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The role and application of social marketing in managing water consumption: a case study

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Abstract

Water shortages are an increasingly significant social and economic issue in many countries. Increasing the supply of water is one solution (e.g., desalination plants, new dams), but such measures are expensive. Using price to manage household water demand may be viewed as socially unequitable and politically contentious. Social marketing campaigns, where voluntary behaviour change is the goal, provide the potential to foster sustainable consumption of an increasingly scarce, yet essential resource. This paper details a case study of successful water demand management in a drought affected region of South-Eastern Australia. In this region, water consumption was reduced to more sustainable levels through a targeted and successful social marketing campaign. This case is of significant relevance to the field of Social Marketing where there are increasing calls for research into environmental issues in general and water consumption in particular (Kotler, 2011). The extant research literature and this case study are integrated to form several propositions about household water consumption behaviour. Consequently, this paper contributes to the literature by providing a conceptualisation of how residents respond to water conservation related social marketing campaigns. Key issues include: the potential for reciprocal behaviour by consumers when a water authority is perceived to manage the water problem effectively, and linking behaviour change through structural approaches (e.g., subsidies and restrictions), and voluntarist approaches (e.g., attitudinal change).

Keywords: social marketing, water consumption, case study

Introduction

There is pressure for society to adopt more sustainable behaviours and this is increasingly so for household water consumption. With access to potable water often regarded as a basic human right, the sustainable management of water resources is a vital societal and political issue (Clarke, 1991; Phipps and Brace-Govan, 2011).

In Australia, the site of this case study, unsustainable levels of residential water consumption resulted from water-use behaviours that had developed over periods of plentiful supply and a growing size and sophistication of household consumption (CUAC, 2008). The corporatisation of water companies contributed since it was in their interests to encourage consumption that increases revenue. The use of potable water for outdoor use, low adoption of residential water efficiency devices, wastage through leaking taps and inefficiencies in old water distribution infrastructure exacerbated the problems presented by increasing household demand. Droughts in South Eastern Australia put further pressure on water storages. But whilst these remained able to support household and industry demand, governments did little. As the spectre of shortages became apparent, water companies and governments sought to manage demand more effectively as well as address supply issues through new storages, access to underground water, desalination and recycling. However, supply side solutions are expensive and meet opposition from many stakeholders concerned with resource conservation and protection of the environment. In Australia, the practice of recycling water for human consumption is still opposed by most communities, although attitudes are changing (Jeffrey and Jefferson, 2003; Hurlimann and Dolnicar, 2010).

Achieving sustainable water use, whilst securing public health, equity and community support are key challenges requiring water companies and governments to think beyond restrictions and price or increasing supply. This paper reports on a social marketing project at an Australian location that led to a long-term reduction in household water consumption of thirty per cent over five years. It addresses calls in the literature to explain why and how such water saving campaigns are successful (e.g., Syme, Nancarrow and Seligman, 2000, p. 572), and then builds on work presented by Walton and Hume (2011), in a context similar to the one presented here, by developing testable hypotheses informed through qualitative research. Specifically, this research contributes to the literature on social marketing by providing a conceptualisation and rich understanding of how residents respond to water related social marketing initiatives aimed at reducing water consumption. In doing so it illustrates the applicability of the Theory of Planned Behaviour (TPB, Ajzen, 1988) to water consumption, and highlights the motivating role of a consumer's moral orientation, trust in water related institutions, and the complex interactions between policy approaches to behaviour change.

Reducing water consumption

Approaches to resource demand management vary but normally include both economic and behavioural approaches. Economic approaches typically rely on price or legal restrictions, whilst behavioural approaches seek to change behaviour by changing attitudes. Some scholars divide these possible remedies into structural approaches and voluntarist approaches (e.g., Dobson, 2007; Karlsson, 2012). Structural approaches focus on mechanisms which influence behaviours directly, rather than through the attitude-behaviour link, and might include subsidies for water

efficient devices and water restrictions. Voluntarist approaches include strategies to promote ecological citizenship through more permanent attitude change. Consistent with the hierarchy of effects (e.g., Schiffman and Kanuk, 2010) underlying attitudes in turn influence behaviours. Though both approaches have behaviour change as their goal, Dobson (2007) argues that structural approaches are more instrumental and lead to behaviour change only while the structural mechanism is in place (e.g., people will consume less water only when water restrictions are in place but will revert back to their original behaviour quickly after they stop). Alternatively, voluntarist approaches try to target and address the underlying cause of the problem and such approaches are consistent with the ideals of social marketing through voluntary behaviour change.

According to the literature, water consumption is driven by many factors. As well as population growth, income per head will increase water consumption as households install more water using devices, wash more and water their gardens (Loh and Coghlan, 2003). Renwick, Green and McCorkle (1998) suggest that a 10 per cent increase in income levels leads to a 2.7 per cent increase in water use. On the other hand, some technologies have helped reduce consumption per head (Sarac, Day and White, 2002).

Price is often proposed as one way to manage water consumption (see for example Dziegielewski, 1993), and is typically used in a two part tariff structure. However, social and political opposition to the use of market mechanisms is strong because water is often viewed as a necessity (Phipps and Brace-Govan, 2011). Consequently, its use as a rationing device is often limited and requires extensive government auditing and approval. Some studies measuring price elasticity of demand suggest in any case that the price mechanism is not very effective. This is suggested to be because consumers are not very responsive to price increases for water, and most do not even have an accurate knowledge of their utility bills or tariff structure (Carter and Milton, 2005). Crase and Dollery (2006) contend that price signals need to be enhanced for urban water households. Barrett (2004) estimates that a 10 per cent increase in price will reduce water consumption by 5 per cent and that this is mainly through a reduction in outdoor water use. To have large impacts, he argues, prices must be significantly increased, and in a way that is obvious and noticeable to the consumer. OECD (1999) identifies the difference in price elasticity for summer and winter, emphasising the impact on price for outdoor but not indoor use. Thus demand for water is generally price insensitive.

Other structuralist measures include restrictions, often implemented on bans on outside watering where between 20% and 50% reductions have been reported (CUAC, 2008; Kenney, Klein and Clarke, 2004). Structuralist measures can have an immediate impact but they might also be regarded as short-term, because they only last as long as the structural remedy is in place, and superficial, because they might not necessarily change underlying attitudes or behaviour.

Generally size of household, housing tenure, income, price and environmental beliefs are all identified as important in affecting water use. However, the effect of social marketing approaches is less clear (Syme *et al.*, 2000). A marketing campaign to achieve water use reductions by households in the South-East of England was undertaken, but research concluded that there appeared to be limited impact on the amount of water used by the targeted populations, with approximately fifteen per cent of respondents feeling more informed about water saving methods (Environment Agency, 2003).

Although a plethora of research has examined the effects of different policy initiatives, it is surprising that, despite calls in the literature (e.g., Kotler, 2011), so little research has examined and developed theory about household water use. However, some exceptions exist. For example, Walton and Hume (2011) show how water based social marketing initiatives should be designed

to lead to long-term behaviour change, highlighting the role of attitudinal change, goal setting and community feedback.

Some argue that voluntary behaviour change might prove to deliver more achievable and sustainable consumption (Gordon et al., 2006, Kotler, 2011). However, both voluntarist and structuralist approaches might still suffer from the Jevons Paradox, otherwise known as the “rebound effect” (Greening et al., 2000). This occurs when the reduced marginal costs associated with investments in more efficient water devices encourages people to use more water than they did previously. Potentially, increased consumption levels may undermine the sustainability benefits of adopting water efficient technologies.

Whilst the voluntarist and social marketing approach seem to be useful measures for policy makers, there is still a lack of empirical evidence supporting their long-term effectiveness (Andreasen, 2003). So far there is a dearth of research in the area of consumer water use behaviours. Though the social marketing literature is extensive and growing, none of it examines voluntarist approaches to demarketing water consumption, despite calls in the literature to examine social marketing applications in a variety of new contexts (Kotler, 2011). Likewise, though the environmental management and economics literature has widely researched water reduction issues, it tends to focus primarily on structural solutions to the water consumption problem. Using a well cited definition, here, we define social marketing as “...the adaptation of commercial marketing technologies to programs designed to influence the voluntary behaviour of target audiences to improve their personal welfare and that of the society of which they are a part.” (Andreasen, 1994, p.110). Thus, real social marketing campaigns are more than just advertising with a social cause, for example (McDermott et al., 2005). Instead, comprehensive social marketing campaigns make full use of the marketer’s toolbox, as illustrated by the benchmarks provided by Andreasen (2002) to help identify a “genuine” social marketing program (see Figure 1).

The case study detailed in this paper examines the use of voluntarist and structuralist approaches. It uses qualitative data collected from a sample of residents in a drought affected urban area of Australia in 2008-9, and does this in the context of a social marketing campaign and associated initiatives designed to reduce water consumption.

<INSERT FIGURE 1 ABOUT HERE>

Case context

Australia is recognised as one of the driest countries in the world. The site of the case study had endured sustained drought from 1998 when an El Nino weather system or Southern Oscillation pattern dominated the South Eastern part of the continent (Cordery and Opoku-Ankomah, 1994). The El Nino system in place at the time of this case study, coincided with increased political discussion of human induced climate change. During this time, there were also catastrophic fires across South Eastern Australia and a Federal Election, fought partly on the need for climate change action. At the case study site, an iconic recreational lake had dried up completely. Many local sporting fields could not be used and the media contained images of dry and barren landscapes. Community sentiment was receptive to conservation and environmental issues.

Because of the sustained drought, water storages at the case study's site had reduced to 11% of capacity by 2007; in some parts of the State they had fallen to less than 5% of capacity. These circumstances were the backdrop to targeted campaigns to increase water conservation and reduce water use. In the first instance, an outdoor watering ban was imposed. Several other measures to encourage water use reduction were also introduced. With average daily consumption at approximately 250 litres per person per day, a target of 150 litres per person was set and progress towards that target was monitored in the local media. This campaign, implemented across the State, was called Target 150 and was promoted through water bills, billboards, and the media. Its emphasis was to set an injunctive norm of average daily consumption that consumers could benchmark against. At the case study's site, Target 150 aimed to influence attitudes through marketing communications, but was also supported by another initiative, Project Hydro (renamed for anonymity), that through subsidised installations, maintenance and audits supported the overall strategy of reducing water consumption and tried directly to change behaviour. Consumers had to opt into this program, whereas Target 150 was focused around general marketing communications across the State. Project Hydro and Target 150 represent aspects of the voluntarist and structuralist approaches identified earlier by Dobson (2007) and others, though price was not a tool used in either of these initiatives. Specifically, Target 150 was designed to invoke injunctive norms, by allowing households to compare their household energy use with societal standards during drought conditions. Project Hydro was designed to address informational barriers to water efficiency through an auditing service and financial barriers through subsidies for investment in water-related technologies.

<INSERT TABLE 1 ABOUT HERE>

Households were exhorted to reduce water use through reducing waste and investing in more water efficient devices. Such technologies are an important source of behaviour change (Lowe, Souza-Monteiro and Fraser, 2013) In addition, industry, which had been attracted to the region by guaranteed water supplies, signed new (and reduced) supply plans with the water company. This was identified in the media as industry pulling in the same direction as the general community. Later, these issues of distributive fairness surfaced in an initial exploratory study of users' attitudes to water use. A plant to recycle water for industry use and recreational watering was established. An extensively promoted scheme, 'Project Hydro' promoted and subsidised installation of household water efficient devices. Households, besides being offered subsidised installations, could also receive subsidies of up to \$1,000 to install rainwater collection tanks that could be linked to washing machines and toilet systems. All housing developments were required to install rainwater tanks at each new property. Regular community consultations, education initiatives and 'prizes' for good practice supported a press, radio and television campaign. Citizens could report households thought to be breaking outside watering restrictions. Therefore, Project Hydro encompassed a comprehensive range of social marketing tactics and we define the Project as a social marketing campaign with reference to Andreasen's (2002) benchmarks (Figure 1).

The impact of these measures proved significant and by 2009 the target of 150 litres per person per day was met. The results of this study are consistent with other similar reported water related social marketing interventions (e.g., Walton and Hume, 2011). To evaluate the impact of the campaigns and policies that might have contributed to this, a research study was undertaken by the authors. This included exploratory research consisting of several focus groups, with

samples taken from those who participated in Project Hydro and those from the general population (referred to as householders).

Method

At the exploratory phase, four focus groups of eight members were run with a sample of residents stratified by age, sex, and participation/non participation in Project Hydro. The purpose of the focus groups was to explore changes in residents' water consumption behaviours, and their motivations and barriers for changes to water consumption in the past and looking forward. Focus group participants were identified from the target population based on their responses to newspaper advertisements and were purposively selected by the researcher. Participants were also given a small payment to induce participation and compensate them for their time, according to standard industry practices. Each group had an equivalent gender split, and covered a particular age range (i.e., 18-34, 35-55, 55+). A separate group included participants from Project Hydro, which was again relatively evenly stratified by age and gender. The main characteristics of the groups are shown below:

- Focus group 1 – consisted of younger water users (18 – 34) across the range of income levels (low, medium and high);
- Focus group 2 – consisted of middle aged water users (35 – 55) across the range of income levels;
- Focus group 3 – consisted of older water users (56 plus) across the range of income levels, and
- Focus group 4 – consisted of a selection of householders who have participated in Project Hydro.

Groups were run by a professional focus group moderator. The format for the focus groups was typical (Zikmund *et al.*, 2011). The moderator introduced the topic and the guidelines for discussion, and sought permission from participants to use audio equipment. She then asked broad questions to guide the focus group discussion. The moderator concluded the discussion by thanking participants for their time, and explained how the information would be used. Each focus group was conducted using an identical format and moderator's instrument except for the Project Hydro group which was asked particular questions around the programme. Discussion within the groups explored a range of themes but centred on understanding household water use behaviours and conservation efforts. Participants were also asked about their thoughts on the water authority's management of local water resources. Stratification by demographics enabled understanding of how such factors may contribute to water use behaviours. Participants in the Project Hydro group were also prompted to discuss their motivations for taking part in the initiative. Specifically, respondents across all groups were asked about:

- How their perceived water use had changed now compared with two years ago.
- Where a change occurred, what influenced that change?
- What were the barriers to change?
- What were the nature and extent of any 'new' water use behaviours?

Findings from the study and some preliminary propositions

In the focus groups, all participants indicated they had changed water use, although there was some concern that others outside these groups might not be actively reducing water use. The emergence of strong *social norms* around water conservation was a major theme arising from these discussions. This was reinforced by suspicions about possible free riders not “doing their bit”. A whole range of water curtailment behaviours and efficiency investments were identified, including: minimising laundry, stopping leaking taps, reducing showers and investing in low water use equipment. Outside the home, water was recycled through grey water systems, although here, suspicions of illegal hosepipe use were raised; reinforcing the presence of strongly held social norms and a need to control shirking behaviours – even as far as informing on illegal hosepipe use.

Many participants reported they had changed their water use indoors and outdoors because it was “the right thing to do” for individuals, the community and for the environment. This reinforced the earlier notion of *social norms* playing a strong role in influencing short-term and long-term water use behaviour. Participants seemed to have a strong belief that individual efforts could make a significant difference to the overall level of water consumption, and by indications of strong feelings of an obligation to conserve water, rather than water being perceived as a universal right. Generally, the younger group members held stronger fears than their older peers about future water shortages. Positive *attitudes* to water conservation were strongly held in focus group discussion emphasising severe problems for the future unless water consumption was better managed now.

These factors are consistent with the antecedents in Ajzen’s (1988) TPB and might manifest as attitudes, social norms and perceived behavioural control. According to the TPB, people are likely to engage in a particular behaviour if they hold a positive attitude about that behaviour, and if they think their peer-groups (i.e. people whose opinions they value) expect them to act in such a manner (social norms). For example, one respondent commented:

“The longer I hear the message, the more frustrated I become with other people who don’t listen (participant, older years group)”

Also important is a person’s self-efficacy; people who believe they actually have the ability or resources to change their behaviour (perceived behavioural control) and are not disconcerted by factors that may impede such changes (control beliefs), are more likely to engage in more efficient consumption of water. Therefore, it might be expected that the TPB is an appropriate and parsimonious theoretical framework through which to examine residents’ household water consumption decisions. Though the TPB is highly cited and has been used to predict behaviours in a range of situations it is useful to replicate key hypotheses in this particular new context.

P1: The stronger the attitudes towards the benefits of water conservation, the greater probability of reducing water consumption.

P2: The stronger the perceived social norms for water conservation, the greater probability of reducing water consumption.

P3: The greater the belief in an ability to control water use through water efficiency investments or water use curtailment, the greater probability of reducing water consumption.

Some participants also identified that they felt social pressure to reduce water use indoors. These participants indicated that there seemed to be a general expectation among community members that water should be saved, and that those who did not save water were acting irresponsibly, reflecting a perceived moral obligation. It was also reported in the focus groups that even though indoor water use was not regulated, their attitudes and behaviours in the house had changed because it was the “fair” and “right” thing to do in the current water situation. This was illustrated by one respondent who stated:

“...frightening idea of what will happen if we do run out of water...it’s terrifying (participant, youth group)”

This participant seemed to gather support from others in the group, around the notion that fear of the consequences of exhausting water supplies was a significant factor in individuals’ decisions to conserve water. Some participants identified that everyone was responsible for making savings and that it was “right” that everyone should share the burden, and in so doing distribute the “pain” of conserving water.

Discussion of fairness also prompted comments about whether business and industry, in particular, were as effective and committed as households in their efforts to conserve water. This indicated a possible association between intentions to conserve water, and how others were managing water. Transparent and clear feedback about the results from water-related social marketing initiatives has been suggested as a key success factor in long-term behaviour change (Walton and Hume, 2011). However, the mechanism for this change has not been explained. Most participants indicated that advertising messages about the importance of saving water had influenced their attitudes and decisions to change indoor water use behaviour. Participants recalled different forms of corporate and government advertising and marketing communication messages, including local advertising about Project Hydro, information on water bills, and other communication that came to householders through billboards, direct mail and door drops. Some participants also mentioned other forms of advertising exhorting households to collect and use grey water. Many of the participants identified the value of corporate and media communications in reducing their *knowledge* deficit and increasing conservation behaviours. This suggests a certain degree of reciprocity in the decision to conserve water, such that individuals are willing to conserve more water if they feel that their water is being well managed by water companies. This notion of reciprocity’s importance is similar to other water related research which argues that institutional trust might be an important determinant of household water consumption (Jorgensen, Graymore and O’Toole, 2009). Consequently, these findings suggest that the TPB could be augmented within the context of household water consumption. This implies further propositions:

P4: The stronger consumer’s feelings of moral obligation the greater their water conservation efforts.

P5: The stronger consumer's attitudes towards the water management efforts of other significant organisations, the stronger their water conservation efforts.

Participants also reported that media reporting of the state-wide and national water situations, as well as a range of other environmental and conservation issues in general, influenced their attitudes and behaviours. Several participants suggested that the imposition of water restrictions, whilst impacting specifically on outdoor water use, also served to influence indoor water use by raising householders' awareness of the current water situation. This seems to support a cognitive dissonance hypothesis with already changing attitudes being reinforced by mandated behaviours. Such observations are noted elsewhere in the sustainability literature. For example, McKenzie-Mohr and Smith (1999) suggest that incentives share an interaction effect with internal motivations, such that the removal of incentives will undermine conservation efforts, in the absence of a strong motivation developed through attitudinal change. This is supported by one respondent who stated:

"...if you don't use electricity, you don't get charged, but if you don't use water, you still get charged access...there is no genuine incentive to save water, other than the feel good scenario (participant, older years group)"

Therefore, we would expect to see that social marketing initiatives will be more effective in changing attitudes if reinforced through the imposition of structuralist measures more generally and restrictions and subsidies more specifically. This leads to proposition 6 and proposition 7.

P6: The diffusion of conservation attitudes and intentions is increased through a mix of voluntarist and structuralist measures.

P7: Social Marketing initiatives will be more effective in changing attitudes and intentions when some behaviour change is previously or concurrently enforced through restrictions or subsidies.

Behaviour also seemed likely to be influenced by environmental factors. For example, significant discussion by participants in the focus groups centred around the visible signs of drought, such as a dry lake, the quality and colour of the earth, as well as visible signs of distress amongst trees in public places, as factors reinforcing their view of water conservation's importance. For example, one respondent noted:

"...the visual side effects...to me it's a stark reminder of just how much of a drought we're in" (participant, middle years group)

Other significant external events which appeared to influence attitudes included disastrous bushfires, the deterioration of sporting facilities due to lack of water, and the increased scientific and political debate on climate change. Several participants also conflated climate change with what was a recurring local and regional problem.

P8: Water conservation attitudes and behaviours are directly influenced by external environmental events.

Most participants supported comments to the effect that it was not difficult to make simple changes to household water use. When asked to identify what made it difficult to reduce water use in the home, responses related to *household structure* and the difficulty of reducing water for families with young children, conservation behaviours *not being rewarded* by lower water bills because of a two tier pricing structure and the *cost* of new water efficient devices. These factors indicated the importance of residents believing they had the control to change behaviours, consistent with work in the sustainability literature (McKenzie-Mohr and Smith, 1999). Calls in the literature also illustrate the importance of better understanding how socio-demographic factors affect water consumption (Hyllegard *et al.*, 2011; Jorgensen *et al.*, 2009; Randolph and Troy, 2008).

P9: Household structure influences water savings intentions and behaviours.

P10: Insensitive pricing structures fail to reward water saving behaviours can reduce consumer commitment to behaviour change.

This overview of the initial and exploratory phase of the research supports a model of individual and community behaviour that is influenced by:

- Knowledge of the problem and what can be done.
- Attitudes to water conservation that are formed through experience, communications from multiple sources and external but analogous events in other domains like climate variation (e.g. drought), bushfires, crop failure and the general state of the environment.
- Strong social norms reinforcing these attitudes with a repeated concern of shirking behaviours.
- Recognition that whilst there are barriers to changing water use, these barriers can be managed and individuals can exert some control over their water use.
- Perceptions of how well the water company was managing water (i.e. reciprocity).
- A strong sense of moral obligation about the conservation of water.
- Background factors that act as antecedents of attitudes and beliefs, obligation and reciprocity and ultimately water conservation intentions and behaviour.

These proposed relationships and the potential influence of social marketing are conceptualised in Figure 2.

<INSERT FIGURE 2 ABOUT HERE>

Though the TPB provides a useful theoretical lens through which to understand how to change water conservation behaviour (e.g., through improving attitudes, making behaviour change easier for consumers etc.), these findings have some interesting and useful practical implications beyond the standard TPB framework. Specifically, if moral obligation is an important predictor of water conservation behaviour then this suggests consumers might respond to campaigns differently based on whether they are high or low in moral obligation. For example, in Australia, where many citizens have been through a serious and prolonged drought, campaigns which focus on moral imperatives might not be so effective because that battle has already been

won. On the other hand in countries like the UK, where water shortages exist, but where rainfall is high and there is little understanding of the water shortage situation, campaigns focusing on positioning water as a privilege, rather than a right, might be more effective.

Consistent with other water related research (Jorgensen *et al.*, 2009), another finding from the current study suggests the importance of institutional trust. If residents are more likely to conserve water if they feel their water resources are being managed effectively, then this suggests the importance of water organisations effectively managing the relationship with residents to heighten trust. This notion of reciprocity will then enhance water conservation behaviours further as a virtuous circle. On the other hand, the opposite could also occur. If residents have a negative attitude towards the organisation's handling of the water situation then they may feel less compelled to reduce their water consumption behaviour in light of an otherwise positive attitude toward water conservation. So, practically speaking, this research highlights some interesting issues for water organisations to take account of when communicating with customers and residents.

Although the research presented here provides some original and rich insights into the nature of residents' reactions to a social marketing campaign designed to reduce water consumption, it is limited by the usual caveats regarding case study research. In particular, caution should be used when generalising the insights developed here to other contexts and situations. Consequently further case study research should be done to explore these propositions in different contexts. For example, these propositions may apply to other morally relevant behaviour change contexts (e.g., blood donations, drink driving etc.). Further research should also be done to quantitatively test some of the propositions developed here to see how well they hold up to empirical scrutiny. The findings here also imply the need to take a broader approach when evaluating the effectiveness of social marketing campaigns. Though the findings suggest that social marketing programmes might be more effective when structuralist policies are followed by voluntarist campaigns, it is difficult to isolate cause and effect with case study research. Consequently, further research ought to look more broadly at the interaction of structural and voluntarist approaches across a range of different contexts. The findings here also conform to social marketing findings more generally, whereby social marketing campaigns can influence consumer attitudes towards a particular behaviour. This is consistent with the hierarchy of effects (Schiffman and Kanuk, 2004). However, the research here cannot ascertain whether or not selection bias could have been responsible for the effects observed (as with other similar social marketing research). It might be the case that there is some difficulty in disentangling these effects. For example, individuals might self-select into some social marketing campaigns and their personal characteristics, rather than the campaign itself, might be responsible for some of the effects being observed. Advances in statistical analysis techniques such as propensity score matching (e.g., see Greenstone and Gayer, 2009) enable quantitative exploration of the effect of selection bias when individuals can self-select into social marketing campaigns.

The exploratory findings from this study and propositions for testing in future empirical works provide water management organisations and policy makers with the potential to better understand the role of social marketing in influencing participant behaviour. Further research into the effectiveness of such programs, and complimentary policy measures, will help to ensure better management and policy decisions aimed at achieving greater residential water efficiency, especially in times of water shortages.

Conclusions

The findings from this research provide a conceptual framework and an in-depth understanding of the key drivers of water consumption behaviour. Specifically, the findings provide evidence of 1) the important role played by concepts such as attitudes, perceived behavioural control and social norms, supporting the conventional TPB in this context, 2) the importance of factors such as perceived moral obligation and attitudes towards relevant water related institutions, in morally relevant situations, and 3) the complex interactions between different policy instruments to encourage behaviour change.

A social marketing campaign has the potential to be a highly effective approach to changing use behaviours for household water consumers. However in this case, social marketing was supported by other measures including restrictions and subsidies. Attitude change and behaviour change reinforce each other in a broad campaign. The campaign was not a purely voluntarist approach, but constituted a relatively comprehensive social marketing approach, according to well accepted definitions from the literature (Andreasen, 2002). Indeed one of our conclusions is that the probability of success for a campaign to change attitudes is increased with some support from structuralist instruments. Bringing together the extant literature on demand management and social marketing, and the preliminary results from this research, suggests a number of possible propositions that will be tested in future research.

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Table 1. Target 150 and Project Hydro

Key Characteristics of “Target 150”	Key Characteristics of “Project Hydro”
<ul style="list-style-type: none"> • Campaign to motivate residents to cut their water use to under 150 litres per person per day. • Supported by monthly household water use statements providing feedback on recent water consumption and water saving information. • Actual vs. target water use progress was promoted in local media. 	<ul style="list-style-type: none"> • Household retrofit and audit service. • Included installation of water efficient appliances (e.g. showerheads, flow adjustors), toilet flush controls and minor leak repair.

Figure 1. Adapted from Andreasen's (2002) benchmarks for social marketing

1. Behaviour-change is the benchmark used to design and evaluate interventions.
2. Projects consistently use audience research to (a) understand target audiences at the outset of interventions, (b) routinely pretest intervention elements before they are implemented, and (c) monitor interventions as they are rolled out.
3. There is careful segmentation of target audiences to ensure maximum efficiency and effectiveness in the use of scarce resources.
4. The central element of any influence strategy is creating attractive and motivational exchanges with target audiences.
5. The strategy attempts to use all four Ps of the traditional marketing mix; for example, it is not just advertising or communications.
6. Careful attention is paid to the competition faced by the desired change behavior.

Figure 2. Proposed extension of Ajzen's (1988) TPB to household water use

