Literature Review: Learnings from previous pro-water campaigns, interventions and studies

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1. Executive Summary

This literature review collates evidence from 60 documents and interviews with nine experts on the topic of pro-water engagement and behaviour change, in order to assess how learnings from previous water system behaviour change research, campaigns or initiatives can maximise the success of a future campaign involving stakeholders from the water system, and targeting the public and businesses.

1.1 Key findings

There is substantial complexity and diversity to people's water using practices, and standard social and psychological variables fail to account for the lived realities of water use. Despite this, there is still a lack of insight into the drivers behind people's behaviours with water, and much of the extant literature is predicated on assumptions about motivators, rather than on rigorous research, or an evidence-based framework. There is also currently a widespread and problematic lack of formal process of intervention design and evaluation with regard to 'real world' (non-academic) pro-water campaigning and interventions, making it difficult to assess the efficacy of campaigns, replicate successes or discard ineffective approaches. This is particularly the case for the non-household sector, where little is known about the impact of campaigns to instill pro-water behaviours in a business setting.

What we do know is that public receptivity to pro-water messaging will be determined in large part by who that messaging is coming from, and the degree of public trust in the messenger. In other arenas word-of-mouth has been shown to be the most effective channel for behaviour change, and approaches like social diffusion (the example of a trusted or respected individual) and peer-to-peer knowledge exchange are promising avenues for pro-water change. To date, the large majority of pro-water campaigns have been awareness raising/educational, rather than utilising specific behaviour change methodologies. These information based approaches may increase awareness, but do not necessarily translate into the desired behaviour change. Behavioural methodologies which have shown potential include community-based interventions, social effects and pledges. Practice-based interventions, socio-technical approaches and the change points approach all show promise.

Pro-environmental attitudes have been shown to have little effect in initiating pro-environmental actions, and likewise, valuing water does not necessarily lead to pro-water behaviours. The gap between value and attitude has been largely attributed to the barriers to change, and there are several barriers to pro-water behaviour change. These include a lack

of knowledge/understanding, the perception of abundance, the perception of water as a product, the relatively low cost of water, the difficulty of changing habits, the assumption that individual actions can't make a difference, ongoing perceptions of water company mismanagement, the lack of social effects due to much of water use taking place in private, and personal circumstances which make behaviour change difficult or undesirable.

At a basic level, people still do not really understand why they should save water, or engage in other pro-water behaviours. The main benefits to pro-water behaviour change used in communications to date are environmental friendliness (or environmental credentials in the case of businesses) or money saving potential. Effective campaigns will identify the barriers and benefits relevant to specific segments of the community, and will tailor and target communications strategically. In the absence of ongoing engagement, water using behaviours tend over time to return to where they started.

There is a need for government to do more to increase the visibility of water in the public space, at a national and local level. Issues feel more relevant to people when they are localised, which starts with regional and local government departments themselves being engaged with the importance of pro-water behaviour change.

1.2 Key recommendations

- Interventions to instill pro-water behaviours among the public and businesses need to be evidence-led and strategically developed, deployed, governed and evaluated, in order to maximise their efficacy. Success is most likely to come out of a systematic approach to interventions that understands its key collaborators, target demographic, desired outcome, chosen methodology for intervention, delivery channels, and how to evaluate its impact.
- More research is needed to develop our understanding of the drivers behind people's current water use behaviours, and which factors make the biggest difference to the effectiveness of different water saving interventions.
- A joined-up approach involving multiple stakeholders, and going beyond the usual water industry players could be effective, but governance needs to be clearly defined, and all stakeholders need to have clarity on their roles and responsibilities. It may be that an independent voice, supported by government and the water industry, will be more effective in bringing the public along with the pro-water message. Communications should come from a trusted source. Communications from 'the powers that be' may be effective if they are clear about what they are doing to address the problem, and if they ask people to reciprocate in kind.
- Communications should be targeted at well-researched segments of the population or business sector. Different groups of people will perceive different barriers to behaviour change, and these will need to be addressed. Likewise, different groups of people will see different benefits to behaviour change, and these will need to be emphasised.
- Interventions need to go beyond awareness raising efforts, and utilise behaviour change frameworks and approaches. Initiatives designed around a selected approach should be piloted, evaluated and refined before being implemented.

- A toolkit of ways to accurately evaluate the impact of interventions should be developed, and chosen evaluation methods need to be defined at the outset of a campaign or intervention. Because awareness does not automatically lead to behaviour change, figures on engagement and reach will not be good indicators of practice changes.
- Rather than a set timescale, engagement with the public and businesses on pro-water behaviours requires continuous and ongoing dialogue.
- Government funding and influence should be used to facilitate a joined-up national strategy for engagement on water, and to empower stakeholders to deploy initiatives at a regional and local level. Pro-water policy change can remove some of the barriers to behaviour change, demonstrate the importance of the issues, and instill more trust, and therefore receptivity, in the public.

2. Introduction

Despite the increasing challenges to our water resources encountered over recent years, water is still not high on the public agenda. While carbon emissions and climate change have received extensive attention, water has largely been missing from the narrative, in spite of the fact that it is the primary medium through which the effects of climate change will be felt (United Nations, nd).

The health of the ocean, rivers and waterbodies, and the ecosystem at large, as well as of wildlife and our human communities, is dependent on human behaviour change in relation to water. We need to adapt, and in some cases transform, our practices around water; consuming (and wasting) less, and refraining from flushing pollutants, plastics and other objects into a system already under pressure.

This literature review outlines findings from 60 documents and interviews with nine experts on existing knowledge around pro-water campaigning and behaviour change, in order to maximise the success of future interventions aimed at increasing public engagement and transforming the water-using practices of people and businesses.

3. Whose behaviour needs to change?

‘For most people, most of the time, their present actions produce satisfactory outcomes, and the challenges that unflushables present remain invisible’ (Alda-Vidal et al. 2020). While Alda-Vidal’s statement refers specifically to unflushables, it is equally relevant to behaviours around water in general; when taking water out of the system or flushing things into the water system, the outcome for most people is acceptable, and the effect of their actions unseen. Thus, when interviewees for this report were asked who needs to change their water-using practices they were largely unanimous in their response - everyone does. More specifically, they listed individual consumers, as well as farmers, manufacturers, and other businesses.

The advantage of these circumstances is that persuading a large amount of people to change their behaviour in small ways has been shown to be more feasible than persuading a small group of people to change their behaviour in big ways (McKenzie-Mohr, 2021). The

challenge of it is that, as several interviewees noted, different groups of people will have different barriers and motivators, and will each need to be approached and targeted accordingly. For more on demographics see Section 7 of this report.

4. Which stakeholders need to work together?

Achieving positive, pro-water behaviour change is a complex, distributed problem which will require distributed solutions in which all stakeholders play their part (see Alda-Vidal et al. 2020). Relevant stakeholders listed by interviewees included government departments and public bodies, such as Defra, the Environment Agency, the Climate Change Committee, Public Health England, and Natural England as well as local government associations, councils, and government planning officers. They also listed water sector organisations, namely the Consumer Council for Water (CCW), Ofwat, MOSL, Water UK, water wholesalers and retailers, and the NGO Waterwise.

Some interviewees suggested including additional trade associations, for example the Association of Manufacturers of Domestic Appliances (AMDEA) and the British Retail Consortium (BRC), as well as member organisations like the Bathroom Manufacturers Association (BMA), National Farmers Union (NFU), and Country Land and Business Association (CLA). A couple of people also argued the importance of involving energy sector stakeholders, whose aims of reducing energy use intersect with those of water efficiency. National and local media were also mentioned as being vital amplifiers of the message.

Interviewees took care to emphasise the importance of the messenger: public receptivity to the message will be determined in large part by who that message is coming from. For example, a 2006 study (Opinion Leaders Research) emphasised the need for consistent, independent and trustworthy communications in persuading people to adopt more pro-water behaviours. Currently, much or all of the pro-water messaging that people encounter will be from their water company. While respondents to one survey felt that water companies were best placed to provide water saving information (Defra 2019), in an earlier study participants did not think it was appropriate for water saving messages to come from water companies (MVA Consultancy 2008). This is likely due to an ongoing negative perception of water companies which will be addressed further on in this report. While it is important for water companies to continue to demonstrate that they are doing ‘their bit’ to tackle water problems, it may be that an independent voice, supported by government and the water industry, will be more effective in bringing the public along with the pro-water message.

5. Learnings from the water sector and academia

This section of the report outlines key findings from interventions and research into pro-water behaviour change to date. As mentioned previously, there is currently a lack of data on the influences around people’s water using behaviours (see Defra, 2018). There are also a lack of mechanisms for knowing how people respond to pro-water campaigns and interventions, and scarce impact evaluation with regard to campaigns and interventions (see Kamat et al. 2020). Thus, much of the work (though not all) presented here is from academic sources.

5.1 Barriers to change

When designing pro-water interventions it is important to understand the barriers to behaviour change. Addressing and/or removing these barriers (real or perceived) will greatly increase the likelihood that people will adopt the desired behaviour (McKenzie-Mohr, 2021).

Attitudes towards water usage and/or the environment have been found to be poor predictors of actual water-use practices (CCW, 2017; Gregory & Di Leo 2003; Pullinger et al. 2013). In other words, claiming to value water does not necessarily lead to pro-water behaviours. Some studies have found zero link between behavioural typology ('greenie', 'engaged', 'disengaged' etc) and actual water use (see Defra 2018). For example, in a recent study nearly half of respondents said they had poured oil and/or fat down the sink, despite high levels of awareness of this being a 'bad' thing to do (Lanes for Drains, 2019). This gap between understanding, attitudes and/or values and actual behaviour is frequently attributed to the barriers and difficulties involved in acting on good intentions (Anker-Nilssen 2003), which is why it's so important to address these barriers in policy and communications.

The below list comprises the barriers that emerged from the reviewed literature.

Lack of Knowledge

Research shows that many people are still unaware of, or unconvinced by, the need to save water (MVA Consultancy, 2008), and/or do not understand the reasons for saving water (Defra, 2018; Energy Saving Trust, 2018; MVA Consultancy, 2008) or for refraining from flushing oils, fats and other unflushables down the drain (Lanes for Drains, 2019). In one study, a fifth of respondents thought the environment wasn't particularly affected by water use, as water use is managed by water companies (CCW, 2021). Despite this, people also claim that they are already doing as much as they can to save water (Defra, 2019; Environment Agency, 2009; Icaro Consulting, 2013; MVA Consultancy, 2008)

In addition, studies have repeatedly shown that people's perceptions of their water use are not well matched with their actual water use (Beal et al., 2013; Comres, 2020, Defra, 2019; Environment Agency, 2009). Indeed, a 2020 survey found that nearly half of all UK residents surveyed believed that their *entire household* used around 20 litres of water, or less, per day (Water UK, 2020), a much smaller figure than the average PCC (per capita consumption) of around 143. People also tend to be unaware of how water ends up at the tap (Deliberata, 2019), how easy it is to save water (MVA Consultancy, 2008), or of the support, advice and technology available (Defra 2019; Environment Agency, 2009).

Similarly, people's knowledge of the ocean has been found to be very rudimentary (Lindland & Volmert, 2017). One study found that while the public value the ocean and its critical role in sustaining life, and are concerned about pollution, overfishing, and threats to species, their understanding of the ocean and human impact on the ocean is extremely thin (Lindland & Volmert, 2017). The report's authors argue that it is for this reason that commitment to conserving the ocean is not intense or passionate.

As some of our expert interviewees pointed out, many people also do not yet understand the link between climate change and water, or the effect of population growth on water

resources (see also CCW, 2017).

Perceived Abundance

People's attitudes to water are largely shaped by their lived experiences (CCW, 2017). Few people in the UK have had the experience of turning on a tap and no water coming out. Thus, although it is frequently agreed that water is 'precious', it is also considered abundant (Deliberata, 2019; Kamat, Meleady & Turocy, 2020; Icaro Consulting, 2013, MVA Consultancy, 2008). People perceive the UK to be a wet place (Defra, 2019; Energy Saving Trust, 2018) and visual cues in the environment, e.g. greenery and rain, evoke a lack of jeopardy in relation to the need to save water (Icaro Consulting, 2013). Thus, water tends to be taken for granted in daily life (Environment Agency, 2009), and in one study (MVA Consultancy, 2008) all participants assumed that there would always be water in their taps when they turned them on.

Perception of Water as a Product

Although research suggests that water is intuitively conceptualised as a 'precious resource', one study found that while links with 'resource' were very strong, links with 'the environment' were very weak (Icaro Consulting, 2013), and another found a similar gap between water use and environmental values (Environment Agency, 2009). "A lack of contact with nature and centralised systems of water abstraction have left consumers with a disjointed view of water as a natural resource on one hand, and water as a product that comes through the tap on the other hand" (Defra, 2018). For example, in one study (MVA Consultancy, 2008) most participants felt that, as they paid for water, they could use as much as they wanted to.

Low Bills

In relation to other utilities, water bills can be perceived as being quite low (Icaro Consulting, 2013), potentially leading to a sense of water not being very 'valuable'.

Habit, Inertia and Lifestyle Compromise

In an OECD study (2017) identifying the behavioural biases involved in water consumption 'status-quo' bias appeared as number one on the list; people default to the settings already on their appliances, and the habits that they have already formed. In relation to water, we know that people's water use is largely automatic and unconscious (Deliberata, 2019). Water use has been conceptualised as a relatively incidental by-product of daily life (see Icaro Consulting, 2013) and the difficulty of overcoming inertia to break habits is a hindrance to meaningful pro-water behaviour change (Energy Saving Trust, 2018; Lanes for Drains, 2019). In addition, a survey by the Energy Saving Trust (2018) identified lifestyle compromise - the idea of 'sacrifice' - and competing priorities as barriers to behaviour change with water.

According to Grecksh and Lange (2019) more efficient water use may first require the de-routinisation of habits and then the learning of new ones. This includes becoming aware of one's habits and subjecting them to scrutiny and reflection. They found that people who already save water are doing it in simple, everyday ways, e.g. taking showers instead of baths and turning off the tap when brushing their teeth. People who already save water are far less likely to be doing things that take thought, time, and/or money (CCW, 2015).

'I can't make a difference'

People tend to assume that their actions, on their own, won't make a difference when it comes to large-scale problems (Energy Saving Trust, 2018; Environment Agency, 2009). It is critical, therefore, that people feel a sense of collective action, as they are much more likely to make changes to their practices if they are seen as part of a larger effort - especially in terms of observing the water companies to be doing 'their bit' (Opinion Leader Research, 2006).

Perception of Water Company Mismanagement

Seeing stories about water company leaks has a strong emotional impact, causing people to rationalise their own individual inaction (Icaro Consulting, 2013). In a 2009 Environment Agency study, people perceived the problem of water scarcity as being one of 'mismanagement' of water resources, not of availability or demand, and were suspicious of water companies, and distrustful of their motives.When people feel that water companies are not acting responsibly they are much less likely to change their own behaviours (CCW, 2017; MVA Consulting, 2008). In addition, some express concern about a precious resource being privatised and sold for profit (Opinion Leader Research, 2006).

Lack of Social Effects

Because many of our water-using practices take place in private, pro-water social norms have not developed in the same way as, for example, recycling norms. People assume that their behaviours with water are typical, normal and average (Deliberata, 2019; Icaro Consulting, 2013) because in many circumstances they don't have anything to compare them to.

Personal Circumstances

People's personal circumstances can make it difficult or undesirable to change some specific practices that they have around water. For example, extra bathing or laundry associated with paid work, religious observance, chronic ill health and disability (University of Sussex, 2019). In addition, and put simply, some people just won't be in a position to care.

5.2 Effective engagement

This section of the report outlines key insights and recommendations emerging from selected research into, and evaluations of, approaches to pro-water messaging. As a general rule, effective engagement will address the barriers to change, as well as highlighting the benefits (to the audience) of making the recommended changes. It will meet people where they are by connecting the issues with what matters to them, in a manner that encourages them to make a particular choice, but leaves the choice in their hands. A 2017 report (CCW) argues for presenting key information in an engaging, coherent and structured way, with an overarching message focusing on the scale and immediacy of a problem to make it more 'real' to people.

The section has been structured by topic, but many of the recommendations will be applicable to communicating about other pro-water behaviours.

Water Efficiency Engagement

A 2013 trial testing different water-efficiency messages (Icaro Consulting) found that the best performing messaging with participants was around increasing consumption and climate change putting pressure on the water supply in England. Messages linking water and energy use also had a moderately positive impact, with one high performing message being: 'Clothes not really dirty and just need a freshen up? Use a short wash cycle to save water and energy'. Other high performing messages were those which invoked a deep sense of responsibility, and those which demonstrated positive action by water companies and asked individuals to reciprocate (addressing the barrier of potential negative perceptions of water companies). Targeting people's vanity also proved effective, for example with messages about long hot showers dehydrating skin, and jeans wearing out five times faster if washed after every wear (an example of highlighting the benefits of the desired behaviour). A message arguing that the UK is not a very wet country had the most negative impact. Ultimately, the authors suggested moving away from high level messages about why water efficiency is important, towards more specific messages targeting emotions, actions and behaviours.

In 2009 the Environment Agency conducted research using mixed-methods techniques to monitor and evaluate the water efficiency values, attitudes and behaviours of a general population sample. Recommendations emerging from the report included the following: 1) interventions and advice need to be delivered proactively - *'Messages and interventions need to be taken to people, rather than relying on them to be proactive'*, 2) messaging needs to be tailored to different sizes of households, 3) remember that motivations for saving water are complicated and go beyond immediate perceptions of water scarcity and cost, 4) using water scarcity as a motivator is unlikely to be effective unless there is perceived to be a shortage of water in the local environment, 5) messages and interventions should be employed reactively in times of water stress, as they are likely to have a longer lasting impact, 6) careful message design is needed to overcome negative associations with poor hygiene, 7) interventions/awareness raising around technical devices could deliver significant water savings, 8) activities around water meters should include clear information about the relative costs and potential for savings, 9) water bills should provide actual consumption data alongside aspirational or average figures, plus 'reward' measures to prevent low users increasing usage, and 10) water companies need to demonstrate very clearly that they are taking responsibility for water efficiency and practising it themselves.

Another exercise to test a series of water saving messages (MVA Consultancy, 2008) trialled a particular set of slogans, and found that the messages that participants remembered the most were those related to campaigns which were impactful, direct, visual, repetitive and/or shocking, and messages that people could relate to. 'Water: don't let it cost the Earth' was the most favoured message across non-metered participants. However, 'Save water, save money' was the most favoured message across all participants, and across metered participants. People said their behaviour changed as a result of a message when they could relate to the message, there was a financial or health benefit to change, and/or when there were long term benefits to the environment. The findings appear to support the fact that, in general, the water industry has favoured the money-saving argument as a means of persuading people to be more water efficient. In addition, the authors of a later report argue that focusing on water affordability and efficiency together benefits low-income communities

in particular (University of Sussex, 2019). A note of caution, however, that focusing on money savings and the economic value of water (extrinsic values) may actually be counterproductive when trying to engender in people a sense of water being intrinsically valuable (McKenzie-Mohr, 2021).

Focusing on the environmental and climate benefits of water efficiency can be effective; a recent study found that 68 percent of people were willing to reduce the amount of water they used at home in order to protect the environment (Water UK, 2020), and the potential knock-on effect of water use on the wider environment and wildlife resonated with participants of a 2006 study (Opinion Leader Research). In the same study communications campaigns developed by participants as part of a deliberation process landed on a number of key criteria: 1) communications should be small and manageable, 2) messages should build slowly, 3) every call to action should be accompanied by a message about what the 'bigger power' (e.g. government and the water industry) are already doing, 4) every call to action should be accompanied by information about how this feeds into the superordinate goal, and 5) language used in messaging should not appear to blame consumers.

The importance of who the messenger is, mentioned by several of the interviewees for this report, was also highlighted in a University of Sussex study (2019), which recommended drawing on the knowledge that communities already have about water efficiency and affordability, as peer-to-peer information exchange may carry more credibility.

Healthy Sewer and River Engagement

A report prepared for Northumbrian Water on delivering more meaningful engagement around healthy sewers (Barber, 2021) provided recommendations for incorporating elements of public participation into their customer engagement activities. The intention behind public participation (most often occurring in the form of group workshops) is to increase the likelihood of successful interventions by consulting the people who ultimately have to live with certain outcomes. For the participants the process can lead to increased awareness, and initiate behaviour change, as well as prompting the peer-to-peer information exchange recommended in the previously cited study. In another recent report (Kamat, Meleady & Turocy, 2020) the authors point to water company approaches in which customers were encouraged to make the unattractive (the topic of sewers) attractive through creative methods like art installations and games, which the authors argue worked by inspiring conversation, leading to behavioural change.

A recent Citizens Jury on 'Rethinking Water' concluded with several recommendations for the future of the local Ouseburn River, including the need to educate people more about water (overcoming the barrier around lack of knowledge), and providing incentives for driving behaviour change (highlighting the benefits of behaviour change) (Scarr, 2021).

Ocean Conservation Engagement

An article in the journal *Ocean and Coastal Management* (Wright et al. 2015) argues for the use of marketing techniques as part of the conservation outreach toolbox. The authors state that while traditional conservation outreach relies on instilling conservation values, marketers try to offer something that meets the needs and preferences of their target audience, always focusing on the audience's perspective (highlighting the benefits of the desired behaviour).

According to them, for example, leveraging feelings of ownership, pride and patriotism can be effective. They emphasise the need for the target audience's values and decision making processes to be understood via thorough research before this can be achieved. They also describe three main objectives in marketing: 1) to create awareness and understanding, 2) to remove/reduce barriers surrounding an idea so that a proposed action takes minimal effort, and 3) to develop and manage relationships with a target audience. The article stresses that, in general, messages of hope are more impactful than messages of doom, and a specific call to action is always needed.

Similarly, a report on developing communication strategies to build public understanding of, and support for, marine conservation (Lindland & Volmert, 2017) offers the following recommendations: 1) avoid reliance on crisis language, which strengthens a sense of fatalism, that little can be done, 2) avoid talking about the ocean as an economic resource for human consumption, as this approach is likely to sabotage conservation goals over the long term, setting up a short-term economic perspective that can lead people to decide that conservation efforts that aren't clearly economically profitable aren't worthwhile, 3) cue and expand the idea of the ocean as a sustainer of human wellbeing, providing people with concrete examples of how it does this, 4) build on existing knowledge to expand understanding of marine systems, 5) emphasize ecosystem disruptions, showing how single endangered species play a part in a whole network, 6) specify what government can and should do, 7) introduce, explain and showcase specific systemic solutions, 8) avoid language that romaticises the vastness or mystery of the ocean, which only strengthens a sense of separation instead of connectedness, 9) discuss pollution other than oil spills and plastic, 10) stress negative outcomes for all human populations, not just coastal communities, 11) highlight compatibility between marine conservation and human prosperity, 12) avoid focusing solely on individual action, and pair calls for individual action with calls for collective action and policy change, and 13) avoid the generic 'we' when attributing responsibility for ocean protection, as this reinforces people's underlying assumption of dispersed, individual responsibility; instead emphasise the public's collective responsibility in holding governments, corporate and community actors accountable.

The report also suggests a handful of potentially effective messaging tools centred around using a body to describe the ocean, e.g. the ocean as the climate's 'heart', or 'osteoporosis of the sea'. The authors cite experience in the United States, where talking about the human health effects of climate change has proved effective in messages framed with a broader value - specifically, the value of *Protection* - and thus describing the human health effects of a compromised ocean might also prove effective. A subsequent communication guide on how to talk to the public about the ocean to improve understanding and increase support for solutions (O'Neil and Hawkins, 2019) recommends a systematic approach which builds on the original report's suggestions: 1) establish that the ocean has health using health language and body metaphors, 2) turn to the future, to increase people's sense that there are actions we can take to heal and take care of the ocean, 3) explain how the ocean's health has worsened over time, specifying impacts and consequences. During this process it is recommended to highlight specific types of health terminology, including hurting, injuring, inflicting, wounding, infecting, healing, reviving, treating, and curing. Always include solutions when using the metaphor to describe threats to the ocean, and when turning to the future emphasise the value of *Stewardship* and shared responsibility. Interestingly, the authors recommend avoiding framing stewardship as a matter of fairness to future generations; in

previous studies the idea of fairness depressed people's concern for the ocean in the research, which they authors attribute to causing 'us vs. them' thinking.

5.3 Approaches to behaviour change

This section of the report looks at some approaches to behaviour change that have been proposed, trialled or deployed in relation to pro-water behaviour. Behaviour change interventions are the various methodological strategies which aim to influence an individual's behaviour by targeting its internal antecedents. To date, the majority of pro-water communications have relied on raising awareness and increasing knowledge to change people's water-using practices (see for example, Kamat, Meleady & Turocy, 2020). However, while increased awareness and knowledge of an issue are important factors in achieving change, knowing something is often not (on its own) enough to prompt people to adapt or transform what they actually do in their daily lives, particularly in relation to their habitual practices.

There is not scope in this report to provide an in-depth explanation of the different behaviour change frameworks or approaches listed, and any strategy selected for use in an intervention would benefit from the input of a behavioural scientist.

The ISM Model

The ISM model (Individual, Social, Material) provides a framework for behaviour change design in recognising that people operate at multiple levels: as individuals, as part of social groups, and within wider technological and regulatory systems. The model posits that lasting change requires action at all three levels (see Defra, 2018). There is still a need to identify what behaviour change approaches to pro-water practices work under what circumstances, and the ISM framework could potentially be used strategically to gain a better understanding of the factors or conditions at different levels that may have a bearing on efficacy.

The Information-Motivation-Behavioural Skills Model

The Information-Motivation-Behavioural Skills (IMB) model refers to three primary constructs influencing changes to a person's behaviour: information and increased knowledge about the behaviour, the individual's motivation to engage in the behaviour, and the behavioural skills required in order to perform the behaviour. In the United States, Ehret et al (2020) recently identified and classified 24 water conservation studies using the IMB model. They found that interventions with two or more IMB components led to reductions in water usage. The authors suggest that designing interventions explicitly with the IMB model would facilitate comparability across studies and could support a better understanding of water conservation interventions.

Encourage, Enable, Engage, Exemplify

As presented in the UK sustainable development strategy, *Securing the Future,* Defra's model for influencing behaviours is known as the '4Es': Encourage, Enable, Engage, Exemplify (see Defra, 2008 & 2018; Environment Agency, 2009). 'Encourage' describes highlighting the benefits of the desired behaviour, 'Enable' describes making the behaviour easier by removing the barriers to change, 'Engage' refers to getting people involved through trusted partners and intermediaries (e.g. through social dissemination) and 'Exemplify'

focuses on leading by example. This model is very similar to the Community Based Social Marketing strategy developed by environmental psychologist Doug McKenzie-Mohr (2021) which also focuses on removing barriers, highlighting benefits, and recruiting trusted messengers.

It is likely that different groups of people will be more responsive, at least initially, to one of the 'Es'. For example, in a report proposing two axes for categorizing people - willing and able, willing but unable, unwilling but able, and unwilling and unable (Opinion Leader Research, 2006) - a similar '4Es' framework is utilised (Encourage, Enable, Educate, Engage) to work with each group at a different level: focusing on 'Engage' with the unwilling and unable, on 'Educate' with the unwilling and able, on 'Enable' with the willing and unable, and on 'Encourage' with the willing and able (Opinion Leader Research, 2006).

Community-Based Interventions

According to McKenzie-Mohr (2021) 93 percent of behaviour change is the result of word-of-mouth communication, making approaches founded around people talking directly to each other by far the most effective means of achieving changes to people's water using practices.

Community-based approaches, where groups of people work together to understand, for example, why reducing water use is important, can leverage natural sociality and adherence to social norms (see Transition Streets, 2011) and bring about behaviour change in the community (Kamat, Meleady & Turocy, 2020). For example, the Catchment Based Approach (CaBA Benefits Assessment Working Group, 2020) promotes collaborative working at a river catchment scale to realise environmental, social and economic benefits. It's recruitment of people to act as volunteers and citizen scientists is likely one of the most effective ways to prompt positive changes to those people's water using behaviours. Previously, interventions in which trained staff provided information while supplying devices/measures were found to result in more devices being installed and higher water savings (Omambala et al., 2011).

Social Effects

Social interactions have been repeatedly shown to play a pivotal role in the diffusion of practices. As one of the expert interviewees for this report pointed out, during droughts people don't want to be the only one not watering their lawn. Yet conversely, people are also unlikely to want to be the only one *continuing* to water their lawn.

While 'prescriptive' social norms involve judging the un/desirability of specific actions, 'descriptive' social norms are messages indicating that a large majority of citizens have already carried out a task. In an online survey which tested the effectiveness of different behaviourally informed messages aimed at encouraging people to reduce their personal water consumption at home (Defra, 2019), 'Water is precious. Join the millions of people choosing to save water' was the most effective message at getting people to express an interest in water efficiency. These 'peer effects' (sometimes called social contagion) have previously been shown in the adoption of solar photovoltaic panels and hybrid vehicles, and in the US Bollinger et al. (2020) claim to have identified causal peer effects in water consumption using water billing and housing transaction data from over 300,000 households in Arizona. They demonstrated that a household's water consumption was influenced by the

water consumption of nearby households in the previous year. In addition, they found that economic incentives appeared to influence the strength of the peer effects. Similarly, in a 2016 study on social norms messaging in water conservation (Schultz et al.) residents were provided with personalised feedback about their water consumption, coupled with normative information about other residents in their neighbourhood. As a result, they were found to have consumed less water than a control group. However, residents with strong existing personal norms about water consumption were less affected by the messaging than residents with low personal norms. According to Grecksh and Lange (2019), 'It's not about telling people how they should behave, but tapping into their existing values'. They posit identifying values (something's perceived importance) as a vital part of targeting campaigns, as values determine our motivation to change behaviour.

There is some uncertainty as to the transformative powers of leveraging social norms in communications, and although many experts describe engagement with social norms as key to implementing successful pro-water campaigns (e.g. Grecksh & Lange, 2019), others have been more conservative in their estimates, stating that social norms 'may induce participation' (Brent et al., 2015) or even that the effect of social norms based messaging is 'generally small' (Defra, 2019).

Pledges and Declarations

Commiting to enacting a specific behaviour, and in particular, making a *public and visible* commitment (McKenzie-Mohr, 2021) has been shown to increase the likelihood of following through on an intention. In addition, written commitments are more likely to be effective than those that are made verbally (OECD, 2017). Goal setting in general increases the likelihood of success. For example, in the city of Belen in Costa Rica, where goal-setting and plan-making reduced water consumption relative to a control group. Plan-making appears to be most effective for low-consumption households, who may already be motivated in relation to water conservation efforts and just need support in identifying concrete actions.

Nudges

Nudges are single-point interventions that aim to alter people's in-the-moment choices by leveraging their cognitive biases. While not specifically investigating pro-water behaviours, Schubert's paper (2017) on 'green nudges' investigates several nudge experiments aimed at promoting environmentally benign choices (mostly related to energy use). According to Schubert there are three types of green nudge: 1) nudges that capitalise on the consumer's self image, 2) nudges that exploit people's inclination to follow the herd (social norms), and 3) nudges that exploit the behavioural effects of purposefully set defaults (status-quo bias). Political ideology is found to be a good determinant of people's responses to green nudges, and opportunities for 'virtue signalling' and conspicuous conservation (e.g. driving a Pruis) can work. Green nudges, like all nudges, are fleeting and do not evolve into long term behaviour change, and thus Schubert recommends that they should be viewed as complements to, rather than substitutes for, traditional incentive based measures.

Practice-Based Approaches

A social practices approach to water efficiency takes practices as the unit of analysis when exploring water use (rather than attitudes, behaviours or litres used), and has shown promise (Pullinger et al., 2013). A practice-based approach makes sense particularly when

looking at the variance in water-using practices between households, where it becomes clear that there is little relationship between the different practices in a household, and, for example, using lots of water in one area does not necessarily equate to using lots of water in all areas (see Hoolohan & Browne, 2020). A practice-based intervention strategy focused on one action, for example cutting out single-use plastics, or correctly disposing of wet wipes, may be more effective in achieving significant change, therefore, than an attempt to transform people's relationships or values around water itself without a defined outlet for enacting that value.

Socio-Technical Approaches

Strategically combining different engagement and behavioural approaches with technological interventions can be effective. According to Kamat, Meleady and Turocy (2020) socio-technical approaches 'aim to bring about seamless incorporation of technology to change the social context of decision making'. Dual flush buttons on toilets, and smart water meters can be viewed as examples of where technology and decision making intersect. Jordan (2012) describes a 'whole-town' approach in which residents of Swindon were asked to take a '20 litre challenge', pledging to save water through device installation and behaviour change. The main behaviour change reported was shorter showers. The report recommends targeting a receptive audience, addressing the common barriers to change when recruiting people, optimising knowledge gained during a project going forward into new iterations of the project, offering home visits over self-installation, and measuring product use and removals subsequently. Although one third of people reported devices removed or never used, a home visit appears to have been very influential not only in retrofitting devices, but also in achieving behaviour change.

In their report on 'unflushables' - wet wipes, menstrual absorbents & more - Alda-Vidal et al. (2020) argue that attempts at behaviour change in this area overestimate people's capacity for individual behaviour change, and propose the use of socio-technical practices, which instead of focusing on a particular behaviour attempt to effect change in 'the collective conventions, routines and infrastructures of consumption'. A recent survey of current and future water customers found that one in three people thought smart technology would be a big part of how they managed their water use in the future - especially younger age groups and future water customers (CCW, 2021), making a focus on socio-technical interventions a promising area for further development.

Change Points

The Change Points method (see Browne et al., 2020) is a toolkit designed by the Universities of Manchester and Sheffield enabling the design of interventions that unlock sustainable practices. Change points occur in the process of carrying out routine household tasks, and are the moments in which resources are used up and waste is produced (Foden et al. 2017). It is at those points where opportunities for a different action arise.

A report on understanding the role of household practices in domestic resource consumption, and using the change points approach to focus on the issue of household disposal of fats, oils and grease (FOG) argued that rather than seeking to address the problem through individual decision making (most often targeted in awareness campaigns), the change points approach might be most effective (Foden et al., 2017). The authors

describe how FOG happens through a sequence of change points involved in shopping, food preparation, cooking, dealing with leftovers, and cleaning up, eventually leading to FOG entering sewers. The report recommends: 1) taking opportunities to make the infrastructures involved in these practices more visible, 2) understanding household routines in context, 3) appreciating diversity within and between households, 4) working with shared social norms, 5) recognising that kitchen practices are shaped by wider systems, and 6) collaborating across sectors.

More recently, a change points workshop to generate ideas around tackling the problem of unflushables came up with several novel ideas for intervention, including the 'Green City League', described as a UK wide collaborative competition for towns and cities with prizes and activities; and 'Reusables: Media Moment', a 'media moment' encompassing coverage across all channels to normalise the use of reusable menstrual hygiene products and overcome the taboo around periods (Browne et al., 2020).

5.4 Interventions in practice

Much of the literature cited in this review is from an academic/research origin. While it would be helpful to be able to cite so-called 'real world' interventions, there is currently a widespread lack of formal process of intervention design and evaluation with regard to pro-water campaigning (see Kamat, Meleady & Turocy, 2020). A report by Kamat, Meleady and Turocy (2020) draws together learnings from different interventions done during AMP6 (2015-2019) by Anglian Water, Scottish Water, Southern Water and the Consumer Council for Water. The interventions reviewed related to water use, water recycling, and environmental sustainability, in both household and non-household settings. The authors point out that to date most intervention design is based on experiential knowledge, not on research conducted before deployment, and recommends more preliminary research, including studying the customer base to be able to target interventions more effectively. They found that most interventions relied on educating the audience, rather than on behaviour change models, a trend which can, anecdotally, be seen throughout the water sector. The report also recommends continued engagement and reaching out to the target audience beyond the initial implementation period, to reinforce newly introduced behaviours. Finally, it identifies the need for better evaluation, adopting new methods of data collection and impact analysis.

The report's recommendations for designing successful behaviour change interventions are: 1) conduct comprehensive research (academic and non-academic) at the outset, 2) share knowledge, 3) study your customer, 4) collect baseline data, 5) formalize the data collection process, 6) conduct randomized control trials, 7) utilise social media, and 8) plan the evaluation process early (Kamat, Meleady & Turocy, 2020).

Grecksh and Lange (2019) meanwhile propose nine key steps to a successful pro-water behaviour change campaign: 1) identify why and how relevant target groups value water, 2) develop narratives and stories that form the core of the campaign, 3) identify a specific thematic framework for these narratives, 4) set a realistic behaviour change target, 5) choose a behaviour change tool, (e.g. competition) 6) cite reference groups that people can compare themselves to, 7) align structural and behaviour change messages, 8) build water

saving messages on energy saving campaigns, and 9) evaluate the impact of your campaigns.

There is currently a dearth of analysis of how information provided to consumers affects outcomes (Defra, 2018). Kamat, Meleady & Turocy's report (2020) found a lack of rigorous impact assessment, with 49 percent of interventions not followed by any evaluation at all. In addition, they found a general lack of good baseline data and clear outcome measures. While an ideal outcome measure for a water efficiency campaign would be analysis of actual consumption, there is not always access to this, and other measurable outcomes include behavioural, awareness, and/or attitude changes (Defra, 2018). There is a clear need for a toolkit of impact evaluation measures, possibly including metering data, surveys, and process tracing.

6. Oversees insights: Australia, the United States, Canada, South Africa

Much of the existing research on pro-water behaviour change comes from parts of the world that have a history of water resource challenges. Of these, Australia, the United States, Canada and South Africa are culturally comparable to the UK, and their insights into behavioural interventions around water are helpful to examine.

6.1 Australia

The organisation Smart Approved Water Mark (SAWM) aims to raise water consciousness among Australian consumers, and understand what it will take for Australians to value the water they have. Their recent report (2020) details research based on ethnographic studies in 2019, as well as an online survey of 2,077 respondents, in which 91 percent of people believed that 'water is precious', but when asked, did not think of 'water' and 'tap water' as the same thing. Indeed, their feelings about 'tap water' were very different to their associations with water in the environment. People expressed concern for the environment, but this did not extend to water issues such as droughts, water shortages, and dam levels. The report highlights a disconnect between water in the environment and water used in everyday lives, similar to that seen in the UK. Until they were asked to think about it, survey respondents did not value tap water, especially the younger demographic questioned. Indeed, efficient water behaviour depleted with every younger generation. However, while 'Gen Z' were the least water literate, they were also most likely to care about environmental issues, most open to learning about water issues, and most open to changing their behaviours for environmental reasons.

The research found that awareness of the water saving capabilities of taps and devices was low, with appliances not consciously chosen or used. Water literacy in general was also low among respondents, with only 64 percent knowing where their household water came from; which the report suggests is partly because those who had been affected by water shortages tended to have higher water literacy. The authors determined that it would take a personal water shortage for younger generations to appreciate tap water, and to understand the connection between tap water and water in the environment. As part of the ethnographic

phase of the research, delivered in the form of a pledge-based campaign entitled ‘Water Night’, the study conducted an experiment that deprived people of water from 5pm until the following morning. Those that completed the exercise reported becoming very aware of their water ‘auto-pilot’ and claimed to be shocked by how subconsciously they reached for the tap. The report concludes that Australians would be most likely to abandon ‘auto-pilot’ to save water if they were to have a combination of household water knowledge *and* a personal drought experience.

This conclusion is supported by earlier research trialing water demand interventions in Australia (Fielding, 2013), in which an experimental study divided participants into four groups. The first was a control group, the second was provided with water saving information alone, the third was provided with water saving information plus a description of how a majority of similar households were making efforts to save water (social norms), and the fourth was provided with information plus tailored end-user feedback in the form of smart meters. The three intervention groups all showed reduced water consumption over the course of the intervention and for months afterwards. However, effects dissipated over time, with water consumption returning to pre-intervention levels after around 12 months. Interestingly, the group provided only with information was actually *as effective* as the two behaviour change groups at saving water, which the authors attributed to a recent experience of drought in the area.

In other research, Dean et al.’s study (2016) draws from the field of educational psychology to propose a model of water engagement that they term 'water sensitive citizenship', in alignment with the more well-known concepts of environmental and ecological citizenship. They describe practices being carried across cultures and time ('practice-memory') and propose that children may act as catalysts of environmental change by sharing information with their families. As seen elsewhere, they also argue that activating perceived social norms can reduce household water use (and increase social capital).

Finally, in a study into how people talk about their energy and water use (Kurz et al., 2005) participants described water as a shared, scarce natural resource, but they accounted for their water-use habits by positioning themselves as caught between a personal desire to conserve water and an incompatible social obligation to maintain the appearance of their gardens for the aesthetic appeal of the suburbs in which they lived. To resolve any cognitive dissonance, people constructed the environmental impact of their decisions as minimal or unavoidable.

6.2 United States

The efficacy of a ‘persuasive’ water conservation program in the US was analysed, with researchers focusing on the extent to which people’s attitudes predicted compliance with the programme (Landon, Kyle & Kaiser, 2016). Residents were provided with a recommended volume of lawn irrigation, referred to as a ‘water budget’. Communications included feedback on their water use, along with a comparison of their water use with an ‘efficient’ standard, the water use of their neighbours, and tips on how to conserve water. The study found that the program was successful in developing positive attitudes towards compliance, and that those attitudes did predict water use to an extent. However, attitude only accounted for a small

portion of the variance in measured water use, and overall the observed relationship between intention and behaviour was quite weak. The report's authors conclude that behaviors that are difficult, habitual, costly, or time intensive are unlikely to change as a result of attitudinal change alone. This finding is consistent with aforementioned research insights in the UK which demonstrate that environmental values do not always translate into pro-environmental behaviours (e.g. CCW, 2017; Pullinger et al., 2013).

6.3 Canada

In 1995 Durham Region in Canada began deploying water efficiency initiatives to help residents reduce their water consumption (see CBSM, nd (a)). The program managers utilized a non-coercive approach to changing water related behaviour built around community based social marketing, which relies heavily on personal communication. They recruited summer students to talk to water customers about saving water, achieving an observed 26 percent reduction in garden watering.

The following year the same approach was used, and now in the interventions students gave residents water efficient gadgets, brochures, and a tag for their outdoor tap as a prompt to remind people to save water. The students would then ask the residents to reduce their water consumption by whatever means they preferred. The final goal was to get residents to make a written commitment to a series of water efficient behaviours. Written commitments (which have been found to be more likely to be effective than those that are made verbally) were obtained from 88 percent of the households visited, and this program also achieved a 26 percent reduction in outdoor water use. The report concludes that the program was successful due to giving residents both the information and the tools that they required to reduce their lawn watering (in both instances, removing barriers to behaviour change).

6.4 South Africa

In January 2018 the city of Cape Town announced that it was a few months from running out of water. The day when taps would be turned off and people would have to access water by collecting it from one of 200 citywide distribution centres (LaFrance, 2018) was labelled 'Day Zero'; a concept specifically designed to shock people out of complacency (Walwema, 2021). This was accompanied by the hashtag #DefeatDayZero, constructing the water crisis as a common enemy to be defeated by residents of the city. While the city imposed various laws restricting how and for what purpose people and businesses could use water, it also launched a campaign designed to initiate radical behaviour change among residents in a short period of time (LaFrance, 2018; Walwema, 2021). People were given calls to action and tips for saving water, and for how to live on 50 litres per day. City officials created a public awareness website (http://coct.co/water-dashboard/) with a dashboard dedicated to Day Zero, regularly updated with information on water supply levels, the percentage of citizens complying with the restrictions, specific water saving actions, and alternative water supply projects (LaFrance, 2018). Behavioural strategies included posting weekly updates of dam levels in public places (for example, on electronic boards to freeways), and launching a public, city-wide water map depicting which households were achieving their consumption targets (Walwema, 2021), an approach previously shown to activate social norms. A study

the year before the crisis had found that the most effective motivators for pro-water behaviour change were publicly recognising water conservation, appealing to households to act in the public interest, and social norm comparisons (Brick, DeMartino & Visser, 2017). Using the persuasive approach of reciprocation, the city publicised the technological and scientific interventions that they had initiated, including fixing leaks, and asked residents and local businesses to do their part in averting the crisis, with updates demonstrating mutual accountability between city officials and residents (Walwema, 2021). Stakeholders across the city mobilised, with radio stations playing 2 minute 'shower songs', and businesses installing hand sanitizers to replace hand washing (Walwema, 2021).

On social media people made the commitment, 'I Pledge to Defeat Day Zero'. They were able to use a campaign template to impose a photograph of themselves into the water drop icon used by the campaign, and with the pledge statement below it: a powerful example of the public and visible pledges that are known to be highly effective in achieving behaviour change goals (McKenzie-Mohr, 2021).

Figure from Walwema, 2021.

Walwema (2021) describes Day Zero as an example of using 'apocalyptic rhetoric' successfully in what she terms a 'rhetorical intervention'. The perception of crisis allowed the campaign to be much more aggressive than most pro-water initiatives. For example, at the height of the emergency posters urged the public to report 'water wasters', a blunt yet effective tool for leveraging social norms to shame perceived outliers and place the reader in the position of being part of a collective majority of responsible citizens. By the end of January 2018, 55 percent of Capetonians were complying with the restrictions (Lafrance, 2018).

During the crisis the World Wildlife Fund (WWF) in South Africa began issuing a weekly 'Wednesday Water File' to help households and businesses prepare for Day Zero (WWF South Africa, 2018). The 'Water Files' were specifically designed to increase people's knowledge and understanding of the crisis, and each was issued with a weekly 'bucket list' of simple actions to take that week, which included practical recommendations (how to monitor the amount of water your household was using, to stock up on emergency supplies and clean storage containers, to look into water treatment methods, and so on), and recommendations based around activating social norms, for example, checking your water efficiency status on the public map, talking to neighbours and friends about the issue, and convening a neighbourhood meeting to talk about water. People in the business community

were advised to ask their management about a business continuity plan and to make sure that water saving and adaptation became a prominent budget line in the new financial year.

After the peak of the crisis, official messages thanked Cape Town residents for being 'water conservers' and for continuing to save water. The city continued to publicise dam levels, but now the knowledge that levels were rising was used to demonstrate to the public that their efforts had made a difference, thereby motivating them to continue (Walwema, 2021). Since 2018 water consumption in Cape Town has largely been below the target, even though water use is no longer highly restricted. However, the city has sustained their dialogue with the public about the importance of saving water.

7. Public behaviours: learnings by demographic

There is extensive diversity and complexity in people's water using practices (see Hoolohan & Browne, 2020), and, according to Pullinger et al. (2013) attempting to predict or manipulate household water demand based on standard psychological and economic variables fails to account for the complex sociological realities of water use. Alda-Vidal et al. (2020) argue that, 'interventions must address the multiple cultural, political and material factors that shape how people routinely use and dispose of unflushables'. They emphasise that what people do in their day-to-day lives varies substantially, and argue for the need to identify different opportunities for intervention, and not cast judgement on particular groups of people.

Dean et al.'s research (2016) exploring the knowledge, attitudes and practices of citizens in relation to water engagement identified five key groups: 1) disengaged, 2) aware but inactive, 3) active but not engaged, 4) engaged but cautious, and 5) highly engaged. They list home ownership, having a garden, being older, and experience of water restrictions as key indicators of engagement with pro-water behaviours. Their study found that water practices also tend to be influenced by gender, with women more engaged and also more responsible for water-related activities in the home. Ultimately, the authors recommend targeting messages towards young, male, urban renters with families, who are typically the least engaged demographic. Another report found that men and younger people aged 18-24 are less likely to have made a decision to use less water (CCW, 2015, see also Opinion Leader Research, 2006), and similarly, an additional study (Icaro Consulting, 2013) found that people already trying to reduce their water use were older, had a water meter, had higher incomes, and/or considered themselves very environmentally friendly. However, geography, or living in an area of water stress was found *not* to be an influence.

As mentioned previously, studies demonstrate that people's perceptions of their water use are not congruent with their actual water use. In Australia, Beal et al. (2013) examined whether any psycho-social and socio-demographic factors were relevant to this, and found that people who tended to *overestimate* their water use typically had lower incomes, lower levels of education, less children, small household occupancies, and were less likely to have water efficient technologies in their homes. Those who underestimated their water use were more likely to have higher incomes, be larger families with young children, and were more likely to have water-efficient tech in the home.

In terms of information delivery, in the US, Eck et al. (2019) found age to be a key factor in delivery and learning preferences, with older participants favouring print material, and younger people favouring technology (online communications).

8. Business behaviours

This section of the report looks at pro-water initiatives in business, specifically, in the hotel and farming sectors. There is currently minimal recording and evaluation of business behaviours around water, and more is certainly needed.

8.1 Hotels

The Green Hotels Association (GHA) was launched with the goal of reducing the amount of energy and water consumed in hotels. The Association provides hotels around the world with easy access to environmentally friendly products and ideas. Each member hotel's name is placed on the website www.greenhotels.com, and by staying at a Green Hotel guests demonstrate to the industry that environmental credentials are a priority for them. An added benefit to the hotels is that the ideas the GHA provides can save them a lot of money. Products provided include a printed towel rack hanger and sheet changing card, giving guests the opportunity to decide if they need new towels and linens every day. The GHA reports that hotels can save approximately $1.50 per day per occupied room simply by using these two products (CBSM, nd (b)). At most hotels participation with the towel and sheet cards has been 70 to 90 percent, a level of participation that translates into 5 percent savings on utilities alone at most hotels (CBSM, nd (b)).

One study tested various different persuasive communications on hotel towel reuse signs to determine which would be the most effective (Goldstein, Griskevicious & Cialdini, 2007). Two messages stood out as increasing reuse rates the most. The first was based on the norm of reciprocation; namely that the hotel had already done something (made a donation to an environmental charity) and was asking people to do something in return. The sign read: 'WE'RE DOING OUR PART FOR THE ENVIRONMENT; CAN WE COUNT ON YOU?'. The participation rate was much higher than any of the other cards, including a card based on the idea of cooperation, which read 'PARTNER WITH US TO HELP SAVE THE ENVIRONMENT'. The next most successful message was based around descriptive social norms, and read: 'JOIN YOUR FELLOW GUESTS IN HELPING TO SAVE THE ENVIRONMENT'. Again, reuse rates were substantially higher than the other cards, supporting the theory behind descriptive social norms that people will use other people's decisions as a short-cut for making their own choice. Thus, the study concluded that applying the norm of reciprocation and the descriptive norm for pro-environmental action improved guests' participation in a hotel's towel-reuse program, saving both water and energy.

8.2 Farming

Launched in 2005, the Catchment Sensitive Farming (CSF) partnership is an advice-led initiative enabling action by farmers to reduce agricultural pollution. A recent Environment Agency report (2019) examined the impact of CSF advice to farmers on water quality in England. Pollution from agriculture is a complex issue, and the study's approach utilised a range of data, including farmer engagement, farmer awareness and attitude, farmer uptake of measures to control pollution, pollutant losses, water quality and ecology. In total, 19,776 farm holdings received CSF advice, leading to a 4-12 percent reduction in agricultural pollutant losses. There were 4-8 times higher reductions in agricultural pollutant losses from within agri-environment scheme farms that had implemented CSF measures. The success of the scheme was attributed to effective farmer engagement and advice delivery, that had been achieved through a combination of CSF Officers, commissioned contractors, and partnerships with other organisations. The report highlights how important building relationships across the farming community was, and how it was achieved through a mix of one-to-one and group engagements. As one of the interviewees for this report emphasised, businesses are run by individuals, and individuals respond to advice from trusted and respected messengers.

In a report on understanding how to influence farmers' decision making (Rose, Keating and Morris, 2018) key recommendations for behaviour change were to target messages carefully and positively, to fund and encourage knowledge exchange activities, to prove the value and ease of adoption (remove barriers), and to incentivise behaviour change (highlight benefits). The authors further recommend a participatory and practice-relevant research culture, involving multiple actors in knowledge exchange, communicating with farmers through existing formal or informal networks, investing in trained facilitators, using the advice of 'peer champions' (social diffusion), and a new phase of social change initiatives focused beyond the individual and onto social and organisational change.

9. Timescale needed to maximise effectiveness

Although there is only minimal longitudinal research on the efficacy of pro-water behavioural interventions, existing data indicates that in the absence of ongoing communications behaviours tend over time to return back to where they began (see e.g. Alda-Vidal, 2020; Fielding, 2013). Thus, as one of the interviewees for this report questioned, 'Should we be talking about interventions, or about continuous dialogue?'. There was a general consensus among the experts that people need ongoing reminders regarding their water-using behaviours, and that maximum effectiveness will come from continuous engagement. The frequency of communications may then depend on the circumstances, for example, habitual behaviours may need very frequent engagement, seasonal behaviours (e.g. paddling pools in summer) might benefit from seasonal engagement, and so on. Interventions focused on one-off behaviours, for example persuading people to incorporate water efficient technologies in their homes, may require less ongoing dialogue.

10. Less effective approaches

As referenced throughout this report, an individual's awareness of the challenges around water resources does not necessarily lead to behaviour change (CCW, 2017; Gregory and Di Leo, 2003; Lanes for Drains, 2019; Pullinger et al., 2013). Some older research (Opinion Leader Research, 2006) indicated a strong need for the public to be provided with more information about water conservation, although much of that need may have been met in recent years. Indeed, some of our interviewees felt that people are fatigued from seeing the same types of messaging in information based/educational campaigns, and are generally already aware of their content. Another reason why educational campaigns may not be effective on their own is that human beings tend to make a lot of their decisions based on emotional responses, rather than rational ones, and may need to connect emotionally to a message (which carefully highlighting the benefits to change can achieve), something which was emphasised by interviewees.

Research and our interviewees indicate that messages that make people feel lectured to, preached to, or blamed, will be ineffective (e.g. Opinion Leader Research, 2006). Broadcast-style communications that attempt to persuade everyone are likely to be much less successful than carefully targeted campaigns focused on a specific and well understood segment of consumers. As mentioned, different segments of people will perceive different barriers and benefits to change, and successful communications will address these.

Environmental appeals have been shown to be effective for many people, in part through creating and/or reinforcing an individual's identity as 'someone who cares about the environment' (McKenzie-Mohr, 2021). While appeals based around potential financial benefits and other incentives can also be effective, combining environmental and financial appeals could actually be counteractive, because the (extrinsic) financial motivation actually works as a barrier to developing an identity based around (intrinsic) feelings of connection to and value of the environment (McKenzie-Mohr, 2021). Thus, campaigns which attempt to combine both arguments could potentially be less effective.

The medium of delivery also matters: some experts pointed out that focusing campaigns only on social media doesn't reach everyone, and that the right people will need to be targeted through appropriate and thoughtfully selected channels. In general, no media will be as persuasive as engagement from a trusted or respected person, or peer-to-peer communication (McKenzie-Mohr, 2021).

Some interviewees cited the recent 'Love Water' campaign (Water UK, 2019), a collaboration between several UK organizations including environmental groups, water companies, and regulators, as an example of a potentially innovative initiative that was not as successful as it could have been. They felt that there were a number of reasons for this. Firstly, the governance of the initiative was not well structured, or understood. Although a large steering group was assembled, some key stakeholders with specific and relevant expertise were omitted. Secondly, the scope of the campaign was very broad, attempting to cover beach and river health, as well as water efficiency. Third, the ultimate aim of the campaign was not clear, with no explicit outcomes or deliverables, and no clear call to action. The campaign demonstrates the importance of a strategic, systematic approach to interventions that understands its key collaborators, target demographic, desired outcome, chosen methodology for intervention, delivery channels, and how to evaluate its impact.

11. How can government collaborate most effectively with other sectors?

The experts interviewed for this report had several suggestions for how government can collaborate effectively with other sectors and stakeholders to achieve pro-water engagement and behaviour change. They felt that there was still a lack of visibility for water, and a need for water to be included in government initiatives. One interviewee pointed out that when government communicates about carbon, these communications are seldom linked to water, which they viewed as a missed opportunity in light of the strong relationship between carbon and water. Experts also felt that government involvement should go beyond Defra and the Environment Agency to other departments, as water issues are not just 'environmental issues' but touch all parts of life.

While people felt that government endorsement of water issues is important, some members of the public are distrusting of the government, and so there is perceived to be a need for other parties to potentially take a more visible role in the deployment of any initiatives. Nevertheless, government was seen as crucial, not only in providing funding, but in its ability to exert soft power to influence and mobilise certain stakeholders. In terms of governance of initiatives, getting this agreed before any launch, and ensuring that all parties are clear on their role, with partnership agreements signed up front, was viewed as critical. The importance of ensuring that independent voices with expertise are involved from the outset was also emphasised.

Finally, government was seen as vital in mobilising stakeholders not only at a national level, but also regionally and locally, with this involvement predicated on a knowledge of the systems, and who the actors are within those systems. Thus, local government and planning authorities were viewed as having a role to play. This was seen as especially important in areas of water stress.

12. Case studies

12.1 Water efficiency

Affinity Water's 'Save 10 A Day' campaign (Affinity Water, 2020) challenged residents of St Albans to save ten litres of water each day. The campaign ran over three months at the end of 2020, and targeted 156,000 customers in the district, which was chosen because it used more water than almost anywhere else in the UK. Customers were encouraged to sign up on the website to take part in the challenge and receive a free water-saving kit to install in their homes.

Rather than talking about water 'consumption' or 'usage', the campaign specifically chose the terminology 'water wastage', and took a marketing approach in deliberately 'selling' wastage reduction. Communications were careful not to be perceived as 'preachy' or apportion blame, instead offering people solutions to water wastage. The initiative was localised by explicitly being linked to the River Ver and Colne, two of only 200 chalk streams in the world. The company informed customers about what they were doing to improve

circumstances, and asked them to reciprocate. While communications drove people to the campaign platform, the platform utilized elements of competition and gamification in keeping them engaged. For example, as people took part in activities they could earn coins, which they could choose to donate to charity. Tests were run to find ways to call people back to the platform as a means of continuous engagement. The delivery of water saving technology was done in part so that if customer behaviours drifted back to 'normal' water savings would still be made over the longer term. A local artist was recruited to draw attention to the campaign, creating chalk art along routes where people exercised.

The campaign achieved 14,000 sign ups, with nearly ten percent of customers engaging with it. 8,500 water saving products were issued, and 84 percent of signups followed up by taking part in activities. In a street survey, campaign recognition was high, with 32 percent of people recalling the Save 10 campaign, and 61 percent of those people claiming to be acting on its advice.

The next phase of the initiative is to roll out the strategy at a larger scale, with the 'Save our Streams' campaign. This will target 12 geographies but still maintain a local feel, for example with the recruitment of local influencers (e.g. from faith-based groups and mums' networks) to spread the message utilising the channels that they normally would; online, in person, or otherwise. Elements of process tracing (an impact evaluation method that attempts to identify the successful change points in an initiative in order to replicate them) will be used, for example, identifying what made people click on a particular link on the website. The campaign will continue the strategy of very granular audience segmentation and targeting. The tone of the campaign has been described as cheeky, playful, and distinctly British, with particular attention paid to not feeling 'water industry' derived.

12.2 Unflushables

In a recent report on 'unflushables' - wet wipes, menstrual absorbents and other materials commonly disposed of down toilets - Alda-Vidal et al. (2020) include a case study of Anglian Water's interventions around unflushable behaviours. For the 'Keep it Clear' programme the main audiences are domestic customers and food premises. Once a campaign is started in a particular area, there is a constant 'drip feed' of reminders and interventions. The system for developing and deploying interventions is: 1) understand the context in which the behaviour is enacted, 2) understand the audience and behaviour, 3) develop a strategy and pilot interventions, 4) evaluate impact, 5) refine and roll out. The programme's toolkit includes communication and awareness, provision of tailored information, gamification, learning by doing, community-based engagements, and technological innovation aimed at reshaping inappropriate practices. Campaigns are targeted and attention grabbing, with communications kept positive, direct, simple, and clear, making it easy to act. The audience are segmented by experience, behaviour and attitudes, with messaging adapted to diverse needs and motivations. Trusted voices in the community are recruited to spread the message, and local facts are incorporated to make the problem relevant on a local level. Interventions take an open and flexible approach, incorporating feedback. According to evaluation of the initiative, there has been a successful reduction in overall blockages by 30 percent, and by 52 percent in locations where the campaign has been active for over a year.

In an example of a social norms and networks approach, ‘The Unmentionables’ was a hen-party style game designed to educate women in the area about sanitary waste disposal in an innovative and fun way. Beyond information provision, the objective was to ‘change understandings of what is normal and acceptable through conversations with women with different flushing habits’ (Alda-Vidal et al., 2020, p. 25). The parties were hosted by influential women in the area, and were very successful, with 89 percent of ‘flushers’ converted to ‘binners’.

12.3 Plastics

The #OneLess campaign (https://www.onelessbottle.org/) was launched in 2016 with the aim of reducing plastic pollution in the River Thames, and ultimately the ocean, by lowering the consumption of single use plastic bottles in London. The campaign is a collaboration between the Zoological Society of London (ZSL), Forum for the Future (experts in system change), Communications INC (communications experts) and the Thames Estuary Partnership (TEP) alongside a variety of stakeholders both national and international.

The idea for the campaign arose out of a ‘what if’ conversation of the Marine CoLABoration (https://marinecolab.org/) based on the knowledge that 75 percent of litter in the Thames is single use plastics, namely, ‘what if you could get Londoners to use less water bottles?’ The resulting campaign is an example of a practice based approach which communicates a very specific call to action.

The collaborators examined the current systems that result in water bottles ending up in the Thames, including running a stakeholder analysis to identify where in the chain there were opportunities to change what stakeholders were doing, and make the system more supportive of water refills (removing the main barrier to change) and less supportive of single use water bottles. Stakeholders across the system were then brought together, including big department stores, museums, and London venues. The campaign specifically targeted organisations who had a large sphere of influence, creating a ‘Pioneer Network’ of businesses and organisations who would come together to consider how to enact change. Rather than doing the work for the stakeholders, the campaign enabled them to find solutions themselves. For example, they linked Transport for London (TFL) with the Sea Life Centre, as both had issues with their underground infrastructure not lending itself to refill options. In order to recruit these organisations the campaign often identified a champion within the business, for example a sustainability manager. There are now 52 organisations in the Pioneer Network, who have collectively succeeded in eliminating 4 million plastic water bottles.

To encourage behaviour change in the public the campaign took a values based approach, appealing to people’s existing values and intrinsic (rather than extrinsic) reasons for protecting the environment and the ocean. This involved communicating Ocean Literacy principles - the understanding of the ocean’s influence on us, and our influence on the ocean - as well in this case the link between the Thames and the ocean. Using pictures of water bottles that had clearly originated from the UK piled up on a remote island is one example of a powerful and immediate way of communicating the connectedness of the system, as well

as providing an emotional ‘hook’ to motivate behaviour change. At the same time the campaign was careful not to use crisis language, opting instead for ‘ocean optimism’, and seeking to leverage people’s pride in London and the Thames. Acknowledging, however, that not everyone would’ buy into’ the need for behaviour change, the aim with the systems approach was for people who would not be persuaded by the campaign to eventually be operating in a system that made it natural to use tap water and not single use bottles.

13. Conclusion

This literature review finds that a successful pro-water behaviour change initiative will begin with an understanding of the drivers behind the current behaviour, the systems that support that behaviour, and the barriers and benefits associated with the desired behaviour. Campaign governance will be clearly defined, the most effective and relevant stakeholders will be recruited and briefed on their responsibilities, and the messenger or messengers will be selected based on a good degree of public trust and respect, or on their ability to demonstrate action and accountability. While intervention strategy may be defined at a high level, campaign delivery will feel local or locally relevant. An overarching strategy will likely be deployed as a series of interventions tailored to different segments of the public and businesses. Communications will grab people’s attention and feel relevant to their lives and values, always with a specific call-to-action. Barriers to the desired change will be removed by whatever means necessary; policy, education, or otherwise. Benefits to the desired change will be enhanced and emphasised. Appropriate behaviour change methodologies will be utilised in the design of interventions, and interventions will be piloted and rigorously evaluated before being implemented. The impact of interventions will be carefully tracked and measured, and findings used in refining new phases of the campaign. Engagement will be ongoing.

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