one-size-fits-all policy implementation approaches.
Policy Evaluation	Carefully **defining the expected/beneficial behavioural change during the design phase helps establish meaningful indicators of impact** and monitoring mechanisms. Observations at the **"human"/individual/community scale can be made relatively quickly to assess whether driving forces are effectively tackled by the policy design**. By contrast perceptible environmental changes can happen on a long time-scale. Comparing **information on behavioural change with actual environmental change, provides a deeper understanding of what may be driving environmental change** – and so, whether complementary measures (such as tax measures, fines, strict regulations or bans, or similar) are needed. Close **observations of the challenges for compliance with a given environmental intervention can help identify the behavioural barriers** that must be addressed in a further round of policy design. This provides significant opportunity for fine-tuning policy design.

18. OECD (2017), Behavioral Insights and Public Policy: Lessons from Around the World, OECD Publishing, Paris.

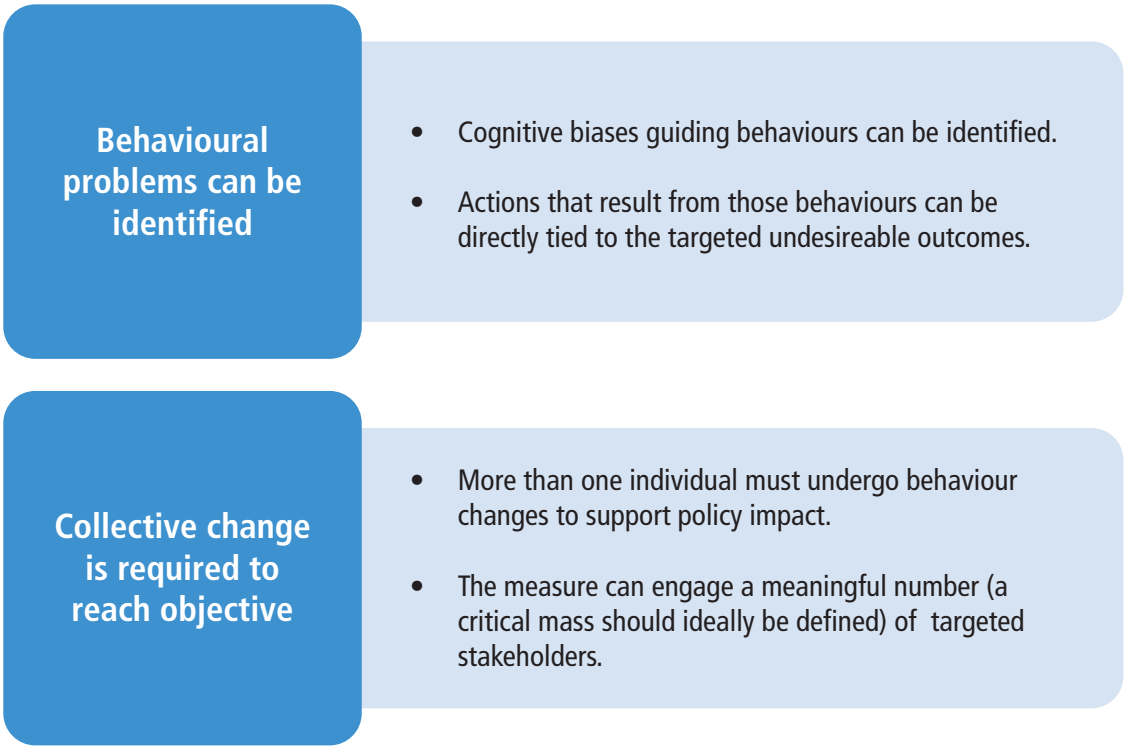
4. Devising behavioural interventions

CAN BEHAVIOURAL INTERVENTIONS MAKE A DIFFERENCE? - ASSESSING THE POLICY PROBLEM

A lack of institutional capacity can restrict access to the resources needed (labs, researchers, etc.) to devise and carry out behavioural interventions. There is a need to develop partnerships and support in order to foster innovation and strengthen institutional capacity and improved environmental governance.

Assuming institutional capacity to be present, predetermined "criteria" (see figure 1) can aid policymakers in deciding when a policy issue can be effectively addressed through a behaviourally informed solution. Such criteria should be applied at the stages of scoping the policy problem. The necessity to consider behavioural insights has been integrated in an "executive order," in the United States of America, mandating the evaluation of relevant costs and benefits of new regulation through this innovative lens, to help shape the correct policy response.[19]

Figure 1: Pre-defined criteria can help assess whether a given environmental problem may be a suitable candidate for applying behavioural insights as described below



19. OECD (2017), Behavioral Insights and Public Policy: Lessons from Around the World, OECD Publishing, Paris.

TARGETTING BEHAVIOUR CHANGE

There is significant room for applying behavioural science to both consumption and production processes. Consumers can be nudged towards more sustainable consumption decisions such as the reduction of necessities such as electricity and heating, the reduction of luxuries and overconsumption, the reduction of food waste, and the substitution and adoption of pro-environmental products such as electric vehicles.[20] Behaviour change by producers and manufacturing companies may require a stronger nudge due to the profit motive . Here, behavioural interventions can be paired with traditional market to prompt change in decision-making. Boxes 3 and 4 below show examples of behavioural science applied to increase sustainable outcomes for consumption and production respectively.

Box 3: China – Celebrity Messenger to Decrease Consumption of Shark Fins[21]

Yao Ming, a household-name basketball player in China who played for the Shanghai Sharks, has appeared in numerous WildAid campaigns, including messages such as, "I'm FINished with FINs". The goal of this intervention is to decrease demand for and consumption of shark fins. This intervention targeted consumers by choosing the right messenger. A messenger's authority can be established through popularity (celebrity) or knowledge (experts). Using peers as messengers can also be affective as they are more relatable and leverage existing relationships.[22] This intervention may be compared to traditional ad campaigns where celebrities are used to endorse and promote a product; therefore, in order to prevent such interventions from feeling like ads, they must be targeted at a specific behaviour or attitude rather than the purchase or non-purchase of a specified branded product.

Box 4: Indonesia – Program for Pollution Control, Evaluation and Rating (PROPER)[23]

The PROPER initiative targeted polluting firms and plants in order to abate water pollution, and other pollutants such as hazardous waste. This intervention used a simple colour-coded system to rate the environmental performance of companies. Each firm's ratings were widely published by BAPEDAL (Indonesia's National Pollution Control Agency). This intervention leveraged social comparison bias to nudge firms towards increased compliance with pollution standards - and improved ratings. Along with increased compliance levels, another benefit of this program was a lower implementation cost than conventional enforcement, as it did not rely on time-consuming legal procedures.

20. Thøgersen, J., 2021. Consumer behavior and climate change: consumers need considerable assistance. Current Opinion in Behavioral Sciences, [online] 42, pp.9-14. Available at: <https://www.sciencedirect.com/science/article/pii/S2352154621000309> [Accessed 10 August 2021].

21. Rare and The Behavioural Insights Team. (2019). Behavior Change For Nature: A Behavioral Science Toolkit for Practitioners. Arlington, VA: Rare. Accessed on 10 August 2021, from https://www.bi.team/wp-content/uploads/2019/04/2019-BIT-Rare-Behavior-Change-for-Nature-digital.pdf

22. TRAFFIC and The Behavioural Insights Team. (2019). Reducing Demand for Illegal Wildlife: Choosing the Right Messenger. [ebook] Cambridge: TRAFFIC International. Available at: <https://www.traffic.org/site/assets/files/12129/dr-good-practice-guidelines-messengers-vfinal.pdf> [Accessed 10 August 2021].

23. Performeks.com. 1995. What is Proper? Reputational Incentives for Pollution Control in Indonesia. [online] Available at: <https://www.performeks.com/media/downloads/what%20is%20proper.pdf> [Accessed 10 August 2021].

BASE PRINCIPLES FOR INTERVENTION

There is no single, accepted approach to devising and applying behavioural interventions. Every intervention will vary depending on the policy objective, observed behaviours, target group, etc. However, there are many toolkits and step-wise models, which are applicable to behavioural interventions, that can guide policymakers in covering the right areas when designing such interventions.[24, 25, 26]

There are three base principles help to frame effective behavioural interventions.[27]

I. **Motivate the Change:** Many motivations lie beneath people's daily awareness. To motivate the desired change, policymakers, along with researchers, must harness conscious motivations (identified through data collection) and non-conscious motivations (which behavioural science has identified as cognitive biases) in order to design effective interventions. A change can be motivated by leveraging positive emotions; framing messages to personal values, identities, or interests; personalizing and humanizing messages; harnessing cognitive biases; and designing behaviourally informed incentives.

II. **Socialize the Change:** Humans are social creatures and act according to two major social mechanisms, social proof and peer pressure. Social dynamics are complex, but when understood, they can be used to increase outcomes for environmental sustainability through the establishment of 'social enforcement'. This is especially important for the environment because many conservation and climate outcomes depend on community cooperation and the recognition of group benefits over individual interests. A change can be socialized by promoting desirable norms, harnessing reciprocity, increasing behavioural observability and accountability, encouraging public commitments, and choosing the right messenger.

III. **Ease the Change:** In many cases, individuals lack the motivation to do something due to the difficulty associated with doing so. Pro-environmental decisions and behaviours must be re-positioned and reframed to represent the 'path of least resistance'. This can be done either by supporting the individual, or changing the environment around them. Policymakers can ease a change by removing frictions and promoting substitutes, providing support with planning and implementation of intentions, simplifying messages and decisions, altering the choice setting, and using timely moments and prompts to initiate change.

24. Rare and The Behavioural Insights Team. (2019). Behavior Change For Nature: A Behavioral Science Toolkit for Practitioners. Arlington, VA: Rare.

25. Williamson, K., Satre-Meloy, A., Velasco, K., & Green, K., 2018. Climate Change Needs Behavior Change: Making the Case For Behavioral Solutions to Reduce Global Warming. Arlington, VA: Rare. Accessed on 10 August 2021, from https://rare.org/wp-content/uploads/2019/02/2018-CCNBC-Report.pdf

26. Service, O., Hallsworth, M., Halpern, D., Algate, F., Gallagher, R., Nguyen, S., Ruda, S., Sanders, M., Pelenur, M., Gyani, A., Harper, H., Reinhard, J. and Kirkman, E., 2014. EAST Four simple ways to apply behavioural insights. [ebook] The Behavioural Insights Team. Available at: <https://www.bi.team/wp-content/uploads/2015/07/BIT-Publication-EAST_FA_WEB.pdf> [Accessed 10 August 2021].

27. Rare and The Behavioural Insights Team. (2019). Behavior Change For Nature: A Behavioral Science Toolkit for Practitioners. Arlington, VA: Rare.

FOUR STEP PROCESS TO DESIGNING BEHAVIOURAL INTERVENTIONS

Once behavioural factors have been identified as the driving forces of a specific undesired outcome, and the decision has been made to move forward with a behavioural approach to the issue, the following steps can aid in demonstrating how to devise the necessary behavioural interventions. This scoping exercise helps ensure that the actors who are targeted are the ones who can make meaningful changes towards the environmental outcomes.
Figure 2 illustrates these four steps via an intervention developed in the Philippines.

I. **Data collection:** First, the data is collected through randomized controlled trials (RCTs); quasi-experimental studies; laboratory experiments; and surveys, focus groups and interviews.

II. **Analysis to derive behavioural insights:** The next step consists of analyzing the data to make note of any trends or relationships between variables. Some factors to look for are causation, correlation and majority/minority attributes.

III. **Identify specific levers as a basis for design of the policy or intervention:** Data observations produce behavioural insights about the target policy/ intervention actor. Behavioural insights help to identify behavioural levers that can be deployed to encourage desired behavioural changes. These levers dirrectly respond to different motivations and barriers related to target behaviours.

IV. **Design the interventions that respond to the specific behavioural levers identified: Lastly, the behavioural levers are incorporated into policy design to create case-specific interventions.** Lastly, Box 5 explains how Insights about the behaviour of the targeted actor help identify leverage points for designing interventions.

Box 5: How Behavioural Insights Inform "Levers" for Intervention Design

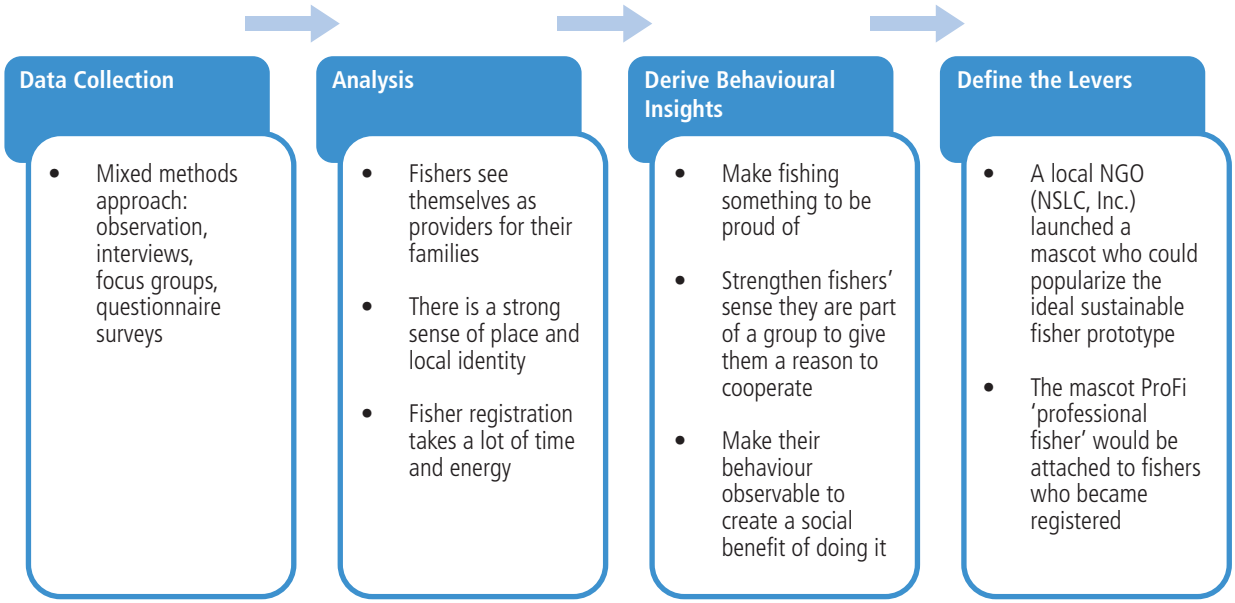
Insights about the behaviour of the targeted actors help identify the types of behavioural motivations and barriers related to target behaviours.

Behavioural interventions can be classified by the type of "behavioural levers" used. There are many different intervention typologies, depending on the identified cognitive bias that is informing a certain behaviour. A behavioural lever harnesses or counters a specific cognitive bias and allows the intervention to target this bias in a way that guides behaviour towards a more desirable outcome.

'Simplification and framing of information' is the most observed behavioural intervention because it can more readily be applied to existing policy, in comparison to other behavioural levers. However, there is opportunity to expand applications for all behavioural levers depending on the relating behavioural barriers and intervention objectives. It is important to note that a behavioural intervention can comprise of one, or a combination of various behavioural levers.

Table 2 provides a synthesis of seven common behavioural levers that together provide an accessible "toolbox" for policymakers to follow when designing behaviourally informed solutions for environmental governance.

Figure 2: The four-step process – a case study from Tinambac, Philippines aimed at creating a more sustainable fishing industry



Adapted from Behaviour Change for Nature – The Behavioural Insights Team 2019.

Table 2: Cognitive biases and their corresponding behavioural levers for policy design

Cognitive Bias	Behavioural Lever	Example
Present bias: Individuals have a natural tendency to skew attention to the present and adopt risky or unsustainable behaviours.	**Simplification and framing of information:** Prevent information overload and simplify information by framing it to activate certain attitudes of individuals, such as long-term thinking.	Energy efficiency labels on electric appliances that are framed to demonstrate relative ranking of future energy savings.
Salience bias: Individuals focus on information that is prominent or physically attractive.	**Changes to the physical environment:** Interventions should apply changes to physical environment to harness the influenceability of low-involvement decision making. This lever aims to make the decision more attractive and visible to the decision-maker.	Colour coordinating recycling bins in libraries for each material with pictures of related products. The bright colours encourage individuals to focus on the act of recycling and the images allow individuals to find the right bin for their product with ease.
Status-quo bias: Individuals are generally risk averse, avoid uncertainty and have the tendency to stick with the familiar.	**Changes to default:** Incorporate and modify default choices into policy design by setting the default option as the most sustainable or compatible with specified goals.	Change the default settings of thermostats to foster energy savings.

Cognitive Bias	Behavioural Lever	Example
Social-comparison bias: Individuals have a tendency to compare themselves to others around them and conform to social norms	**Use of social norms and comparisons:** Strengthen social norms by harnessing social-comparison bias to encourage behaviour change.	Bills that display a comparison of a household's energy or water consumption in comparison to other same-sized households in the neighbourhood.
Availability bias: Individuals recall events that are the most memorable or can be easily recalled. When thinking about something, they rely on the most immediate examples that comes to mind.	**Use of feedback mechanisms:** By providing timely feedback, individuals will have a stronger ability to recall the impact of their decisions and increase their awareness of their daily choices.	Real-time in-home displays connected to smart energy meters that provide feedback on energy consumption and costs.
Endowment effect/loss aversion: Individuals value losing what they already have higher than they would if the same thing was being evaluated as a potential gain. They have greater sensitivity to losses than equivalent gains.	**Reward and punishment schemes:** Offering an individual a privilege or gift, and then presenting the potential loss that could come with it will increase the likelihood of acting according to the desired behaviour, in comparison to simply stating they will receive a reward for behaving a certain way.	Provide loyalty cards for sustainable behaviours that require 12 stamps and have two pre-stamped, rather than having a card that requires 10 stamps. In the former scenario the card will be more effective because individuals will not want to lose the opportunity to reap the benefits of the two stamps that were initially provided.
Commitment bias: Individuals have the tendency to prefer not to act in ways that contradict what they have said or done in the past.	**Goal setting and commitment devices:** Documenting or keeping record of measurable goals and commitments can be used to encourage behavioural changes that individuals may typically lose motivation for.	When an individual purchases a large electric appliance or moves into a new home, they can be asked to commit to a targeted goal of energy/water consumption and be provided with follow-ups on the objectives with regular tips.

28. Rare and The Behavioural Insights Team. (2019). Behavior Change For Nature: A Behavioral Science Toolkit for Practitioners

29. Krüger, C., & Puri, J. (2020). Going the last mile: behavioural science and investments in climate change mitigation and adaptation. Ieu.greenclimate.fund.

30. Mont, O., Heiskanen, E. and Lehner, M., 2014. Nudging. A tool for sustainable behaviour?. [ebook] Bromma, Sweden: Swedish Environmental Protection Agency. Available at: <https://www.researchgate.net/publication/271211332_Nudging_A_tool_for_sustainable_behaviour> [Accessed 10 August 2021].

31. Thaler, R., & Sunstein, C. (2008). Nudge: Improving Decisions about Health, Wealth and Happiness. Yale University Press.

5. A closer look at applying behavioural science in three policy domains

There is abundant opportunity to exploit behavioural science when looking to increase outcomes for environmental sustainability. This section looks at the application of behavioural science in three areas: climate change, human rights and civic participation, and environmental protection.[32]

CLIMATE CHANGE

Human behaviour must be understood and redirected towards more sustainable decision-making that will support the low-carbon transition and carbon neutrality, in order to effectively tackle the climate crisis. Since the mid-20th century, anthropogenic greenhouse gas emissions have been the main driver of climate change arising from energy, transportation systems, infrastructure, land degradation, deforestation and other human environmental impacts.

Behavioural research has shown that consumers need assistance to make more climate friendly decisions, whether by making climate-friendly options the default choice (requiring consumers to "opt out" of climate-friendly action, rather than "opt in"), or by reflecting carbon footprints in product pricing.[33] Investing to make it easier for individuals to switch to electric cars by making charging more convenient can help provide important nudges. Human behaviour is a very important factor to consider when devising climate change mitigation interventions, and such interventions could either focus on reducing GHG emissions or enhancing the sinks that absorb such emissions.

Countries committing to greenhouse gas emissions under the Paris Agreement can use behavioural science as a tool to reach targeted goals. RARE – the center for behaviour and the environment – identifies four sectors where behavioural solutions for climate mitigation should be directed: food, agriculture and land management, transportation, and energy and materials – with energy and transport being the key GHG emission factors.[34]

Bangladesh has recognized and utilized this approach to increase the use of public transit in order to reduce GHG emissions, as it is home to the fourth-most polluted city in the world and people spend approximately 2.5 hours in traffic every day. An analysis from 2014 concluded that people were deterred from taking public transit due to long wait times and unreliable bus schedules. In order to address this barrier, the United Nations Development Programme developed a smartphone app called "goBD" that shows people the real-time location of buses using GPS technology, expected time of bus arrivals, and how long their trip will take.

The goal of this project was to increase usage of public transit in order to reduce traffic congestion and the resultant pollution and contribute to mitigation efforts. This intervention worked to ease the change by removing frictions that would typically prevent individuals from taking public transit.[35] The UN Behavioural Insights Team worked further on this project with the aim to increase engagement with the programme, by designing

32. Williamson, K., Satre-Meloy, A., Velasco, K., & Green, K., 2018. Climate Change Needs Behavior Change: Making the Case For Behavioral Solutions to Reduce Global Warming.

33. Thøgersen, J., 2021. Consumer behavior and climate change: consumers need considerable assistance. Current Opinion in Behavioral Sciences, [online] 42, pp.9-14.

34. Williamson, K., Satre-Meloy, A., Velasco, K., & Green, K., 2018. Climate Change Needs Behavior Change: Making the Case For Behavioral Solutions to Reduce Global Warming.

35. UNDP Innovation Facility. (2021). Behavioural Insights at the United Nations Achieving - Agenda 2030 [Ebook].

a 'push notification text' to be delivered to users before their expected morning commutes. Such a timely message leverages the salience bias by making the information more prominent to the individual's eye. This project showed that traditional mitigation solutions such as encouraging individuals to take public transit can be carried out more effectively through the use of behaviourally informed interventions.

There is great opportunity for changing consumption patterns for climate mitigation.[36]

HUMAN RIGHTS AND CIVIC PARTICIPATION

Research shows that where environmental rights are protected, better environmental outcomes are secured.[37] The right to participate in public life and to access information and decision-making processes helps ensure that the right to a healthy environment can be claimed by rights holders, i.e. the public, and that the conditions to deliver on these rights are put in place by the duty bearers, i.e. those who are responsible for establishing and maintaining the conditions for these rights to be enjoyed.

A healthy environment directly supports the livelihood of communities as many individuals directly depend on ecosystem services for economic support and in more scarce circumstances, subsistence living.

However, rights holders do not always claim their rights, whether through ignorance that the right exists (information is difficult to access), or through perceptions (well-founded, or otherwise) that claiming such rights will be difficult, expensive, lengthy or potentially harmful.

Thus, behavioural science can be applied to understand why people do not claim the right to information and participation even when harmed by environmental change. These insights can help design interventions that increase the public's actions to claim the right to a healthy environment.

On the other hand, responsible institutions can lack motivation to carry out their duties to promote the fulfillment of civic participation and the right to a healthy environment. When there is low demand from the public, or when weaknesses in governance, lapses in delivery are tolerated, or even expected.

Several types of cognitive biases can be leveraged to ensure that the public can participate in securing public enjoyment of environmental rights.

The power of behavioural science where regulation and other pollution control measures were failing was shown more than 20 years ago in Indonesia. In the late 1990s, making information about the polluting behaviour of private firms public, and comparing polluting behaviour across companies, significantly changed pollution outcomes. The programme's simple colour-coded rating system leveraged salience bias to increase access to previously obscure pollution information and social comparison bias to motivate change in firms that were rated poorly.

Connecting individual decision-makers to specific groups of people who may be affected by their decisions, for example by loss of livelihood or disease due to downstream pollution of a nearby river, can strengthen motivation to act to protect the right to a healthy environment. Behavioural insights from "identifiable victim experiments" suggest that this may help build empathy among decision makers. One potential area of application involves repositioning "speaking up" as a collective action problem.

36. Krüger, C., & Puri, J. (2020). Going the last mile: behavioural science and investments in climate change mitigation and adaptation. Ieu.greenclimate.fund.

37. Research on environmental rights in Asia-Pacific countries shows that where environmental rights are provided for in national constitutions, Environmental Performance Index scores are higher, on average. See ESCAP, Asian Development Bank and UNDP (2019). Accelerating progress: An empowered, inclusive and equal Asia-Pacific. Available at https://sdgasiapacific.net/knowledge-products/0000005.

38. Expert Roundtable on Business, Human Rights and Behavioral Science: A Summary Report. Shiftproject.org. (2021). Accessed on 10 August 2021, from https://shiftproject.org/wp-content/uploads/2019/09/VRP-Summary-Report-26April.pdf

There is more evidence that more people speak up if others do, so responsible institutions may offer anonymity to individuals who wish to speak up, in order to spark a collective voice when needed.

Behavioural interventions can also be used to shift harmful socio-cultural norms. For example, the public can be informed of a popular belief from another country, community, or cultural context that is contradictory to local norms, but has proven to produce benefits for human rights elsewhere. Individuals may begin to advocate for or act upon this popular belief as its legitimacy is established by its wide acceptance elsewhere. If a local norm is to dump material waste in a river, and individuals are informed that in another community there is consensus that dumping material waste in rivers infringes upon the right to access clean water, they may be more encouraged to advocate for their right to clean water and speak up against decision-makers who pollute the rivers.[38]

The OECD points out that governments and institutions can use behavioural insights to help improve the effectiveness of engagement with stakeholders.[39] If these engagements are carried out with clarity and transparency, they can foster trust between citizens and counterparts, using behavioural science to boost the frequency and quality of the public's response to surveys, to encourage constructive complaints which can help improve government interventions, but also in the long run, encourage civic participation and strengthen relations between citizens and governing bodies – conditions which are essential for delivery across the sustainable development goals, but in particular the environmental goals.

ENVIRONMENTAL PROTECTION

When behavioural science is incorporated into conservation strategies, the decisions that have led to irreversible levels of biodiversity loss can be better understood and redirected. Rare - the centre for behaviour and the environment - has identified six overarching strategies for behaviour change that can be used to categorize various conservation intervention typologies. These themes encompass the behavioural levers in Table 2, but also provide a broader guide for considerable factors to look for when devising behavioural interventions for environmental protection. The six strategies are emotional appeals, social influences, choice architecture, information, material incentives, and rules and regulations. Policymakers should explore complementary leverage points for each behavioural intervention, as human behaviour is complex and can be redirected from multiple angles.

Economic instruments are common environmental policy tools. When economic instruments are informed by behavioural science, they can become more powerful. The plastic bag charge in the United Kingdom has reduced plastic bag use by 83 per cent. The charge leverages multiple cognitive biases. First it harnesses salience bias by acting as a reminder of what individuals should or should not do, second it targets status-quo bias by establishing a new default and lastly, it imposes a new social norm which simultaneously addresses social-comparison bias.

As well, financial rewards can be paired with other behavioural interventions to increase their effectiveness. For example, the Wolong Nature Reserve in Chengdu, China had the goal to increase farmers' re-enrollment in a program that produces pastures or forests from agricultural land. Farmers received a payment upon enrollment in the Grain-to-Green program, and when they were given information about their neighbours' behaviours in converting land, farmers were more likely to re-enroll. This example demonstrates another approach to complementing economic instruments by leveraging pro-social behaviour and promoting a desirable norm. The behavioural nudge of

39. OECD (2017), Behavioral Insights and Public Policy: Lessons from Around the World, OECD Publishing, Paris
40. Rare and The Behavioural Insights Team. (2019). Behavior Change For Nature: A Behavioral Science Toolkit for Practitioners. Arlington, VA: Rare.
41. Rare and The Behavioural Insights Team. (2019). Behavior Change For Nature: A Behavioral Science

providing information about other individuals in the same social group harnessed social comparison bias to reach the target goal.

Bans in trade in ivory, shark fin, tiger bone and similar products create illegal markets, crime and corruption. Behaviourally informed interventions can couple such bans with "boosts" to elevate individuals' awareness and understanding. "Nudges" are essential complements; pro-environmental awareness may lead to an increase in recycling but this outcome is unlikely if there is a significant compromise in convenience, enjoyment or profit.[40]

When designing interventions to address conservation threats, it is important for policymakers to know the target groups for behavioural solutions in order to foster the greatest impact of related policies. Behavioural insights can help identify the right targets for behaviour change - based on understanding which group is most influential for a given environmental issue. The measures to reverse habitat loss and degradation could consider targeting farmers, consumers, fishers and businesses; actions to reduce exploitation may target consumers, fishers and loggers; reducing the demand for illegal wildlife trade of tourists, locals and businesses; and managing and mitigating pollution through behaviour change in consumers, farmers, industry and local governments.[41] "Effective targeting can be boosted by behavioural observation. Relying on assumptions to determine the main policy target can lead to policy failure, especially when dealing with complex environmental policy challenges.

A study in the Northern Republic of Congo demonstrates a behavioural intervention that is targeted towards community hunters in order to establish a more sustainable management system for a common pool resource – bushmeat. Field experiments tested individual decisions to hunt and farm under three conditions: "without communication between group members, with communication, and with communication and a self-monitoring system".[42] The findings show that inter-group communication must be paired with inter-group monitoring in order to effectively lower hunting levels and reduce the rate of resource decline. This behavioural strategy harnesses commitment bias by guiding action through peer-to-peer commitments.

Toolkit for Practitioners. Arlington, VA: Rare.

42. Marrocoli, S., Gatiso, T., Morgan, D., Nielsen, M., & Kühl, H. (2018). Environmental Uncertainty and Self-monitoring in the Commons: A Common-pool Resource Experiment Framed Around Bushmeat Hunting in the Republic of Congo. Ecological Economics, 149, 274-284. https://doi.org/10.1016/j.ecolecon.2018.03.020
43. OECD (2017), "Behavioural Insights in Public Policy: Key Messages and Summary from OECD International Events, May 2017", OECD, Paris, www.oecd.org/gov/regulatory- policy/OECD-events-behavioural-insights-summary-may-2017.pdf.

6. What are the challenges of applying behaviourally informed interventions?

The challenges of applying behaviourally informed interventions involve data collection, knowledge transfer, capacity building and ethical issues.[43,44,45] As behavioural science is tested in an increasing number of policy domains, the challenges of producing successful interventions and initiatives will continue to arise.

Data collection: Data collection must be collected on location and inform insights that are socio-culturally and economically contextualized in order to derive accurate behavioural insights.

Knowledge transfer: Peer to peer learning and collaboration can help to identify synergies and leverage learnt insights to create stronger behavioural initiatives across the board.

Capacity: Government institutions often lack the capacity to pilot behavioural science projects on their own. Broadened awareness for behavioural science and tailored training are factors that can elevate an institution's ability to successfully carry out behavioural interventions. Establishing collaborative partnerships within related entities such as those in the UN system can provide new perspectives for best-practices and strengthen any existing technical capacities.

Ethical issues: Behavioural insights and interventions are ever evolving, thus there is the need to develop a set standard for their application to minimize issues of distrust and ethical concerns around manipulation. Concerns have arisen expressing that if transparency is not maintained throughout the process of establishing behavioural interventions, individuals may feel they are being tricked by institutions into having all their behaviours controlled against their own will. Stakeholder engagement and transparent evaluation reports on implemented behavioural interventions will be critical tools to aid in addressing this challenge.

44. OECD (2017), Tackling Environmental Problems with the Help of Behavioral Insights, OECD Publishing, Paris.

45. United Nations Behavioural Science Report. Uninnovation.network. (2021).

7. Conclusion

Solving both global environmental crises and localized environmental pressures will rely heavily on changing human behaviour.

Environmental problems are behavioural problems, and therefore require behaviourally informed solutions. This review shows that it is critical for policymakers to consider behavioural science when devising and implementing policy aimed at tackling environmental issues. The benefits of adopting this innovative approach to environmental sustainability include cost effectiveness, scalability and evidence-based intervention.

There are many opportunities to apply behaviourally informed interventions in environmental contexts such as climate change, human rights, and biodiversity loss and conservation, including by expanding the development of nudge-based behavioural interventions in developing countries.

These opportunities also exist at every stage of the policy cycle and so can be readily applied to strengthen existing policy.

Institutions aiming to incorporate behavioural science into their practices, can build capacity by working with experts to design and implement a behaviourally-informed intervention. The UN Innovation Network is helping to deepen and widen the application of behavioural science in the support provided to governments, despite the challenges.

The UN Innovation Network is helping to deepen and widen the application of behavioural science in the UN's work with governments and other stakeholders.

Formal training and increased application in the Asia-Pacific could help reduce environmental pressures in this region.

Given the urgency of the environmental challenges faced, increased support for the application of behavioural science is highly recommended.

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