

Propensity to retrofit:

Social and other influences on likelihood of uptake of water efficient devices

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Waterwise is an independent, not-for-profit, nongovernmental organisation that promotes water efficiency in the UK. Our aims are to decrease water consumption in the UK by 2010, and to build an evidence base to support large-scale water efficiency initiatives. We are the leading authority on water efficiency in the UK. In England, we sit on the Environment Minister's Water Saving Group, and in Scotland, we convene the Saving Water in Scotland network.

To achieve our aims we work with water companies, governments, manufacturers, retailers, nongovernmental organisations, regulators, academics, retailers, consumers, the media, and other stakeholders.

We conduct our own research and occasionally undertake work as consultants. In addition to research, we are also involved in policymaking, advising, public relations, and other activities.

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Summary

This report draws on previous research, literature reviews, and survey responses from the South West Water WET project and the Essex and Suffolk home audit project in order to recognise if there is a well-developed set of socio-demographic profiles for who is most likely to engage in water efficient behaviour. A clear profile would allow water companies to target specifically and successfully certain consumer groups to adopt particular water saving devices.

Environmental behaviour is complex and diverse, which makes it difficult to anticipate. Predictors of environmental behaviour can be placed into two categories: situational variables and psychological variables. This paper examines variables such as socio-demographic factors, social norms, values, knowledge, and context.

Research into environmental consumer profiles has produced some contradictory results. Defining a particular environmental consumer profile is further complicated by the fact that individual environmental consumer choice varies between the environmental domains.

A set of core variables that studies suggest may be predictors of environmental consumerism include age (mature), home ownership, income (reasonably well off), education (higher education), gender (female), political affiliation (liberal), and family size (small).

Social norms and expectations also shape and constrain behaviour. Social influences include peer pressure and support from local communities.

Consumers' values and perceived moral obligations influence behaviour. Those who belong to community organisations including environmental and religious organisations are more likely to undertake pro-environmental action.

Knowledge of environmental issues is an important moderator of whether or not consumers participate in environmental behaviour and consumerism.

Individuals' responses to environmental consumerism are context driven. Local factors such as perceptions of time available, convenience of particular schemes, experience with retrofitting and water management issues, perceptions and previous record of utility company, and media coverage all influence consumers' actions.

Based on literature reviews of environmental behaviour there is a tenuous link between environmental consumerism and social classification, and the relationships are not predictable.

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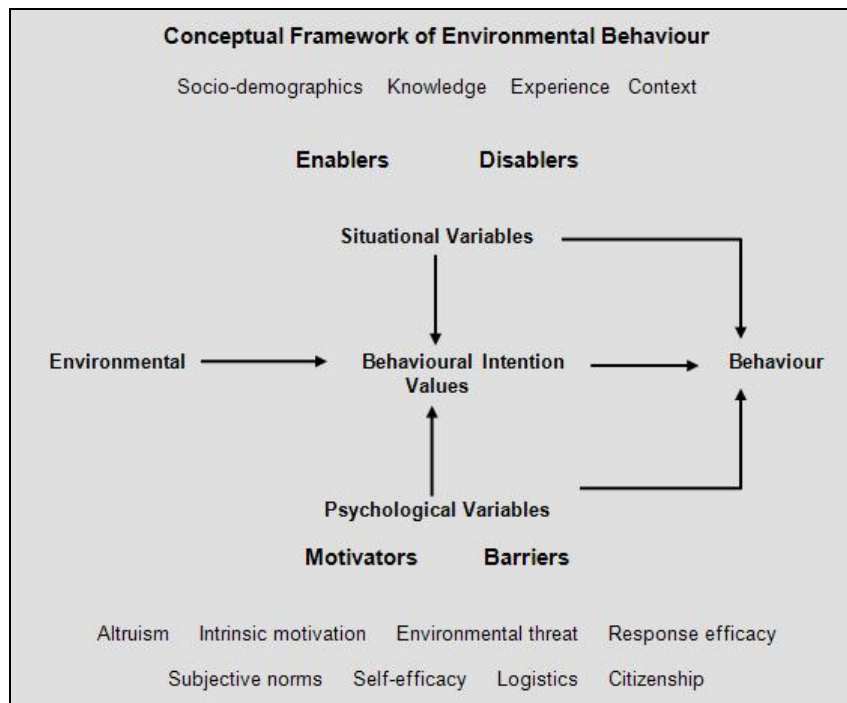
1. Introduction

Opinions and the behaviours of consumers matter for companies and policymakers. Issues of public acceptance are among the most important for the future of water efficient technology (Russell and Hampton 2006). Environmental behaviour is, however, complex and diverse, which makes it difficult to predict.

There are a range of factors that combine to affect consumers’ willingness to engage in pro-environmental behaviour and consumerism: socio-demographic factors, social norms, values, access to information, knowledge, experiences, local context, and heuristics. Judgements concerning perceptions of the credibility of organisations promoting new technology and the convenience of the technology also play an important part in affecting consumers’ willingness to engage (Barr and Gilg 2005; Russell and Hampton 2006).

Barr and Gilg (2005) place predictors of environmental behaviour into two categories: psychological variables and situational variables (figure 1). Situational variables include an individual’s personal circumstances at the given time represented by socio-demographics, access to knowledge, and experience of environmental management. Psychological variables include values, perceptions, and personal traits of the individual. People are more likely to act in a pro-environmental manner if they perceive themselves to have a moral obligation and personal responsibility.

Figure 1. Conceptual framework of environmental behaviour (Barr and Gilg 2005, p234).



This paper will deal particularly with situational variables although values, which are categorised as psychological variables, will also be briefly discussed. Socio-demographics and local contexts are variables that are more visible and may be useful factors for companies to consider when targeting retrofitting projects towards consumers who are more likely to adopt the project.

In a number of areas, the paper highlights the similarities between uptake of water and energy efficiency measures. Waterwise have had a series of meetings with the Energy Saving Trust that included discussions on these links, however, very little of the data on either water or energy efficiency has looked at cross referencing between water and energy, therefore no firm conclusions can be drawn. This, however, is changing as both Waterwise and EST, as well as other bodies, are beginning to make the connection.

2. Socio-demographic variables

Hines et al. (1987) and Schultz et al. (1995) have highlighted the significance of socio-demographic profiles in determining environmental action, in particular the importance of age, gender, income, educational attainment, and political affiliation (cited in Barr and Shaw 2006).

The relationship between socio-demographic factors and environmental concern is, however, generally unpredictable (Fransson and Garling 1999). Research into environmental consumer profiles has produced some contradictory results. Numerous studies indicate that the environmental consumer can vaguely be put into the categories of young, female, well-educated, reasonably wealthy, car driving, politically liberal, and living in a single family home (Barr and Gilg 2005). However, a study on sustainable energy use by Barr and Shaw (2006) found that those most committed to sustainable energy use were older, as were those consumers who were more likely to act on their environmental concerns. These 'Committed Environmentalists' tended to be in older age groups, on moderate incomes, and were more likely to hold university degrees.

Defining a particular environmental consumer profile is further complicated by the fact that individual environmental consumer choice varies between the environmental domains. Research by Hines et al. (1987) has provided evidence for higher levels of pro-environmental behaviour amongst younger, female, well-educated, wealthy individuals; however, De Oliver (1999), who examined water conservation in San Antonio, found almost all the trends above to be the inverse (cited in Barr 2003).

Socio-demographic factors that predict recycling were found by Oskamp et al. (1991) to be living in a single-family house, age, education, and presence of children. However, in Baldassare and Katz (1992) neither age, education, or income predicted water conservation (cited in Tanner 1999). These inconsistencies make accurately predicting environmental consumer behaviour and targeting specific campaigns very difficult.

A set of variables, which studies suggest may be predictors of environmental consumerism, include age, home ownership, income, education, gender, political affiliation, and household size. The way these factors interact and the strength to which they influence behaviour are, however, not known.

2.1 Age

Some studies suggest that younger persons are more concerned about environmental deterioration than older persons (Fransson and Garling 1999). However, studies on recycling and water conservation have revealed that older people – those in their mid teens during the Great Depression or Second World War – are more likely to lead a thrifty lifestyle and to make significant efforts to reduce their waste by recycling and conserving water (Barr 2003 and Strang 2004). Various studies have indicated that those in higher age groups were also more likely to be more energy efficient (Barr et al 2005). The questionnaire results from South West Water suggest that those in higher age groups are more willing to engage in water efficient projects.

2.2 Home ownership

Home ownership is an important factor in explaining large capital investment in energy saving methods. Ownership may engender a sense of belonging and personal control that motivates the individual to think more carefully about environmental conservation. Home ownership carries with it a personal perception of the duty to care for a property (Barr et al 2005). Property type was not the main factor determining participation in Suffolk and Essex's home audit project.

The actual design of the house is a major determinant of retrofitting, since the age or design of a house may impede the implementation of certain retrofitting schemes. There is little point in encouraging water efficiency by advertising cost saving retrofitting schemes in areas where few households have metered supplies.

2.3 Income

The social class hypothesis states that environmental concern is positively associated with education and income. According to an explanation based on Maslow's theory of needs hierarchy, the upper and middle classes have satisfied their basic material needs and can therefore focus on satisfying other desires. The usual interpretation is that beyond a certain income level environmental quality becomes a luxury good (Ferrer-I-Carbonell and Van den Bergh 2004; Fransson and Garling 1999).

This seems to be the case in the South West. If council tax bands are taken as a crude measure of income, the majority of those expressing interest in a water efficiency projects offered by South West Water are from relatively higher income groups. This result contrasts with those from Sydney, Australia where the majority willing to take part in water efficiency schemes offered by Sydney Water are in lower income groups.

The reason that fewer people from low income groups are interested in water efficiency projects may be because of relatively low levels of water metering in the South West in comparison to the international average, although South West Water does have higher than average metering penetration in comparison to the UK average. Without meters the amount of water used is not linked to the water bill and so there is little financial incentive to take part in a water efficiency project. The majority of those who participated in the Essex and Suffolk Water household audit had water meters. One of the main motivational factors for participating in the project was the possibility to make savings on the water bill.

The results from the South West Water survey reveal that those in very high income groups may not be so amenable to water efficiency projects, since those in council tax bands higher than E did not express an interest in South West Water's project.

The amount of financial and technical resources required to invest in water conservation technology can vary greatly. For example, a low flow showerhead is cheaper to install than retrofitting an entire low flush toilet, which in turn requires less capital investment than fitting a water reuse system. In the USA, discrepancies were found in the relationship between income and the adoption of energy efficient measures. Direct energy saving measures were more likely to be taken up by those on low incomes, whereas more cost intensive energy conservation methods could only be taken up by those with sufficient capital to invest. Water conservation activities that require long-term alterations to the structure of the home and that include internal changes will require a higher level of financial and technical resources (Barr et al 2005).

2.4 Education

Most studies support a positive correlation between education and environmental concern; however, in a number of studies education and income were only slightly associated with environmental concern (Fransson and Garling 1999).

2.5 Gender

Generally, research indicates that women are more environmentally concerned than men; however, studies by Acruru and Christianson (1990) found that men were more environmentally concerned than women, and studies by Schan & Holzer (1990) and Davidson

and Freudenberg (1996) revealed inconsistent results (cited in Fransson and Garling 1999; Tanner 1999).

2.6 Political affiliation

Studies have indicated that those more likely to engage in environmental activities have politically liberal affiliations, and are more likely to vote Green Party or Liberal Democrat. Consumers who engage in environmental activities are also more likely to vote (Barr et al 2005; Fransson and Garling 1999).

2.7 Household size

Those more likely to engage in environmental activities tend to have smaller household sizes than those who are less concerned about taking action (Barr et al 2005). In the results from South West Water's questionnaire, only a small percentage of those who expressed an interest in the water efficiency project had children living at home. This, however, could be because the majority of respondents were in higher age groups and their children may have left home. There did not appear to be a relationship between household size and willingness to engage in Essex and Suffolk Water's home audit project.

3. Social norms

Outside of socio-demographic factors affecting consumer choice, other factors are important to consider. Social norms and expectations also shape and constrain behaviour. Social influences include peer pressure and support from local communities (Kaiser and Fuhrer 2003).

3.1 Peer contact

The mimicking of a neighbour's behaviour is a key determinant to the uptake of new environmental practices (Downing et al 2003). It is important to portray retrofitting as socially acceptable and even desirable in order to strengthen social support and create new social norms (Kaiser and Fuhrer 2003). Consumers are more likely to adopt environmental practices if their neighbours have successfully adopted the measures.

3.2 Local communities

The role of the community in mediating and moderating individuals' behaviour is important. Environmental citizenship is grounded in cohesive local communities (Barr 2003). Consumers actively engaging in pro-environmental behaviour are more likely to be part of community

organisations (Barr et al 2005). The experience of communities also influences environmental behaviour. Where consumers in one area have had a positive experience with retrofitting, others in the community may be more willing to adopt the new technology. This, however, also works in reverse: consumers will be less inclined to invest in schemes where there has been negative coverage. The failure of a retrofitting scheme at one site may do much damage to the implementation of further retrofitting schemes (Russell and Hampton 2006).

4. Values

Environmental values do play a role in influencing environmental behaviour. Studies have revealed a weak positive correlation between values and action in environmental behaviour. Those who have strong moral norms are more likely to act on environmental knowledge (Barr et al. 2005; Fishbein and Manfredo 1992; Olofsson and Ohman 2006).

Stern (1992) identified a view that assumes environmental concern is a function of some deeper cause of concern which shapes consumers' values, such as a moral obligation to act appropriately towards the environment stemming from a religious belief (cited in Fransson and Garling 1999). Recent studies have suggested that general beliefs are a strong predictor of environmental behaviour (Olofsson and Ohman 2006).

As with the socio-demographic variables previously discussed, there is a certain ambiguity in the extent that values determine environmental actions and the crossover between various environmental domains. Even people who state that their intention is to act upon some pro-environmental criteria that they incorporate as part of their values will behave contrary to the stated intention at certain times and under certain circumstances (Spaargaren 2003).

5. Knowledge

Knowledge of environmental issues is an important moderator of whether or not consumers participate in environmental behaviour and consumerism (Barr 2003). Consumers need to be reasonably well informed regarding environmental concerns before they are likely to be interested in investing in any water efficiency projects. Support for retrofitting and water reuse by consumers is likely to be greatest when the community has a high awareness of water supply concerns (Russell and Hampton 2006). Not only is knowledge about a specific problem a prerequisite for engagement in environmental action, but also the knowledge of what actions to take in order to deal with it effectively (Fransson and Garling 1999; Kaiser and Fuhrer 2003).

In their home audit survey, Essex and Suffolk Water concluded that the way in which schemes are communicated is important. The audit survey completed by Essex and Suffolk Water supplied consumers with relevant information about methods to conserve water in their particular home. Giving information about methods gave consumers the ability to monitor and

control water usage through home audits. Essex and Suffolk Water viewed the project as successful in reaching customers with a water efficiency message.

Written communication and other forms of behavioural intervention are not always successful because they do not address appropriate gaps in knowledge. It is important to have a broad understanding of the information that people will need and demand before agreeing to have their property retrofitted. It must go beyond providing general information (Fishbein and Manfredo 1992; Russell and Hampton 2006). It is important to obtain a good understanding of customer profiles in order to assess their information needs upon commencement of a retrofit project. Simple devices such as relevant case studies in various media forms can help to reassure customers.

The drawback to the information provided by Essex and Suffolk Water was that a large percentage of the customers who did not participate gave their reason for non-participation as having forgotten they were offered an audit. 93% of those who were inclined to undertake the audit when first asked but then failed to participate stated that the reason for not participating was that they never got around to organising an audit.

It is important for retrofitting schemes to fit in with the context of consumer's lifestyles, many of whom are busy and to whom time is in short supply.

6. Context

Understanding who will take up retrofitting projects is not only a question of demographics, behaviour, values, and knowledge, but also a sociological and cultural one. Consumers' responses to environmental consumerism may be far more contexts driven than has been previously reported (Russell and Hampton 2006).

There is a tendency to assume that if persons do not respond in the way that experts think they should to the information provided, then the poor response is caused by ignorance, misguided beliefs, or failure to bring things into proportion. Individuals, however, act based on their personal views of reality rather than based on the objective possibilities. Consumers need to be able to establish the link between the environmental concern and their everyday lives. Behaviour is modelled on the surrounding social environment. Local factors such as time availability, experience with retrofitting and water management issues, perceptions, record of the responsible organisations, and media coverage all have an influence on people's actions (Barr 2003; Russell and Hampton 2006; Tanner 1999; Spaargaren 2003).

Other events and concerns may also influence consumers' opinions. These concerns may have a positive effect, such as water saving in response to drought; however, failed schemes and poorly fitted technologies will create distrust. Consumer reactions may be judgements about the time they have available to invest in schemes, the publicity surrounding a scheme, institutions in charge of a scheme, the perceived lack of credibility of government and

regulatory agencies, and past failures of the good things that sold but failed (Russell and Hampton 2006).

Support may be higher if schemes recognise the time constraints of consumers. Cistern devices have a relatively high uptake amongst consumers ostensibly due to the ease of use. The Save-a-Flush was considered by consumers to be the most useful component of the pack provided by Essex and Suffolk Water to households.

The utility company promoting the retrofitting scheme may have an important influence on whether consumers will take up the scheme. A consumer may accept an advocated position if the message comes from a highly credible source, but may reject it without considering the merits of the argument contained if the source is perceived to lack credibility (Ajzen 1992). Support by consumers is likely to be greatest when confidence in local management of utilities and technologies is high (Jackson 2005). Research for CCWater's *Using Water Wisely* project has indicated that people are less inclined to engage in water efficient practices or schemes when they perceive that the water companies are not leading by example.

7. Conclusion

Based on findings from literature reviews and research on environmental behaviour, there is a tenuous link between environmental behaviour and social classification, although the relationships are not predictable nor do they carry over between environmental domains.

The social classification that companies could target for retrofitting schemes appear to be mature homeowners who are moderately to very well off, educated, and politically liberal with a small household size and involvement in organisations such environmental, community or religious organisations. Those that are aware of water issues facing their region are also more likely to take up water efficient devices.

The influences of both location of communities and the contexts within which consumers are operating affect consumer environmental behaviour and must not be misunderstood or ignored.

There seem to be a number of tenuous links between a number of factors and the propensity to retrofit. The large-scale pilots currently being undertaken by a number of UK water companies should provide more information on these links. Waterwise is ensuring that data on these factors is being collected in the pilot schemes to aid analysis. There is also a need to assess the link between meters and retrofit uptake. In addition, links between water and energy efficiency should be examined in depth.

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Appendix 1. South West Water project

South West Water used a social survey to assess those who would be willing to undertake a water efficiency project. This statistical analysis is greatly limited because there are only results for those who gave a positive response to the survey. There is no mother sample with which to compare council tax bands, age brackets, and other factors for the positive respondents. The comparisons made for council tax bands and age groups are against the general trends for the South West. There is no baseline data for families or kinds of property.

A1.1 South West Water and the South West region

South West Water provides water services to about 97 percent of people in the South West region; the remaining 3 percent have private supplies. This 3 percent discrepancy may influence results when comparing the distribution of council tax bands and age group distributions in the sample with the distribution of the general population in the South West.

The maps below show the regions covered by the South West local authority (figure 2), from whom regional information has been taken for this study, and South West Water (figure 3), who have supplied information from a survey conducted in the region in which they provide water services.

Figure 2. Map of Local Authority boundaries for South West.

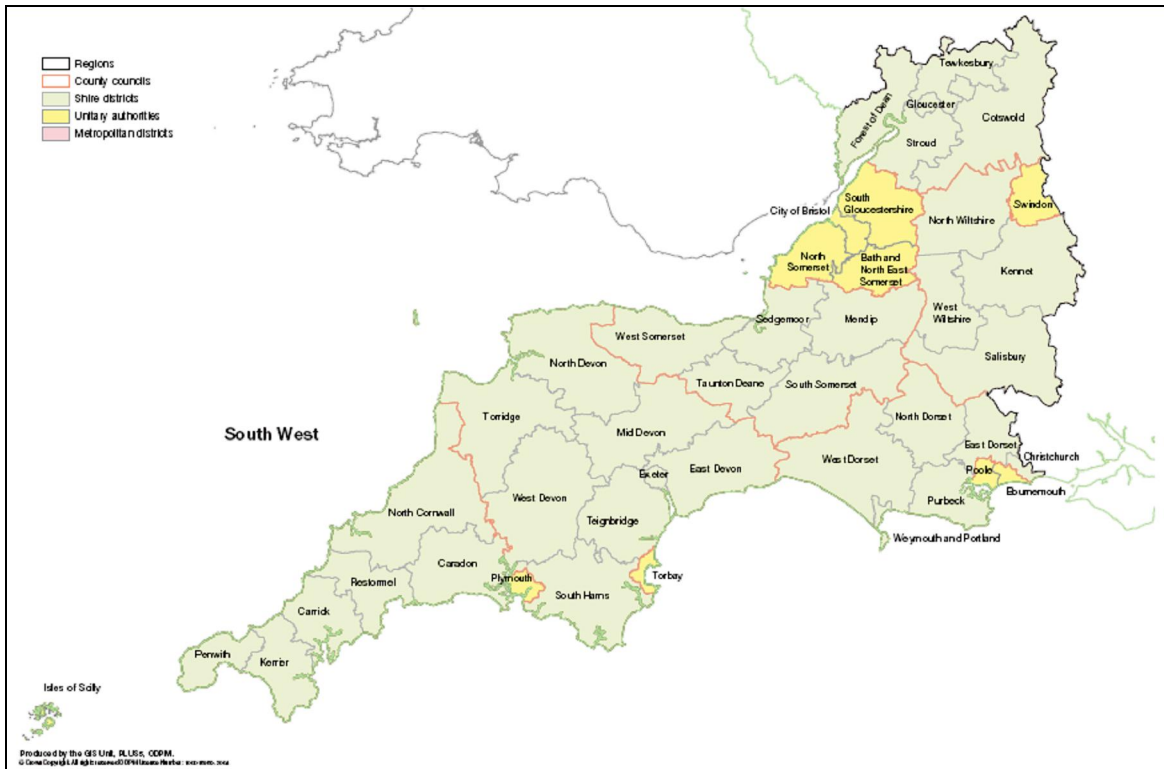
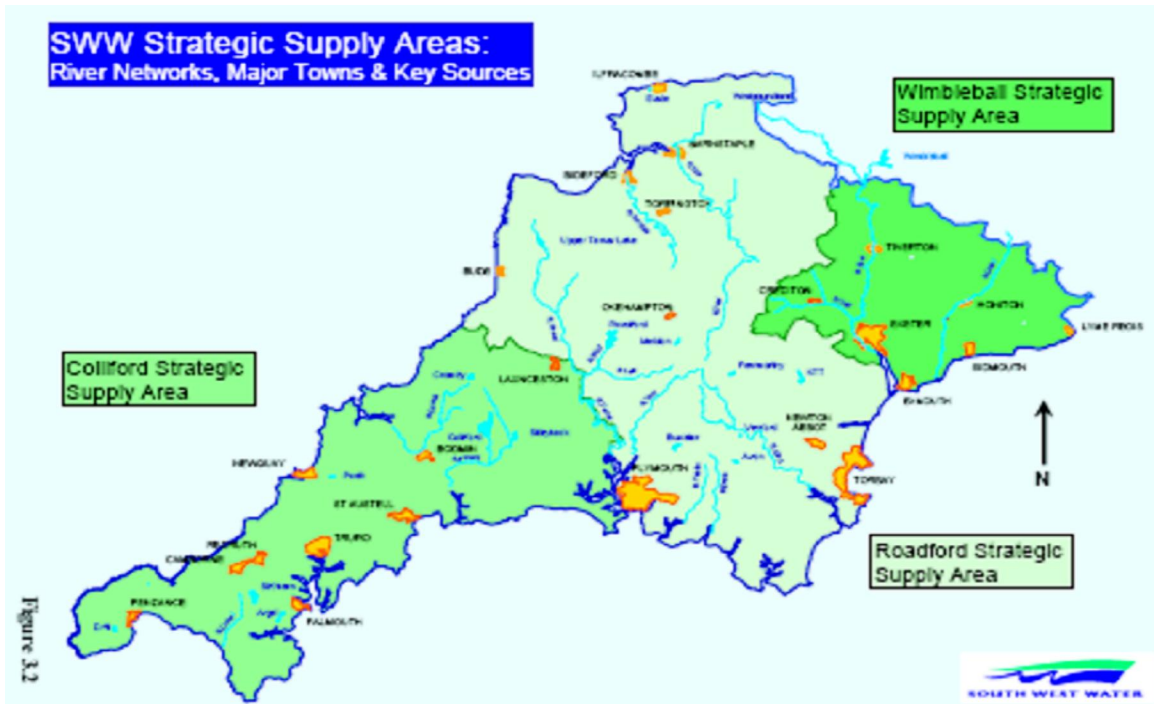


Figure 3. Map of area that receives water services from South West Water.



A1.2 Council tax

In England, the majority of houses fall under tax band A with progressively fewer houses in each band as we move from band A to band H. Nationally, 25 percent of properties are in band A with only 9 percent in the top three (figure 4). The amount of properties in each band differs widely between regions (figure 5). The distribution of properties in the South West across council tax bands is shown in table 1.

Figure 4. Distribution of dwellings by council tax band as at 31 March 2005.

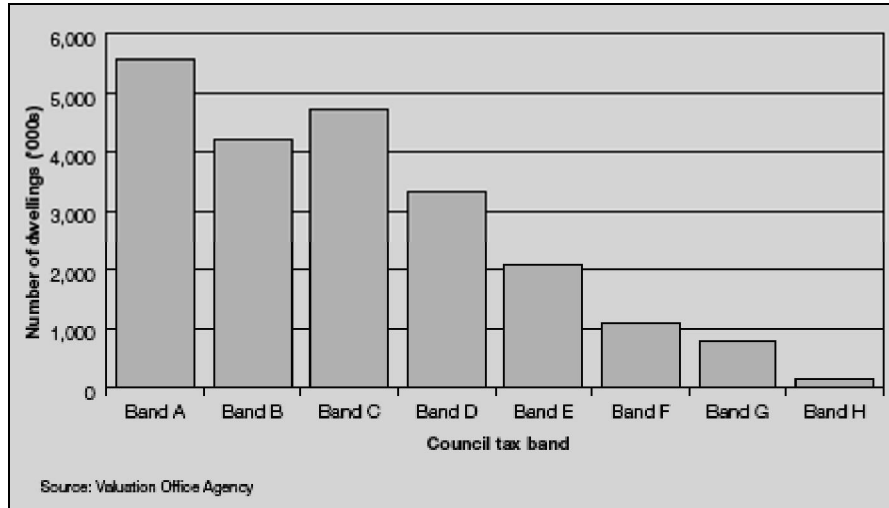


Figure 5. Distribution of dwellings by council tax band and region as at 31 March 2005.

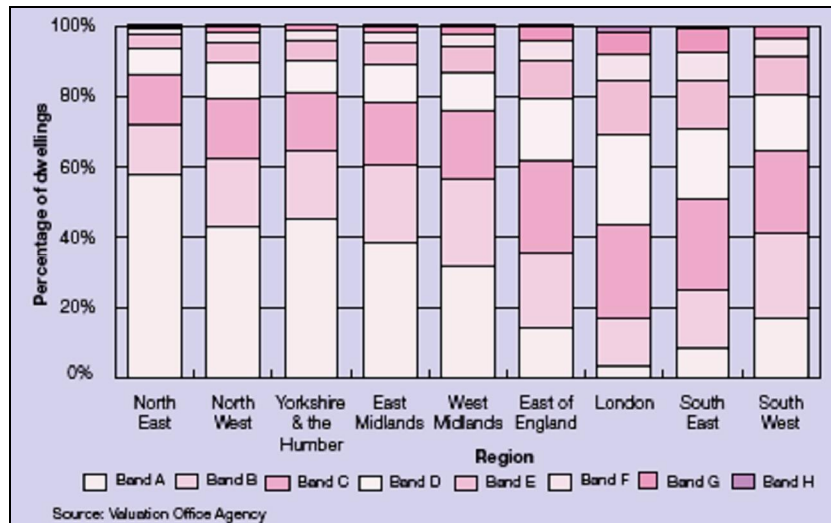
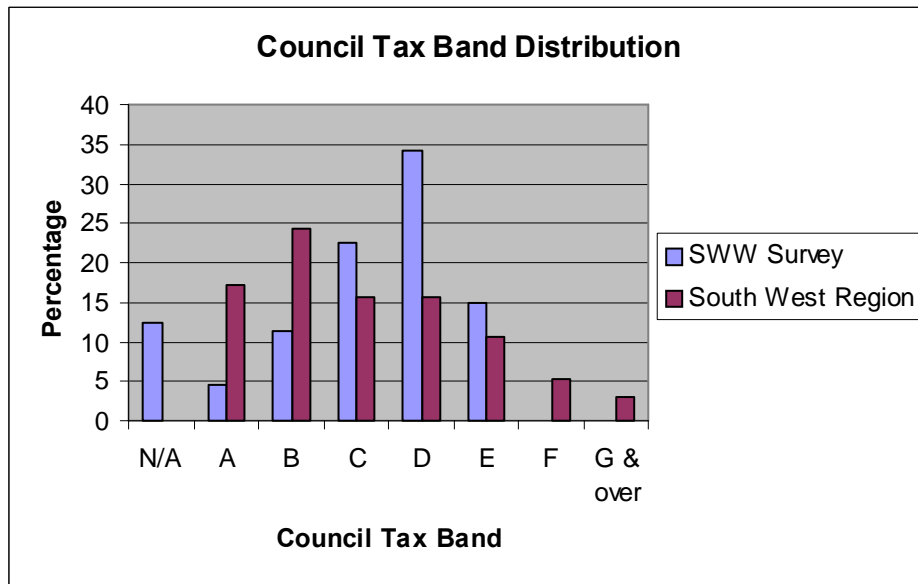


Table 1. Number of dwellings on valuation list in South West England, March 2005	
Council Tax Band	Number of dwellings (thousand)
A	387
B	549
C	521
D	365
E	240
F	122
G	122
H	71
I	7
Total	2253

The distribution of council tax bands in the survey differs from the general distribution of council tax bands in the South West of England. The largest percentages of respondents are in council tax band D (34 percent), with council tax band C accounting for the next largest percentage (23 percent) (figure 6)

Figure 6. Council tax band distributions for both the South West Water survey and the South West region.



The differences suggest that those who own a house in council bands D and C, although not comprising the largest percentage of home owners in the South West region, are the most willing to engage in water efficiency projects.

A1.3 Population

The majority who will take up schemes are between 45-64 years old (33 percent) (figure 7). Although the majority of respondents fell into the 45-64 age range, the distribution echoes the

population distribution in the South West. The age groups 65-74 and 74+ are overrepresented in the survey results as compared to the general population distribution. This would suggest that those in the older age categories are more interested in water efficient projects (figure 8).

Figure 7. Percentage of respondents in each age category of respondents to the South West Water survey.

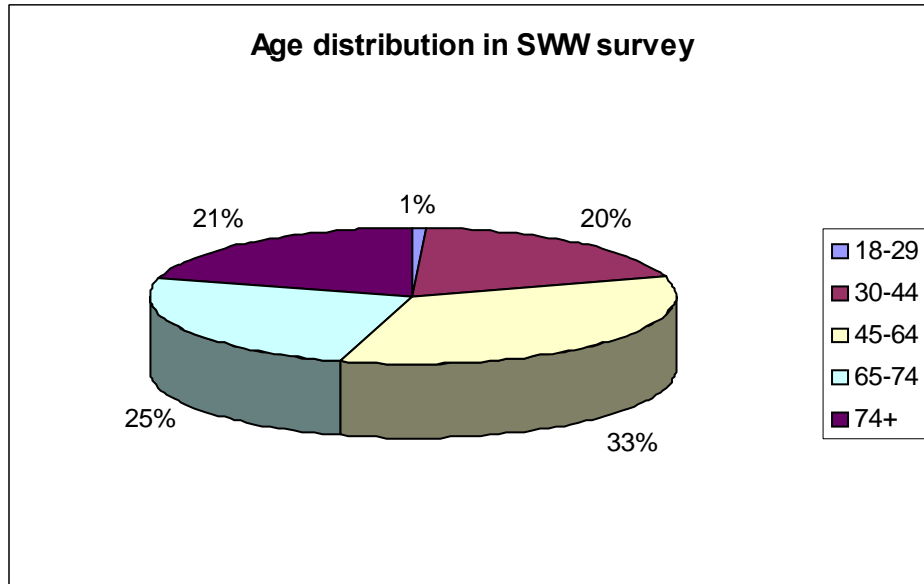
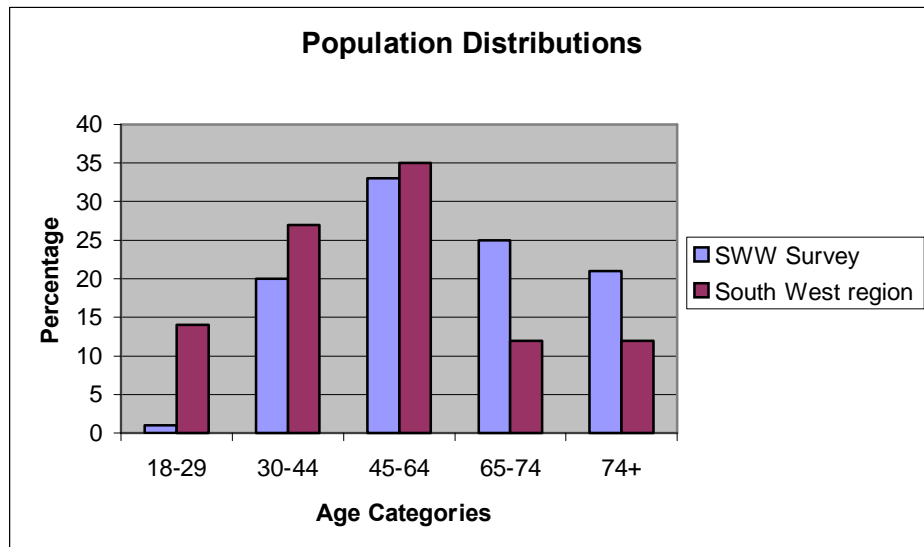


Figure 8. Population distributions for the South West Water survey and the South West region.



A1.4 Families

The distribution of families within the South West region is not known; it is therefore difficult to suggest what the data indicates.

The minority of the 18-29 year old age group of respondents willing to engage in the scheme (15 percent) had children living at home. Of those, 19 percent had children under 2, 19 percent had children aged between 2-4, and 62 percent had children aged between 5-17 years.

The majority of the 30-44 year old age group of respondents willing to engage in the scheme (75 percent) had children living at home. Of those, 11 percent had children under 2, 23 percent had children aged between 2-4, and 66 percent had children aged between 5-17 years.

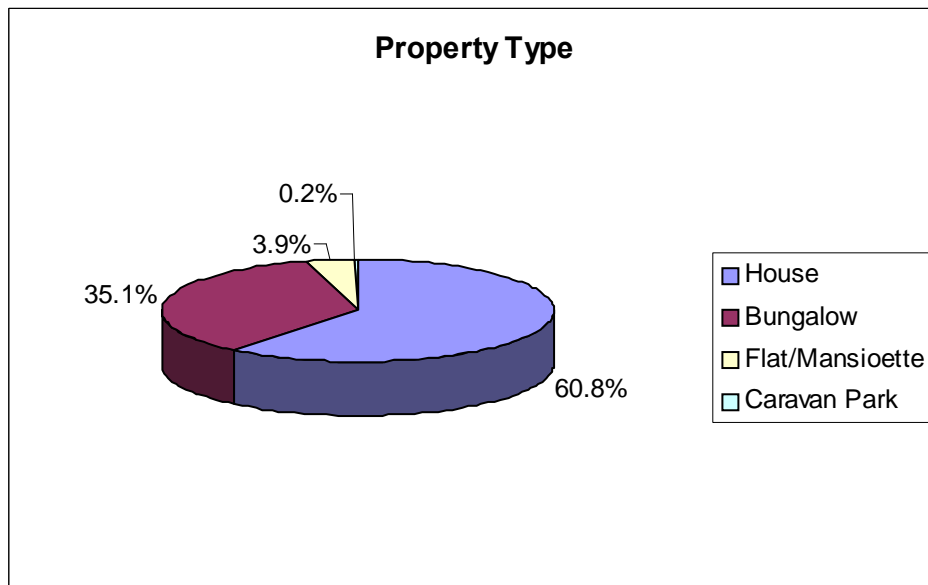
Within the 45-64 year old age group, only 11 percent had children living at home. Of those, 5 percent had children under 2, 12 percent had children aged between 2-4, and 83 percent had children aged between 5-17 years.

Overall, those with children living at home made up 23 percent of the respondents, of whom only 8 percent had children 4 years old or younger.

A1.5 Property types

The majority of respondents (61 percent) live in a house (figure 9). The survey did not differentiate between different categories of houses such as detached, semi-detached, or terraced. Once again, there is no data available on the distribution of property types in the South West so it is difficult to suggest what this data may indicate. However, it is possible that house occupants in the South West are more likely to be owner-occupiers and therefore are able to make decisions about retrofit, unlike those in rented accommodation.

Figure 9. Percentages of each property type resided in by respondents to the South West Water survey.



A1.6 Gardens

The overwhelming majority of respondents (95 percent) have gardens.

A1.7 Conclusions

The majority of respondents lived in properties that fell into council tax band D. The distribution of respondent's council tax bands and the distribution of South West region's council tax bands was markedly different. This could suggest that those in council tax bands D and C in the South West region are more amenable to engaging with water efficient projects. Very few respondents were from council tax bands A and B. The higher council tax bands, E and above, were not represented.

The majority of respondents were from the 45-64 age group; this is consistent with population distribution in the South West and the results may be a reflection of the general age distribution. The older age groups are more prevalent in the survey than would be expected from the regional population distribution. These results suggest that the older age groups in the South West region are more amenable to engaging with water efficient projects.

The majority of respondents did not have children living at home. This links in with the fact that the majority of respondents were older and therefore their children may have left home. A very small percentage of respondents had young children.

The majority of respondents lived in a house as opposed to a flat or bungalow, and the overwhelming majority of respondents had gardens.

Appendix 2. Essex and Suffolk Water project

In 2001, Essex and Suffolk water conducted a household water audit survey in Heybridge, Essex. Customers in the area were offered a water efficiency home survey pack, which was comprised of information and a number of devices that would assist them in assessing their water awareness and usage. Customers were asked to make use of the pack and return details to Essex and Suffolk Water. Similar projects were carried out in five other regions:

- Moulsham, Chelmsford, in a District Meter Area (DMA)
- Hartismere, Suffolk
- Silver End, Braintree
- Burnham on Crouch, Essex
- Southend and the remaining part of Hartismere

Of the households mailed in Heybridge, 28 percent participated in the audit, but in Southend only 15 percent participated. Such a low response rate brings into question the representative nature or the ability to generalise the findings.

A2.1 Results from Heybridge

More affluent households and households with young families dominate the Heybridge area. The number of audit forms returned was in proportion to the number of households. Prizm, a postcode segmentation system, was used to divide consumers into groups. The groups that had the highest percentage uptake for acceptance of the pack had similarities such as the employment type was 'professionals', and they had an interest in rural/outdoor activities and were likely to be members of the National Trust. There was, however, no clear socio-demographic profile for those interested in engaging in the project.

A2.2 Knowledge and communication

Essex and Suffolk Water concluded that the way in which the project is communicated and customers motivated is vitally important. Sixty-two percent of households stated that they would be prepared to carry out their own survey if they were provided with the appropriate information.

A2.3 Values

Motivators for partaking in projects included environmental concern and financial incentives, with 65 percent of respondents claiming they would be prepared to fit water saving devices if they were provided free of charge.

A2.4 Context and convenience

Ninety-three percent of those who were inclined to undertake the audit when first asked but then failed to participate stated that the reason for not participating was that they never got around to organising an audit. Time constraints and convenience were an important factor in non-participation.

The Save-a-Flush was considered the most useful component of the pack. The reason for the success of this device could be attributed to its quick installation and ease of use.

A2.5 Conclusions

There was no clear socio-demographic profile for those interested in engaging in the project. Factors that were found to be important in the Essex and Suffolk Water household water audit project were clear communication (effectively building consumer's knowledge base), values (be they environmental or financial), and convenience (with respect to the lifestyle consumers' lead, which is part of the context in which consumers operate).