



Guide to promoting water sensitive behaviours

Angela Dean and Liam Smith



Australian Government
Department of Industry,
Innovation and Science

Business
Cooperative Research
Centres Programme

Guide to promoting water sensitive behaviours

Accelerating the transition to water sensitive cities by changing behaviour (Project A2.2)

Authors

Dr Angela J Dean^{1,2} and Associate Professor Liam Smith¹

¹ Monash University,

² The University of Queensland

© 2016 Cooperative Research Centre for Water Sensitive Cities Ltd.

This work is copyright. Apart from any use permitted under the Copyright Act 1968, no part of it may be reproduced by any process without written permission from the publisher. Requests and inquiries concerning reproduction rights should be directed to the publisher.

Publisher

Cooperative Research Centre for Water Sensitive Cities
Level 1, 8 Scenic Blvd, Clayton Campus
Monash University
Clayton, VIC 3800

p. +61 3 9902 4985

e. admin@crcwsc.org.au

w. www.watersensitivecities.org.au

Date of publication: March 2017

An appropriate citation for this document is:

Dean, A. & Smith, L. (2016). *Guide to promoting water sensitive behaviours*. Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities

Disclaimer

The CRC for Water Sensitive Cities has endeavoured to ensure that all information in this publication is correct. It makes no warranty with regard to the accuracy of the information provided and will not be liable if the information is inaccurate, incomplete or out of date nor be liable for any direct or indirect damages arising from its use. The contents of this publication should not be used as a substitute for seeking independent professional advice.

Table of contents

Table of contents	3
Executive Summary	4
Why change behaviour?	5
Need for action	5
Water sensitive behaviours	5
Regulation or voluntary approaches?	6
Overall approach to behaviour change	7
Choose a behaviour	7
What influences these behaviours? Identify footholds for intervention	7
Identify the target outcomes	8
Intervening to change behaviour	10
Communicate ‘why’ and ‘how’	10
Make it easy	10
Prompts	11
Feedback	11
Rewards	11
Social modelling	12
‘Foot in the door’ interventions	13
Goal setting	13
Commitments	13
Putting it into practice	14
Which tool?	14
Consider habits	14
Engage with the community	14
Consider multiple tools	14
Should we target certain types of people?	15
Evaluate effectiveness	15
Examples of successful behaviour change campaigns	17
Target 140 Campaign, Australia	17
References	18

Executive Summary

Why change behaviour?

Communities have a strong role to play in the transition to water sensitive cities. There are many behaviours that communities can adopt – in the home, or in their communities – that can facilitate the diverse water sensitive outcomes.

Approach to behaviour change

It is important to choose a specific behaviour that has meaningful environmental impact, and is acceptable to communities.

The next step is understanding factors that influence this behaviour. This can help to identify 'footholds' for intervention, and understand what barriers may limit uptake of water sensitive behaviours. These factors may influence knowledge about the issue, attitudes towards the issue or the behaviour, or contextual factors such as cost or ease of adopting the behaviour.

It is also important to identify how to assess whether your behaviour change intervention has been effective. Evaluation criteria may assess the number of people adopting the behaviour. Evaluations may also assess intermediate outcomes, such as change in issue awareness, or end-stage goals such as changed environmental outcomes.

Interventions for behaviour change

There are many different interventions that research shows can lead to behaviour change. The right intervention will depend on many factors, including the type of behaviour and the context in which you are implementing your behaviour change program.

Approaches to practice

When implementing your behaviour change initiative, it is important to consider community perspectives throughout this process. This will help to identify barriers to change, and provide opportunities to align your program with community values, enhancing the likelihood of uptake.

Not all behaviour change campaigns are effective, so it is important to evaluate your program and share your learnings with others.



Why change behaviour?

Need for action

Rapidly growing populations and changing climates put significant pressure on both availability and quality of freshwater resources (Vorosmarty et al., 2010, Padowski and Gorelick, 2014). Addressing these challenges and ensuring future security of freshwater resources requires new approaches to water management (Marlow et al., 2013, Vorosmarty et al., 2010). In a water sensitive city, we manage water in ways that:

- Provide water security through efficient use of diverse resources
- Create public space in the city that can collect, clean and reuse water. Capturing water throughout the city – either city wide or in specific suburbs – can provide different sources of water for all types of different use
- Mitigate flood risk and damage
- Enhance and protect the health of waterways and wetlands, the river basins that surround them, and the coast and bays. Healthy waterways and coastal areas are not only important for the natural environment, but for the social and economic benefits that these environments generate.

Pursuing these goals requires diverse technological, investment and policy solutions (Brown et al., 2009). Many of these solutions require communities to adopt new behaviours to generate meaningful change. For example, policies that aim to reduce domestic water demand require individuals to follow regulations or recommendations about domestic water use. Development of new household technologies requires individuals to purchase or install these technologies, or use them appropriately.

Water sensitive behaviours

The community has an important role to play in the transition to water sensitive cities (Dean et al., 2016c). There are many individual behaviours that householders can undertake to promote water sensitive outcomes. Household water use has been a target for many behaviour change initiatives that aim to reduce domestic water demand. To achieve this, households may be encouraged to have shorter showers, change garden watering practices, or install water-efficiency devices such as low-flow shower heads or rainwater tanks.

But there are many other individual behaviours that can influence water sensitive outcomes, such as health of waterways. For example, one target may be to reduce stormwater pollution and associated negative impact on waterways. This could involve a range of individual behaviours, such as:

- Reducing consumption of pollutants (such as plastics, microbeads, or certain chemicals)
- Increasing correct disposal of pollutants (such as recycling, or taking chemicals to a safe disposal site or installing a microplastic filter on washing machines)
- Reducing the amount of hard surfaces on private property or installing a private raingarden to reduce stormwater flows from private properties.

Behaviour change campaigns may also look beyond the household, and encourage individuals to engage in stewardship behaviours, such as restoration of local waterways, or events such as 'Clean Up Australia Day'.

While we accept that some people already engage in these behaviours, it is generally accepted that there is scope for increasing society's engagement in these behaviours. To address this, behaviour change programs identify ways to increase uptake of water sensitive behaviours.

Regulation or voluntary approaches?

There are many different perspectives on how to improve water sensitive behaviours. For example, reviews of water demand management programs suggest changing the price structure of water can achieve reductions in household water use. However, pricing mechanisms and mandatory policies raise equity issues and require political will in the face of potential resistance from the community (Steg et al., 2006). In addition, achieving substantial reductions in household water use requires large price increases or stringent mandatory policies (Renwick and Green, 2000). In general, people are more supportive of policies that aim to change their behaviour voluntarily, than through pricing schemes and regulations (de Groot and Schuitema, 2012).

When considering whether a behaviour change intervention is potentially suitable or necessary for your situation, remember that behaviour change tools are well suited to use in combination with other types of policy interventions. Behaviour change approaches can be utilised alone, or alongside other policy implementation strategies. For examples, demand reduction strategies for household water use may utilise changes in pricing structure, restricting certain types of water use, and behavioural strategies. Approaches to reduce urban stormwater pollution may combine structural approaches such as water sensitive urban design, with initiatives to reduce littering.

Overall approach to behaviour change

Choose a behaviour

Be specific

An essential element of initiating a behaviour change campaign is to select which behaviours should be targeted for change. The more specific behaviours we select, the easier it is for individuals to respond to our campaign (Steg and Vlek, 2009).

For example, if we are starting an initiative to reduce household water use – asking people to have shorter showers or to make sure the washing machine is full before use is easier for people to follow than the request to ‘save water’. Similarly, reminders to “bin your butts” or dispose of chemicals properly are easier to follow than the call to ‘look after waterways’.

Which behaviours have the greatest impact?

When selecting an individual target behaviour, an important issue to consider is which of the behavioural options will generate the greatest environmental impact (Gardner and Stern, 2008). For example, installing a rain water tank and plumbing it into the bathroom is likely to generate greater reductions in water use than turning off the tap while brushing teeth. Providing opportunities to reduce individual plastic consumption will potentially have a greater impact than promoting recycling.

Sometimes this will be difficult to assess. For example, when considering the impact of different household behaviours on stormwater pollution, there is less objective data available to inform this decision. There may also be local issues that influence the potential impact of behaviours. In such circumstances, it may be difficult to identify the ‘highest impact’ target behaviour. Instead, it may be necessary to consult with a range of experts to identify potential behaviours that have a meaningful impact on the target outcome.

Which behaviours are people more likely to adopt?

Choose target behaviours that are feasible and acceptable to the community (Smith et al., 2012, Steg and Vlek, 2009). The environmental impact will be minimal if the target behaviour is too difficult for individuals to adopt or unpalatable for other reasons. For example, encouraging recycling in geographic areas with limited kerbside recycling schemes is unlikely to generate a meaningful impact. Similarly, asking people to install an expensive water-saving device may have limited uptake without an associated rebate or financial incentive.

What influences these behaviours? Identify footholds for intervention

Understanding what factors influence water sensitive behaviours can help us identify potential ‘footholds’ for changing these behaviours (Steg and Vlek, 2009, Gifford and Nilsson, 2014). Many different issues can influence behaviour.

Awareness, skills and knowledge

It is difficult for people to engage in a water sensitive behaviour if they don’t know why they should engage in the behaviour, or how to do the behaviour. For example, some individuals may not know how to fix leaks in their house, which will create a barrier adopting this behaviour.

Costs and benefits

For some people, there are many barriers to engaging in water sensitive behaviours. These might relate to the physical effort involved, the cost of purchasing a necessary item, or mental effort involved in remembering to do the behaviour. Behaviour change programs may consider strategies to make behaviours easier. For example, campaigns to reduce littering behaviours may decide to increase the presence of public waste bins to make waste

disposal easier. There may also be benefits of certain behaviours that are important to identify, such as reduced water bills, greater water availability for gardens, or a cash return for depositing containers.

Social factors

Individual behaviours are influenced by social norms and personal values. Social norms reflect the 'rules' that are accepted within a social group. For example, *descriptive norms* reflect the degree to which a behaviour is perceived to be common within a social group, and *injunctive norms* refer to the extent that certain behaviours are approved of (or disapproved of) within society, in a social group or by influential individuals.

Personal values may also influence behaviours. For example, research shows that people with environmental values are generally more likely to engage in behaviours that support environmental outcomes. However, many water-sensitive behaviours may align with other values. These include behaviours linked to healthy waterways that could align with community values about family recreation, safe seafood, or aesthetics of our public spaces.

Emotions

Some behaviours are heavily influenced by emotions related to symbolism and status. This is likely to be an important influence on certain behaviours, such as car use or consumption of high-status items. In some areas or social groups, water sensitive behaviours may also take on high status, such as being able to maintain gardens and green space.

Cognitive biases

We all experience a range of assumptions, perceptions – and at times, misperceptions – about the world around us. These misperceptions can influence engagement in environmental behaviours. For example, high users of water in the house may be more likely to believe that others also use high amounts of water. We are also more likely to notice and retain information that agrees with our existing knowledge and values. This can make it challenging to raise environmental issues with individuals who have limited awareness of, or engagement in, environmental issues.

Contextual factors

These have an important influence on ability to engage in water sensitive behaviours. For example, asking individuals to recycle requires a recycling scheme to be present and accessible. Asking people to reduce their car use requires availability of affordable public transport.

One important contextual factor that influences people's capacity to engage in water-saving behaviours is whether they are a renter or a home-owner. Renters do not always receive water bills or information about their water use and have less capacity to modify their homes by installing water-saving appliances. Home ownership may also provide individuals with a sense of personal control and security, allowing them to engage with 'supplementary' issues such as water conservation (Dean et al., 2016c).

Identify the target outcomes

There are many different ways to think about the desirable outcomes generated by a behaviour change campaign (Steg and Vlek, 2009). These include:

- *Factors that influence the behaviour:* some campaigns may examine whether there has been an increase in awareness about the behaviour, or more positive attitudes about the behaviour
- *Uptake of the target behaviour:* awareness and positive attitudes do not always lead to behaviour change, so it is important to assess the extent to which people have adopted the behaviour. Behaviour change can be measured via self-report using social surveys, or via objective measures such as household water use, or volume of rubbish recycled.
- *Environmental outcomes:* in some circumstances, the goal of promoting water-sensitive behaviours is to improve a particular environmental outcome, such as water availability, or pollutant loads detected in waterways.

- *Liveability outcomes*: a key component of the water sensitive vision is to promote liveability. So if behaviour change initiatives lead to greater greenspace (public or private), or ability to enjoy waterways safely, these are important outcomes to consider.

Intervening to change behaviour

There are many different techniques that can be used to get more people to engage in water sensitive behaviours, or get those people already engaging in water sensitive behaviours to do this more frequently. These techniques are informed by substantial research focusing on pro-environmental behaviours, such as household energy and water use, and recycling (Steg and Vlek, 2009, Osbaldiston and Schott, 2012). These findings align with research examining many other types of behaviours, such as those related to healthy eating or exercise. The techniques discussed below may also be utilised for behaviours in the home or public behaviours.

Communicate ‘why’ and ‘how’

Providing information is a common ingredient in many behaviour change campaigns. There are two types of information:

- ‘Why’ information: this provides information about the issue, and the rationale for performing a specific behaviour. For example, highlighting how much pollution ends up in waterways and the impact of this pollution on marine life would highlight ‘why’ an individual should consider performing a behaviour focused on reducing pollution. This is also called ‘declarative information’ or ‘justification information’.
- ‘How’ information: this can tell people about how to perform a specific behaviour, or how to achieve a certain behavioural target. For example, explaining what products can be recycled (or not), or recommending four-minute showers to save water are examples of ‘how to’ information. This type of information is also called ‘instructional’ information or ‘procedural’ information.

It is important to recognise that while information is useful, campaigns that rely on information alone are less likely to generate behaviour change outcomes. This is because most behaviours are influenced not only by lack of awareness, but by issues such as ease, emotions, norms, and habits. Changing behaviour effectively usually requires adding in an extra ingredient that addresses these issues (Osborne and Schott, 2012). Research also suggests that individuals who are less engaged in issues are also less likely to notice information about the issue – making it difficult to build change (Dean et al., 2016a).

Make it easy

These interventions address the situational barriers to engaging in a behaviour, and make the behaviour easier to adopt. Examples of this type of intervention could include:

- Moving recycling bins to a more convenient location to make it easier to recycle
- Making low-flow shower heads more available to increase purchasing
- Placing products with minimal plastic packaging at the front of a display and products with more plastic packaging at the back to shift consumption patterns from higher waste to lower waste.
- Providing bags for animal faeces that neatly attach to dog leads to make it easier to pick up animal waste

Sometimes just making something look easy can improve uptake of the behaviour. For example, recycling rates can be increased by matching the shape of the opening in the recycling bin to the shape of the object to be recycled - so small circles for cans and bottles, and slits for paper. It is thought that this works via reducing the mental demand of thinking about recycling.

Prompts

Prompts, or reminders, are tools that remind people to do a certain behaviour. They are most suited when the target behaviour is acceptable to the community and easy to do, but also easily forgotten. These might include reminders for a range of behaviours:

- Turning off lights when leaving the room
- Turning off taps while brushing teeth or shaving
- Having shorter showers
- Putting out recycling on particular days
- Turning computers off at the end of the day
- Take rubbish with you
- Reuse towels in a hotel bathroom

When using prompts, make sure any other barriers to engaging in the behaviour are already addressed. Ensure your prompt is eye-catching so it catches people's attention. Make sure that the location of the reminder is closely situated to where the activity is done. So, a reminder to turn off the taps when brushing teeth should be situated close to the bathroom tap and toothbrush.

Feedback

Feedback involves giving people who have engaged in a behaviour information about how well they have done it, or the impact that their behaviour has generated. Understanding the effectiveness of a behaviour is important for motivating people to adopt a new behaviour, or continue an existing behaviour. It also helps people learn what works and what doesn't. Feedback is more effective when given frequently.

The most common type of feedback used for water sensitive behaviours is quantifying household water use via billing mail outs. Being able to examine the impact of water-saving behaviours on household water use allows households to adjust their behaviour accordingly over the coming billing period. Feedback is an important part of water demand reduction initiatives. Similarly, feedback is commonly used as a technique to reduce household energy use.

For many other water sensitive behaviours, identifying opportunities for individual feedback can be challenging. For example, it is difficult to provide feedback about household behaviours that aim to reduce stormwater pollution. Stormwater flows and pollutants are rarely measured with the degree of detail required to give individual-level, or even precinct-level feedback.

Some commercial buildings provide information about the amount of energy or water used over time. Feedback can also be provided across geographic areas. For example, providing information about the amount of plastic recycled, or overall reductions in water use maintain motivation, and also activate social norms (see 'Social modelling' below).

Rewards

Providing incentives can have a strong influence on behaviour. Rewards can be include financial incentives, or simple rewards such as an automated 'thankyou'. Conversely, disincentives can be used, such as implementing fines for littering, or charging higher rates for excessive water use.

Financial rewards are often suitable when high financial cost is a barrier to engaging in the behaviour. For example, providing rebates for installation of water-efficiency devices is a commonly used and effective incentive. Transport policies that aim to increase use of public transport might increase cost of parking, while simultaneously reducing the cost of public transport.

Even when a behaviour doesn't require financial outlay, small financial rewards can still lead to behaviour change. For example, many Australian states have committed to a 'cash for containers' scheme. Under this scheme, when people return a beverage container (e.g. plastic bottle) to a reverse vending machine, they receive a small refund. These schemes have been shown to reduce the amount of plastic bottles that end up as litter or land fill (West and Symes, 2008).

Social modelling

Interventions that use social modelling are based on human nature and our tendency to adopt the behaviour of others, especially significant others, such as public figures. When public figures publicly engage in a behaviour, whether it be trusted professionals in the community, or celebrities, it can increase uptake of these behaviours throughout the community. For example, when a Hollywood actor discussed climate change during a recent awards ceremony speech, this generated a titanic increase in information seeking about climate change, referred to as the Leonardo di Caprio effect (Leas et al., 2016). In Singapore, having influential figures drink recycled water in public is thought to have contributed to building support for recycled water scheme (Guan and Toh, 2012)

But we don't need international celebrities to harness the power of social modelling. The social norms intervention most familiar to many of us may be the use of cards in hotel bathrooms, encouraging us to reuse towels. Experimental studies examining effectiveness of different calls to reuse towels report that pointing out that the majority of other guests also reuse their towels is more effective than just asking guests to save the environment (Goldstein et al., 2008).

This applies to many other behaviours. When conducting an information campaign, communicating the high proportion of the population or a social group engaging in a particular behaviour can contribute to reductions in household energy use (Nolan et al., 2008), household water use (Fielding et al., 2013), and enhance support for environmental policies (de Groot and Schuitema, 2012)

People take cues about the existing social norms not just from our communications, but also from the environment around them. So when designing communication initiatives, it is important to not inadvertently generate a counter-reaction. For example, if a campaign asked individuals to reduce littering by showing them an area with a high amount of litter, this would communicate two messages: (i) that 'not littering' is desirable (*injunctive norm – our perceptions about whether others approve of a behaviour*), but also (ii) that littering is a common behaviour (*a descriptive norm – our perceptions of what others do*). In this scenario, the most influential message may be that others litter a lot, and activating this negative norm may hinder any anti-littering message. This is why we sometimes see campaigns that 'congratulate' people for their high recycling rates (see Figure 2).



Figure 2. Example of a campaign that activates positive descriptive and injunctive norms

‘Foot in the door’ interventions

There are many different types of interventions that aim to build on existing positive values, attitudes or behaviours. These are sometimes referred to as ‘cognitive dissonance’ interventions. Cognitive dissonance is the term for when people experience an inconsistency between their values or attitudes and behaviours. When people experience cognitive dissonance, they usually try to resolve it. In the context of promoting water sensitive behaviours, reminding someone that they value waterways, but highlighting that they don’t act on waterway pollution, will create cognitive dissonance; individuals may then resolve this dissonance by changing their behaviour to align with their behaviours. Highlighting high rates of water use in people who see themselves as ‘water savers’ can increase uptake of water-saving behaviours. Some of these targeted approaches may be not always be suitable for use in the broader population.

Other interventions in this category focus on existing behaviours, and build on past successes. For example, it has been theorised that engaging in a simple water-saving behaviour in the home (e.g. turning off the tap when teeth brushing) can lead people to engage in more significant actions such as collecting warm up water in the shower or installing water-saving devices. This notion that engaging in certain water sensitive behaviours may act as a trigger or catalyst for engaging in other, potentially more significant water sensitive behaviours, is called behavioural spillover (Thøgersen and Ölander, 2003). The effectiveness of behavioural spillover interventions is a current research area for the CRC for Water Sensitive Cities (Lauren et al., 2016).

Goal setting

Goal setting has become a popular way for people to support their personal behaviour change goals – programs like ‘Dry July’ and ‘Meat-free Mondays’ create a collective pathway towards a specific goal. In the context of water sensitive behaviours, goal setting is a regularly used component of household water demand reduction campaigns. Currently in Victoria, individuals are encouraged to limit their water use to 155 litres per day. Campaigns that raise awareness about the negative impacts of single use plastics on oceans encourage people to refuse certain single use plastics for a certain period (e.g. a week or month). Other goals for water sensitive behaviours could include:

- Always take my own coffee cup
- When purchasing new garden plants, make sure they are suited to the climate
- Pick up plastic bottles off the ground when there is a bin nearby
- Always take plastic bags when I take the dog for a walk
- Get the car serviced at least annually

Some goal setting programs may ask people to keep a diary, or record, of certain behaviours. This ‘personal feedback system’ can help to quantify to what degree someone has met their goals. It could also highlight contexts when the behaviour was successfully adopted, and circumstances where it wasn’t, identifying key areas for future focus.

Commitments

Commitment interventions ask individuals to make a commitment to engage in a particular behaviour. Written commitments can be made by signing a pledge card, whereas verbal commitments can be made by asking individuals to specifically state their commitment to adopting a particular behaviour. It is thought that written pledges may be more effective than verbal ones.

Research shows that when people make such a commitment, they are more likely to subsequently engage in the behaviour. Commitments are most effective when people have already shown some interest in the issue and target behaviour. Commitments are unlikely to be effective if people feel pressured to make a commitment. Another version of commitment involves asking people to specify not only the behaviour they intend to change, but the way they intend to change it.

Putting it into practice

Which tool?

There is no strict formula for identifying which tool is most appropriate for your situation, but there are things to consider. Is your target behaviour relatively easy? If so, 'low intensity' interventions such as prompts combined with information might be suitable.

Understanding what factors influence the behaviour in your area will also provide clues about which intervention is most appropriate. If there are specific barriers to engaging in the behaviour, think about ways to make it easier. Interventions that make the behaviour easier to adopt can often be combined with information and prompts.

Some behaviours might require more effort and consideration by community members. In these circumstances, consider social modelling, goal setting and commitments (Osbaldiston and Schott, 2012).

Consider habits

Many behaviours that are potential targets for behaviour change campaigns are very habitual (Verplanken and Roy, 2016). Habitual behaviours are automatic behaviours that we repeat regularly, usually at the same location and time. Because they are habitual, they are less influenced by deliberate intentions, and can be harder to change. Sometimes crises (e.g. droughts or floods), disruptions (e.g. road closure) or new regulations (e.g. water restrictions) can create opportunities to introduce new behaviours into routines.

Engage with the community

When designing behaviour change programs, it is important to engage with the community prior to design and implementation. In the early stages of planning a behaviour change initiative, engaging with communities can provide valuable insights and perspectives on the issue, the target behaviours and other potential solutions. Engagement can also identify any unexpected barriers to implementation of your initiative (Steg and Vlek, 2009). Aligning your campaign with community values can enhance the effectiveness of your campaign.

Consider multiple tools

Many behaviour change approaches are complementary, and can be used in combination to improve the overall effectiveness of the intervention (Osbaldiston and Schott, 2012). One review of behaviour change studies reported that the majority (78%) of studies included for review used multiple tools (Osbaldiston and Schott, 2012). Commonly utilised combination included:

- Rewards and goal setting
- Goal setting and 'how to' information
- Commitment and goal setting
- Prompts and making it easy,
- Prompts and 'why' information
- Cognitive dissonance and 'why' information.

Should we target certain types of people?

This depends on the type of issue you are addressing. Do you need most of the population to adopt the target behaviour, or it is satisfactory for a smaller proportion of people to adopt the behaviour?

Some programs, such as those aiming to reduce domestic water use during droughts, aim to target the majority of the population. This works within the assumption that if everyone makes a small reduction, this can lead to large impact overall. In these scenarios, we need to encourage everyone to adopt the target behaviour. However, we may use different approaches to motivate different social subgroups. For example, research examining community profiles of engagement in water-related issues suggests that interventions with disengaged individuals may need to address barriers related to renting or socioeconomic disadvantage (Dean et al., 2016c).

For other issues, it might not be feasible to target the majority of the population. For example, if you are hoping for a proportion of households to install a raingarden on their property, you might target certain social groups with greater capacity or potential interest in raingardens. These might include those interested in gardening, people in suburbs where the average backyards are large, or in areas where there has been an identified issue with overland stormwater flows.

Evaluate effectiveness

Formal evaluation provides an important way to assess the outcomes of your behaviour change campaign. Evaluation can assess whether you have met a range of goals and objectives, not just whether individuals adopt the behaviour. It may include perceptions about the behaviour, awareness about the issue, or environmental indicators relevant to the behaviour. Evaluating effectiveness is important because not all campaigns are effective (Dean et al., 2016b, Kurz et al., 2005, Geller et al., 1983) and in some cases campaigns can inadvertently trigger the opposite response (see 'Social modelling', above).

There are many ways to consider the success of your engagement initiative. Evaluations benefit from including a diverse mix of indicators of success, including processes, outcomes and impacts:

- Process indicators: could include the number of community members effectively targeted, whether these individuals were representative of the broader community, and perceptions of the behaviour change initiative
- Outcome indicators: change in community awareness of the rationale for behaviour change, change in number of people adopting the behaviour, increased number of individuals promoting behaviour change information within their social network
- Impact indicators: reduced water demand, improved water quality

Choosing a mix of outcome indicators can ensure that you don't 'miss' some aspects of your project. For example, choosing only process indicators will not allow you to examine the effects of your behaviour change initiative on actual target behaviours or long-term impact. Choosing only impact indicators may mean you miss a range of intermediate benefits that prevent you from understanding the pathway to this impact. In some cases, long-term beneficial impacts may occur beyond the time period of the behaviour change initiative.

Outcomes may be assessed using a range of techniques. For example, community surveys provide the opportunity to estimate how many people are performing the behaviour of interest. They also provide the opportunity to assess perceptions about the initiative and whether there are any additional barriers to performing the behaviour. It is important for survey participants to be representative of the broader population of interest. Behaviours may also be assessed using observation studies. For example, evaluators may monitor behaviour in a public place and quantify the proportion of individuals using recycling facilities.

In general, effective evaluations involve measuring the behaviour prior to the intervention, and at completion of the intervention. Depending on the budget available, and the nature of the issue, more frequent assessment of

indicators may be conducted. Evaluation that is conducted throughout the life of your project allows you to adapt the project to meet changing needs. Consider what has been done well, and what has not been done well. Plan how you can learn from this project, and how to share the knowledge across your organisation.

Examples of successful behaviour change campaigns

Target 140 Campaign, Australia

The Target 140 Campaign was run during the Millennium Drought in South East Queensland (Walton and Hume, 2011). A key element of this campaign was its use of multiple interventions. These included:

- *Providing 'why' information:* government and media outputs provided daily updates on the severity of the drought and declining water levels in dams
- *Providing 'how to' information:* households were regularly provided with information about different ways to save water. These sometimes targeted specific areas of the house (e.g. 'Saving water in the bathroom', or 'Saving water in the garden') and were provided across diverse formats and platforms.
- *Goal setting:* a key feature of this campaign was encouraging residents to adopt a specific goal. Key goals were: reducing shower time to 4 minutes or less; and reducing overall to 140 L per person, per day.
- *Prompts:* government distributed plastic shower timers with suction cups for positioning in the shower. These not only allowed monitoring of shower times, but acted as visual reminder at the point of use to have a shorter shower.
- *Rewards:* governments provided a range of rebates to support installation of water efficiency devices such as low-flow shower heads.
- *Feedback:* water billing information provided regular feedback about average daily water use
- *Social modelling:* water bills also provided information about water use of others in the neighbourhood and across the region as a whole. For high water users, this communicated that others were 'outperforming' them on water saving behaviours. There was also widespread use of signage on house fronts indicating "Tank water in use", activating positive descriptive norms about uptake of rainwater tanks.

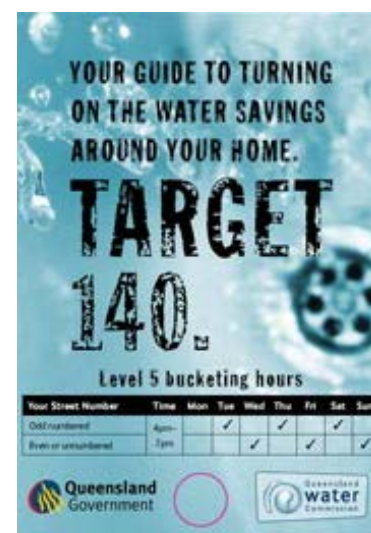


Figure 3. The Target 140 Campaign used diverse strategies to promote reduction of household water use in South East Queensland

This campaign ran for 8 months, from May to December 2007. Over this time, it generated a 22% reduction in average daily water consumption. The Queensland Water Commission reported that during the 2007-2008 financial year, average daily water consumption fell to 129 litres per person. During the following financial year, the daily per person target was relaxed to 200 litres. Despite this, average daily water use remained low, at 132 litres per person. It is thought that the multidimensional nature of the campaign contributed to its success, in which it addressed costs and benefits of action, social factors, and enabling factors (Walton and Hume, 2011). This campaign was considered an important success, instilling long-term water conservation behaviours into everyday routines.

References

- Brown, R. R., Keath, N. and Wong, T. H. (2009) 'Urban water management in cities: historical, current and future regimes', *Water Sci Technol*, 59(5), pp. 847-55.
- de Groot, J. I. M. and Schuitema, G. (2012) 'How to make the unpopular popular? Policy characteristics, social norms and the acceptability of environmental policies', *Environmental Science & Policy*, 19-20, pp. 100-107.
- Dean, A. J., Fielding, K. S. and Newton, F. J. (2016a) 'Community Knowledge About Water: Who has Better Knowledge and is this Associated with Water-Related Behaviors and Support for Water-Related Policies?', *PLOS ONE*.
- Dean, A. J., Fielding, K. S., Ross, H. and Newton, F. (2016b) *Community Engagement in the Water Sector: An outcome-focused review of different engagement approaches* Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities.
- Dean, A. J., Lindsay, J., Fielding, K. S. and Smith, L. D. G. (2016c) 'Fostering water sensitive citizenship – Community profiles of engagement in water-related issues', *Environmental Science & Policy*, 55, Part 1, pp. 238-247.
- Fielding, K. S., Spinks, A., Russell, S., McCrear, R., Stewart, R. and Gardner, J. (2013) 'An experimental test of voluntary strategies to promote urban water demand management', *Journal of Environmental Management*, 114, pp. 343-351.
- Gardner, G. T. and Stern, P. C. (2008) 'The short list - The most effective actions US households can take to curb climate change', *Environment*, 50(5), pp. 12-24.
- Geller, E. S., Erickson, J. B. and Buttram, B. A. (1983) 'Attempts to Promote Residential Water Conservation with Educational, Behavioral and Engineering Strategies', *Population and Environment*, 6(2), pp. 96-112.
- Gifford, R. and Nilsson, A. (2014) 'Personal and social factors that influence pro-environmental concern and behaviour: a review', *Int J Psychol*, 49(3), pp. 141-57.
- Goldstein, N. J., Cialdini, R. B. and Griskevicius, V. (2008) 'A Room with a Viewpoint: Using Social Norms to Motivate Environmental Conservation in Hotels', *Journal of Consumer Research*, 35(3), pp. 472-482.
- Guan, Y. K. and Toh, S. (2012) 'Chapter 10: From zero to hero: NEWater wins public confidence in Singapore', in Howe, C. & Mitchell, C. (eds.) *Water Sensitive Cities Cities of the Future Series*. London, UK: IWA Publishing, pp. 139-146.
- Kurz, T., Donaghue, N. and Walker, I. (2005) 'Utilizing a social-ecological framework to promote water and energy conservation: A field experiment', *Journal of Applied Social Psychology*, 35(6), pp. 1281-1300.
- Lauren, N., Fielding, K. S., Smith, L. and Louis, W. R. (2016) 'You did, so you can and you will: Self-efficacy as a mediator of spillover from easy to more difficult pro-environmental behaviour', *Journal of Environmental Psychology*, 48, pp. 191-199.
- Leas, E. C., Althouse, B. M., Dredze, M., Obradovich, N., Fowler, J. H., Noar, S. M., Allem, J. P. and Ayers, J. W. (2016) 'Big Data Sensors of Organic Advocacy: The Case of Leonardo DiCaprio and Climate Change', *Plos One*, 11(8).
- Marlow, D. R., Moglia, M., Cook, S. and Beale, D. J. (2013) 'Towards sustainable urban water management: a critical reassessment', *Water Res*, 47(20), pp. 7150-61.
- Nolan, J. M., Schultz, P. W., Cialdini, R. B., Goldstein, N. J. and Griskevicius, V. (2008) 'Normative social influence is underdetected', *Personality and Social Psychology Bulletin*, 34(7), pp. 913-923.
- Osbaldiston, R. and Schott, J. P. (2012) 'Environmental Sustainability and Behavioral Science: Meta-Analysis of Proenvironmental Behavior Experiments', *Environment and Behavior*, 44(2), pp. 257-299.
- Padowski, J. C. and Gorelick, S. M. (2014) 'Global analysis of urban surface water supply vulnerability (vol 9, 104004, 2014)', *Environmental Research Letters*, 9(11).
- Renwick, M. E. and Green, R. D. (2000) 'Do residential water demand side management policies measure up? An analysis of eight California water agencies', *Journal of Environmental Economics and Management*, 40(1), pp. 37-55.
- Smith, L., Weiler, B., Smith, A. and van Dijk, P. (2012) 'Applying Visitor Preference Criteria to Choose Pro-wildlife Behaviors to Ask of Zoo Visitors', *Curator: The Museum Journal*, 55(4), pp. 453-466.

- Steg, L., Dreijerink, L. and Abrahamse, W. (2006) 'Why are energy policies acceptable and effective?', *Environment and Behavior*, 38(1), pp. 92-111.
- Steg, L. and Vlek, C. (2009) 'Encouraging pro-environmental behaviour: An integrative review and research agenda', *Journal of Environmental Psychology*, 29(3), pp. 309-317.
- Thøgersen, J. and Ölander, F. (2003) 'Spillover of environment-friendly consumer behaviour', *Journal of Environmental Psychology*, 23(3), pp. 225-236.
- Verplanken, B. and Roy, D. (2016) 'Empowering interventions to promote sustainable lifestyles: Testing the habit discontinuity hypothesis in a field experiment', *Journal of Environmental Psychology*, 45, pp. 127-134.
- Vorosmarty, C. J., McIntyre, P. B., Gessner, M. O., Dudgeon, D., Prusevich, A., Green, P., Glidden, S., Bunn, S. E., Sullivan, C. A., Liermann, C. R. and Davies, P. M. (2010) 'Global threats to human water security and river biodiversity', *Nature*, 467(7315), pp. 555-561.
- Walton, A. and Hume, M. (2011) 'Creating positive habits in water conservation: the case of the Queensland Water Commission and the Target 140 campaign', *International Journal of Nonprofit and Voluntary Sector Marketing*, 16, pp. 215-224.
- West, D. and Symes, A. (2008) *Container Deposits: The common sense approach towards a zero waste society - Background Briefing*: Boomerang Alliance.