www.defra.gov.uk

Water Retrofit Policies Review – The Household Perspective

R&D Technical Summary FD2649/TS

Produced: May 2010

defra
Department for Environment
Food and Rural Affairs

Defra's Flood and Coastal Erosion Risk Management R&D Programme

Water Retrofit Policies Review – The Household Perspective

R&D Technical Summary FD2649/TS

Produced: May 2010

Statement of use

This report is an outcome of Defra's Flood & Coastal Erosion Risk Management R&D Programme. It summarises the key findings from project **FD2649: Water Retrofit Policies Review – The Household Perspective**. The project's objective was to provide an evidence base on householders` attitudes towards water-related retrofit measures across three domains: water availability, surface water management and flood risk management, water pollution and quality. This work is focused on the specific detail of reactions to water retrofitting propositions. The work involves an exploration of responses to water measures and behaviours in the home as well as at a community scale

Dissemination status

Internal: Released Internally

External: Released to Public Domain

Keywords: Environmental protection, water conservation, water quality, surface water management, policy development

Research contractor: Icaro Consulting Ltd

Defra project officer:

Victor Aguilera

Publishing organisation
Department for Environment, Food and Rural Affairs
Water Availability Division,
Ergon House,
Horseferry Road
London SW1P 2AL

Water Retrofit Policies Review: The Household Perspective
Research for Defra, May 2010

This research, undertaken by Icaro Consulting in partnership with Waterwise and Ipsos MORI, explored householders' attitudes towards water retrofit measures. Such measures were explored in the context of four key domains: water conservation, flood risk management, sustainable drainage systems (SuDS), and water pollution.

The policy context

Implicit within *Future Water*[1], the Government's water strategy for England, is a recognition that its objectives cannot be delivered by Government alone. Householders, alongside other stakeholders, will have a significant role to play in terms of, for example, the water-using appliances they install, what they pour down the sink, and how they water and drain their gardens. Therefore, and alongside policies to support the inclusion of a range of water measures into new build homes, Defra is also considering ways of supporting and encouraging in-home retrofit measures, such as permeable paving, green roofs and rainwater harvesting. The challenge for government is to better understand homeowners' attitudes and behaviour so that it can design effective initiatives and interventions.

Methodology

The research comprised four phases of work:

I. A rapid review of the existing literature, based upon UK sources from the past 10 years.

II. Deliberative Forums: A total of 89 participants took part in four, day-long deliberative forums held in March 2010. The forums were held in Hull, Watford, Thatcham and Cambourne, and were selected to provide: (a) an urban/rural mix; (b) a geographical spread; (c) locations in close proximity to demonstration homes (i.e. for the subsequent site visits); and (d) a sliding scale of surface water flood experience (with Hull providing - by virtue of the extensive flooding in 2007 - one end of the spectrum, and Watford – with no recent experience of significant flooding – the other). Technical experts were on hand in the forums to field questions. Recruitment criteria were set to ensure a spread of metered and non-metered properties and to allocate participants to Defra's Segmentation Model[2], which divides the public into seven clusters, each sharing a distinct set of attitudes and beliefs towards the environment. For the purposes of this research the seven segments were consolidated into three 'uber' segments:

- *Segment 1* – the most environmentally receptive group, comprising Defra's 'Positive Greens' and 'Concerned Consumers';
- *Segment 2* – a mid-receptive group comprising Defra's 'Sideline Supporters', 'Cautious Participants' and 'Waste Watchers';
- *Segment 3* – The least environmentally receptive group, comprising Defra's 'Stalled Starters' and 'Honestly Disengaged'.

III. In-home depth interviews: 25 participants had follow up in-home depth interviews, which allowed for an exploration of how the measures discussed in the forums 'made sense' (or not) in the context of participants' homes and daily lives.

---

[1] *Future Water: The Government's Strategy for Water*. Defra, 2008
[2] http://www.defra.gov.uk/evidence/social/behaviour

IV. Site visits: 16 participants (drawn from those subject to the in-home depth interviews) were taken on a site visit to see various water measures in situ. Like the interviews, the purpose was to make the measures as real and tangible as possible, so that participants could respond to the look and feel of, for example, permeable paving and green roofs. The visits were to BRE Innovation Park (Watford forum), where a number of water-related technologies and measures are showcased; and Lamb Drove (Cambourne forum), a community-level SuDS trial operated by Cambridgeshire County Council.

Key findings

The key research objectives, and corresponding findings, are presented as follows:

I. Managing flood risk
II. Reactions to SuDS options
III. Reactions to water conservation options
IV. Attitudes to water pollution from domestic sources
V. Reactions to water retrofit policy options

1. Perceptions of flood risk

Research Questions / Objectives

i. Explore perceptions, attitudes and behaviour towards how householder actions (or inactions) can help manage flood risk, both on a householder and wider community basis.

ii. Explore levers that can help respondents to understand their potential impact on communities downstream (e.g. awareness, education), and to take positive action, especially where individual properties may not be at risk of flooding.

The vast majority of participants did not feel at risk of flooding, a perception underpinned by two factors: (a) they had never personally experienced flooding in their home (even in 2007 when the country as a whole – they acknowledged – had experienced major flooding); and/or (b) they believed that the characteristics of their immediate area, in terms of topography or distance from the coast/a river, protected their property. The majority of participants did, however, acknowledge that climate change would lead to a greater risk of flooding in the future, particularly those in the more environmentally-receptive Segments 1 and 2.

> *I'm not really concerned about floods in my local area purely because there's never been a history of it happening. It's a very hilly area as well and I live on quite a slope so the chance of floods is quite small.*
>
> Male, Segment 1, Watford

Very few participants had done anything to make their homes more flood resilient. Even among the handful of participants who had adopted measures, several had done so for reasons completely unconnected with flood protection (e.g. having tiles instead of carpet because it was the design they wanted, or choosing gravel rather than concrete for the driveway because of the perceived security benefits). In fact, only a few individuals in the Hull group had pro-actively taken measures in response to the floods in 2007, including the removal of carpets downstairs, putting vented caps on cavity vents, and raising electricity points. In line with the existing literature, the reasons cited for a lack of action correspond closely to Harries' (2009) findings[3]:

[3] Harries, T. Understanding Barriers and Incentives to Retrofitted Household Flood Protection and Resilience: Defra, January 2009

- ***Personal experience:*** even those whose immediate surrounds had been flooded, but had escaped damage themselves, assumed that this meant that they would not be flooded in future (i.e. it would be the same houses flooding again).

- ***Real costs now vs. potential savings later:*** participants had reservations about making any significant financial outlay to guard against a risk that may never happen. For many, having insurance in place was considered a sufficient safeguard against low probability/ high impact events (to the extent that this acted as a block on taking additional measures, and Harries' (2009) research suggests that threatened withdrawal of insurance cover can be a strong potential incentive for implementing protection).

- ***The aesthetics of the home:*** participants were loathed to undertake any measure that detracted from the look and feel of the home, particularly changes that – in their view - are not commensurate with the level of risk they face.

- ***Doubts over effectiveness:*** the sense that flood protection measures would prove insufficient in the event of a serious flood was evident across all participants, even those who had already undertaken measures themselves.

Participants believe it is both necessary and possible to actively manage periodic flood events rather than accept them as a *fait accompli*. Flood protection was largely felt to be the responsibility of other agents, including water companies (for maintaining drains), Government (providing physical flood defences) and the council/developers (preventing development in flood risk areas and ensuring that sufficient drainage infrastructure is built into any new plans).

> *There has been a massive amount of new building without the proper infrastructure. It should have been foreseen [by the local authority].*
>
> Male, Segment 1, Cambourne

> *The Government and industry have not done enough and now suddenly it's all our responsibility.*
>
> Female, Segment 3, Thatcham

The issue of community-level impacts was difficult for participants to conceptualise, largely because their immediate interest and focus was on their own home and their own behaviour. While they were able to recognise the premise of communities collectively coming together (sceptical though they were that this would happen in practice), they did not see their own individual choices adding up to part of a bigger whole. So, for example, their concern about water pollution leading to blocked pipes was in relation to *their own* pipes; likewise their demand for permeable paving was in relation to making *their own* homes look nice. However, this needs to be counterbalanced by three factors:

- Irrespective of whether they were consciously aware of wider community impact, the research shows (see Sections 2 and 3) that participants were personally willing to adopt a number of measures that would – collectively – offer benefits at the community level.

- Participants were very evidently influenced by what others around them were doing, reinforcing the significance of social norms and the potential for community-scale approaches to establish new norms of behaviour that favour, for example, SuDS measures.

- Participants felt that the community dimension would resonate more if there was demonstrable leadership by other agents, such as local authorities and water companies. For example, and subject to questions about cost and local disruption, there was support for the idea of the local council initiating community-wide SuDS schemes in the area. Furthermore, participants felt that, as a matter of principle, it was only fair that steps be taken by the council (as an independent arbitrator who can adopt a strategic perspective) to manage cross boundary flooding issues and protect those areas particularly at risk.

> *[The defences] protect 70-odd houses but the number getting flooded further down is far more than that. I'm just not sure they considered it all. They seem to get a few ideas and go with that rather than looking at the bigger picture and plan it all out.*
>
> Female, Segment 1, Cambourne

2. Reactions to SuDS options

Research Questions

i. To explore owner-occupiers attitudes towards retrofitting SuDS in their properties, taking account of voluntary and regulated actions.

ii. To explore owner-occupiers perceptions and attitudes towards SuDS in new builds/redevelopments – do they see them as an effective measure for tackling flooding, can they create a more pleasant place to live, and do they add or detract from house values? Would they consider purchasing a home served by SuDS? What concerns do they have? What would overcome them?

iii. To explore owner-occupiers opinions on responsibility for SuDS maintenance

iv. In addition to SuDS, many homes have features such as garden walls and embankments that can act as flood defence measures. What will encourage homeowners to value and look after the features that provide them (and their neighbours) protection from flooding?

Although there was very low awareness of SuDS, the concept was familiar to participants and easy to grasp. In fact, the discussions pointed to curiosity and demand among participants to learn more about strategic SuDS measures in their area (supporting Apostolaki's (2005) conclusion about the importance of information provision[4]).

> *They've done all this work in a field near me and it doesn't seem to have worked because it floods all the time. I thought they had made a right mess of it. But quite possibly they could have done this (SuDS) and that's why it fills up with water. They should tell you, it would make a difference.*
>
> Female, Segment 1, Watford

Three specific options were explored - permeable paving, green roofs and 'rain gardens' (incorporating ponds, swales and soakaways) – and reactions to each of these varied significantly. There were positive in principle responses to both permeable paving and 'rain gardens', whereas there were notably divided responses to green roofs (ranging from the positive to the very negative). The research identifies the following as key influences on reactions to SuDS and the propensity to retrofit them in existing homes.

[4] Apostolaki, S, Jeffries, C (University of Abertay). Social Impacts of Stormwater Management Techniques, Including River Management and SUDS: SNIFFER/Environment Agency, February 2005

Salience: while the reaction to the principle of SuDS was positive, the general low level of awareness, combined with participants' perception that they are not directly at risk of flooding, meant that SuDS was considered a low priority. The exception was where participants felt directly 'touched' by a water issue, even something minor such as a poorly draining garden.

> *SuDS sounds great but in the grand scheme of things it's not going to be at the top of most peoples' agendas. If you are at risk of flooding then maybe.*
>
> Male, Segment 1, Cambourne

Costs and payback: the costs associated with SuDS – with the exception of green roofs – were not considered a major barrier. Several participants thought that some of the permeable paving options were expensive (relative to other materials, e.g. asphalt), but not to the extent that it ruled them out of consideration. The range of choice was important, allowing participants to decide which price range worked for them. Switching from outlay to payback, participants saw little potential for cost savings, e.g. by not having to pay a drainage charge.

> *That £16psqm would be prohibitive for me, but that's the thing, you don't have to have it – you've got the low cost option too which is great.*
>
> Female, Segment 1, Cambourne

Aesthetics: whether or not SuDS 'look good' is a key consideration, reinforcing the importance of conforming to, and protecting, idealised norms about the look of a home. In all cases it was the visual impact on the house that governed participants' reactions. In the case of green roofs, for example, it was the principle factor in determining whether they were embraced or rejected by participants. Whereas features that stand out from the norm are sometimes desirable (and set up the archetypal social desire to "keep up with the Jones") this was not evident for green roofs, at least not at the current time. The opposite was in fact true, with participants keen to stay in line with established social norms about the look of a home. On this basis, many participants either dismissed green roofs as "visually weird" or saw them only working under certain circumstances – for example on sheds, flat roofs or new builds.

> *The permeable paving is particularly appealing because it's the kind of look I already have on my own front garden.*
>
> Female, Segment 1, Watford

> *It's a good idea - but it's a bit 21st century living, growing something on your roof*
>
> Male, Segment 3, Hull

Windows of opportunity: the research highlights that SuDS retrofits must fit in with – and take advantage of – the household's cycle of repair and renovation, i.e. key junctures at which households are looking to re-do their garden, driveway or roof. This went someway to negating the weak financial signals, since it is a cost outlay that they would have to make anyway. The literature review suggests that a second moment of potential change is following severe flood episodes, where heightened receptivity to risk provides a (short) window of opportunity to promote the uptake of SuDS measures[5].

> *I'd definitely go for it [permeable paving] if I was getting the drive done anyway but I wouldn't change what I already have just for the sake of it.*
>
> Male, Segment 2, Watford

[5] Ipsos MORI, Flood and Coastal Risk Management Research 2009/10, the Environment Agency, May 2010

> *I wish I'd known about it before, because obviously, when I did this extension, it would have been easier to put it in then, because we had diggers in the garden, everything was up - that would have been ideal.*
>
> Female, Segment 3, Watford

Maintenance: the level of maintenance required for SuDS is a significant consideration, and notable again that both permeable paving and rain gardens were perceived to be low maintenance, in contrast to green roofs which were perceived to be high maintenance (with lots of questions asked about how often the green roof needs to be watered, mown and weeded).

Effectiveness: A potential barrier to uptake - applying to all three SuDS options tested - is their perceived effectiveness at reducing the risk of flooding. In Hull, for example, the key question to which participants kept returning was 'would this have helped in 2007' - and there was a general consensus that they probably wouldn't have been successful.

> *I just think, for the amount of water that little square is going to soak up, it seemed a bit irrelevant really, unless every house had it.*
>
> Female, Segment 3, Watford

Confidence in installers: participants appeared uncertain as to whether the 'average builder' would be aware of SuDS options and whether they'd need to specifically request them or not. There was a consensus that a qualified and experienced installer would be important to install permeable paving or green roofs whereas, in contrast, participants were more confident of undertaking a DIY approach to rain gardens (which they typically thought of as 'digging a hole').

Safety: At a community-scale, safety considerations around children (and animals) playing near water, as well as the potential for fly tipping to despoil the liveability of the local area, were raised at some point in each forum.

Demonstration: the research demonstrates the importance of seeing new measures 'for real', as a means of building confidence and establishing new social norms. The site visits to Lamb Drove and BRE Innovation Park had a notable and positive impact on perceptions, with participants often noting that the measure was different to how they'd imagined it (even with pre-prepared materials in the forums).

> *I was really impressed, the grassed areas were wonderful. And someone had to point out the paving because I wouldn't have noticed otherwise.*
>
> Segment 1, Cambourne

> *I was so impressed by how unobtrusive this looked, and in fact they were attractive – they were features of the landscape. They made the area look much nicer than it would otherwise have been.*
>
> Female, Segment 2, Cambourne

Turning to the maintenance of existing SuDS, awareness of strategic SuDS is very low – to the extent that participants suggested that the very act of becoming aware of these features would increase the likelihood they were valued and maintained. Where maintenance goes beyond low cost/low effort actions that were considered reasonable to expect householders to undertake, this provides an opportunity for local authorities or other actors to support households and demonstrate that they, too, value SuDS. Furthermore, in terms of supporting future maintenance a policy of 'designated assets' was widely backed if it was demonstrably for the benefit of the community (and so long as it is not applied retrospectively or over zealously).

3. Reactions to water conservation options

Research Questions

i. To understand homeowner attitudes towards water conservation, especially in relation to installing and using rain water harvesting and grey water systems in the home

ii. To explore how likely owner-occupiers are to consider water efficiency and conservation with/ without a water meter

The research reveals significant potential for water conservation retrofit options. Many participants were positive - in principle - about a range of measures. Water butts and rainwater harvesting immediately stood out, if for different reasons – the former because it is familiar, simple and cheap, the latter because it is considered innovative (with an element of the 'wow' factor about it) as well as resonating at an intuitive level (i.e. taking advantage of a 'natural' resource). Reactions to grey water recycling were also positive although - in line with the literature review[6] – much depended on what the water is used for. And while reactions to community rainwater systems were likewise positive, concerns about the practicalities and novelty of communities sharing a system soon overtook the discussion.

While there is a widespread perception that the measures should be widely applied in the context of new build developments, the situation is less clear cut for retrofitting. The research identifies a series of barriers to uptake (some of which draw strong parallels with those identified by DECC's *Big Energy Shift*[7] for in-home energy systems). For example:

- The current framework within which households make decisions about water consumption provides little motivation for change. In line with the existing literature (e.g. Defra, 2009[8]), the perceived low cost of water relative to other bills, the absence of comprehensive water metering, a default perception that water is an abundant resource in the UK, and the low priority attached to water relative to other issues (e.g. energy, recycling) all combine to provide little impetus for change and serve only to maintain the status quo.

- High upfront costs and weak pay back present a key barrier to uptake. Participants were immediately resistant to the initial outlay and the discussions – probing on price thresholds - revealed that anything above £1,000 - £2,000 was an immediate 'deal breaker' for many. Participants were also strongly motivated by cost savings and the payback periods of 20-30 years were at odds with a demand for payback in 5-10 years. At best this provided only a weak motivation; at worst, they signalled that the measures make no financial sense.

> *It's a great idea but the cost is just prohibitive*
>
> Male, Segment 1, Thatcham

> *The thing that surprised me was how little the saving was. When you put all the figures in like it costs x and would take x years to recoup the savings, and so on. I was weighing it up and was mmm…, not much incentive there.*
>
> Female, Segment 3, Watford

[6] NHBC Foundation, *Zero carbon: what does it mean to homeowners and housebuilders?* April 2008
[7] DECC/Sciencewise-ERC, *Big Energy Shift*, May 2009
[8] Owen, L, Bramley, H & Tocock, J (Synovate). Public Understanding of Sustainable Water Use in the Home: Defra, September 2009

- Water retrofit options are perceived to offer little in the way of "instant gratification", either financially or in terms of non-financial benefits like comfort and style. Rainwater harvesting is one exception, given that it was perceived to have an element of innovation about it. Nonetheless, even this fared badly when compared to the tangible and visible rewards associated with other home improvements, such as kitchen or bathroom upgrades.

- There are a series of questions that serve to temper in principle support, particularly around maintenance and confidence in the technologies. Many participants voiced concerns that some of the measures are relatively new and therefore constitute a risk, particularly for the first movers who would be "guinea pigs" for the first generation technology while others would stand to benefit later on from cheaper/more reliable versions.

> *With the maintenance you need to know exactly what will happen over the next 10-15 years. Because I'd want to know, if someone dug up the garden, that it wasn't going to conk out in 5 years time.*
>
> Male, Segment 1, Cambourne

- Participants' default assumption was that retrofitting these measures would involve massive upheaval in the home, while the impact on existing space in the home was also a prominent concern for some, especially in relation to grey water recycling. In contrast, there was much stronger support for many of the measures in a new build context because of the lack of hassle and disruption.

> *You're going to have to come in through the house and get the floor up, aren't you, to get the pipe work into the house. On a new build I think all these things are wonderful but to do it into a house like this it would be a big job.*
>
> Male, Segment 1, Thatcham

- Water conservation retrofit measures lag some way behind energy retrofit measures in the public psyche. In several cases participants were hearing about the measures for the first time and - at the other end of the spectrum - not even the environmentally receptive 'first movers', who had already invested in energy efficiency/renewable energy measures, had taken any action on water.

> *Everyone's talking about CO2 emissions [which are] a bigger issue in the general psyche - and that comes down to water being undervalued as a resource. I mean, it needs to be ramped up, how important it is, how much energy it takes to produce clean water.*
>
> Male, Segment 2, Cambourne

In response, the research highlights the potential role that the following could play in influencing the propensity of households to consider in home water retrofits:

- A "big narrative" to support the need for change and that, increase the profile of specific measures and sets out a 'policy roadmap' moving forward.

- Specific usage information - focused on operational information (i.e. how much water does each appliance or behaviour use) and delivered via either smarter billing and/or smarter metering – would provide a motivation to review in-home consumption is a pre-requisite for households seriously considering retrofit measures. The research suggests strong potential demand for better billing and metering arrangements.

If you could see the units ticking away, then I think it would make it more visual. I don't even know where the meter is. If we had a read out for everything – electric, water – and it could monitor it in cash terms, then obviously you're going to be more careful. I know I would, because I'm tight!

Male, Segment 2, Cambourne

- Action to address the fundamental balance between upfront costs and payback. The research suggests that a Pay As You Save (PAYS) scheme could attract consumer interest, although participants raised a number of questions (e.g. levels of interest, the agenda of the lender) while others felt that grants of 50%+ would be a more attractive proposition.

If the Pay As You Go schemes come into practice then it's [rainwater harvesting] something we would consider. Without that it would be a big outlay, which we haven't really got, to be honest with you.

Female, Segment 2, Cambourne

If it takes 20 years to start making a profit then it's hardly worth it.

Female, Segment 1, Thatcham

- Building on findings in the literature (e.g. Downing et al, 2003[9]), concerns about hassle could be addressed through better integration across water measures and – potentially – integration with in-home energy retrofits, to present households with different 'packages' of measures that could be undertaken at the same time.

- A process of demonstration to support familiarisation and normalisation of the measures. Supporting the findings of recent research by the UK Green Building Council[10], the lack of any kind of 'reference point' for participants meant that they had difficulty imagining how they would work and what they look like in their own home. Indeed, the site visit to BRE Innovation Park to see the measures in situ had a discernable and positive impact on perceptions (more so than had been the case when the measures were outlined 'on paper'). This, in turn, highlights the potential for area-based approaches and, rather than focusing on a disparate set of thinly distributed examples (which can be dismissed as a one-off exception to the norm), establishing a concentration of exemplars in a given area to reach a critical mass that challenges prevailing social norms.

I didn't actually have an idea what it was going to look like. You can't really imagine, so I think it's nice to actually see it. It's all very well being told about them but it's important that you can see that it's not unattractive, and that you can tell it's not going to change the look of your home.

Male, Segment 3, Watford

My views have definitely changed. When we spoke about these kinds of things [rainwater harvesting] on Saturday I would have said no, 100%. But actually, having seen it in action, I think it's a good idea.

Male, Segment 1, Watford

[9] Downing, T E/CCDeW et al. Climate Change and the Demand for Water: Stockholm Environmental Institute, 2003
[10] Icaro Consulting. Sustainable Community Infrastructure: UKGBC/Zero Carbon Hub, November 2009

4. Attitudes to water pollution

Research Questions

i. Explore owner-occupier perceptions and attitudes towards polluting household drains. Are they aware how their actions may affect their household or the broader community, especially the risk of local flooding? Do they care?

ii. Explore current behaviour of owner-occupiers. What do homeowners do now?

iii. Explore triggers or levers that could lead to a positive change in owner-occupiers behaviour

Pollution leading to pipe blockages: Participants were readily able to consider the ways in which materials that they or others put down the sink could lead to pipe blockages (e.g. food scraps, oil and hair). However, high levels of awareness appear to have only a limited impact on actual behaviour. For example, while some had adopted behaviours like tipping fat somewhere to let it solidify before disposing of it, others continued to put these things down the sink anyway, accompanied by a range of practices that they believed counteracted the impact (e.g. pouring fat down the sink with hot water/washing up liquid, or pouring it down the toilet or gutter rather than the sink). Furthermore, and even though participants felt that it is "just common sense", participants were very surprised by certain items (e.g. disposable wipes).

> *My children use can-do wipes. I wouldn't then take that off them and put it in the bin, I'd always flush them down the loo. That's why they invented them.*
>
> Female, Segment 3, Watford

> *Sometimes I put things down the toilet instead of the sink to avoid it getting blocked.*
>
> Male, Segment 1, Watford

> *If it's raining outside I can't be bothered so I tip the fat down the sink and put the hot water on.*
>
> Female, Segment 3, Thatcham

Reactions to water companies' campaigns was characterised by very low awareness. A few had seen TV programmes (e.g. Grimebusters), while others had heard a radio advert in their local area. None had heard of, or seen, a fat trap. It was evident, however, that visual representations of the problem had a strong impact on participants, partly because of the 'gross out' factor but also because they immediately began to personalise the issue and think about how it could affect their own pipes (and the potential problems that they may face as a result of any blockages). Any focus on community-level impacts (e.g. problems with sewage and draining systems in general), appeared to be a less powerful motivator as it was 'away' from them and considered to be the water company's responsibility.

> *I think it's more about how it's going to affect us individuals...that has more of an effect than seeing a couple of fish dying. Bring it close to home.*
>
> Male, Segment 1, Watford

> *When I saw the pictures that really did make you think, oh blimey, this is really bad, when you see it like that. I think people should be made more aware, and there's a difference in saying it and showing it visually.*
>
> Female, Segment 2, Cambourne

Pollution leading to phosphates in the aquatic environment: In contrast to physical materials, the issue of chemicals being put down the sink was less salient. While the pictures shown in the forums were emotive – evoking sadness at the thought of killing fish – participants seemed to quickly disconnect the impact from their own behaviour. Some, for example, did not think that household products could lead to the situation depicted by the photos, believing that this could only be caused by industrial sources of pollution. Others immediately suggested that other actors should take action, for example manufacturers to reduce the level of phosphates in products, or water companies to design systems that remove phosphates before they reach rivers. When pressed further on their own responsibility, several participants were able to point to – and name – products on the market that are more environmentally friendly (e.g. Ecover). Most, however, felt that these products are not as effective and/or are more expensive than their "standard" equivalents (even those who were using them).

> *It's alright if you've got a few bits that aren't very dirty. But if you've got kids clothes, towels and tea towels and stuff like that...and it doesn't smell nice and fresh when it comes out either.*
>
> Female, Segment 3, Watford

5. Reactions to water retrofit policies

The research tested reactions to 11 policy options, chosen to represent a mix of different approaches (e.g. some focused on information, encouragement and incentives; others on rules, minimum standards and compulsion). None of these represent official government policy. Participants were asked to consider each option and place it on a quadrant – with one axis representing "acceptability" and the other representing "effectiveness", giving four main groupings. The policies generally fell into three categories (Figure 1):

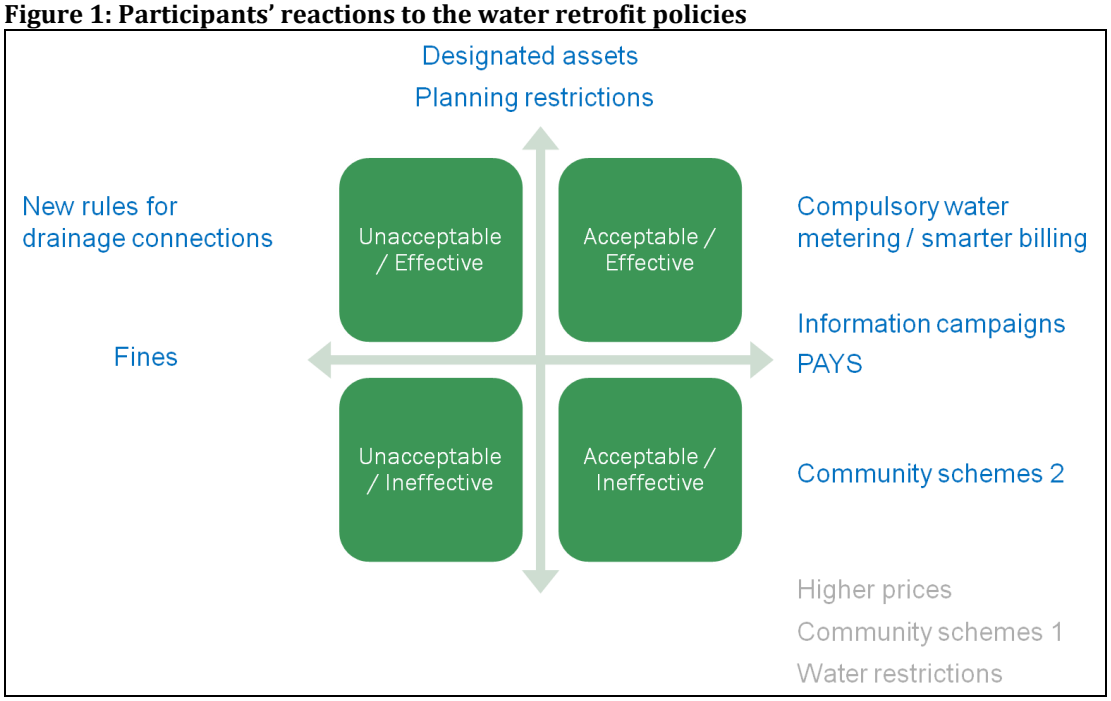
- For some policies there was **general consensus** – for example, schemes led by the community ("Community Schemes 2)[11] were considered acceptable but ineffective (and unrealistic); compulsory water metering was considered acceptable and effective (by all but two of the Hull groups), as was smarter billing. In contrast, new rules for drainage connections were widely considered to be effective but unacceptable.

- In other cases there were **two dominant reactions** - information campaigns, for example, were considered acceptable by all, but there was a clear divide in terms of perceived effectiveness – some thought they would be effective; others not. In contrast, both planning restrictions and a policy of designated assets were both widely considered effective, but split the groups in terms of their acceptability.

- Other policies elicited a range of views with **no clear or consistent pattern** – for example, schemes that are community-focused ("Community Schemes 1") were considered to be, variously, acceptable/effective; acceptable/ ineffective and unacceptable/effective. A policy of higher prices also received quite different reactions across the forums.

[11] Two variants on a community model were tested: the first – "Community Schemes 1" - with a geographic focus on, and some engagement with, a community, but where the work was largely led by water companies/the council; the second – "Community Schemes 2" - where the community assumes more control and leadership over the process.

Figure 1: Participants' reactions to the water retrofit policies



Turning to some of the common overarching themes to emerge, it was evident that participants used a series of heuristics to rapidly form judgements about the acceptability of a policy:

- The need to understand **the purpose** of the policy was a recurring line of discussion and, for this reason, having information campaigns was considered important. This was less so in terms of a means of achieving behaviour change, but rather to give a consistent "big narrative" on the reasons why the policy was necessary and a priority.

- Participants attempted to judge the **costs of administrating and policing the policy**, i.e. could the policy be achieved at reasonable cost, or would the costs of administration outweigh the benefits of the policy. This factor led many participants to dismiss fines as a viable option and worry about a policy of extending the reach of planning regulations.

- Participants applied what can best be described as the **"Big Brother" test**, i.e. does the policy involve an overly authoritative move by the state to achieve its objectives - however well intentioned - at the expense of the rights of home owners. This had particularly important ramifications for designated assets, since assessments of this policy went from completely acceptable under a certain set of implementation circumstances (i.e. a 'proportionate' policy aimed at strategically important, community-level SuDS) right through to completely unacceptable (i.e. if there was a 'designation police' retrospectively designating all manner of small scale SuDS in peoples' back gardens).

- Participants also looked for whether the policy involved **incentives (i.e. carrot) or compulsion (i.e. stick)**. While it is not surprising that incentives were favoured, their inclusion in the policy mix was also seen as an important way of justifying, and counterbalancing, penalties and minimum standards (i.e. to demonstrate that Government is on the side of residents and wants their support in delivering the policy).

- Policies which gave households a **choice** were less contentious. However, there is a fundamental distinction to be made between different types, or levels, of choice. For example, there was less resistance to – and even positive backing for – the notion of choice editing, where choices could be adapted to favour specific options or rule others out. Several forms of choice editing were in fact suggested spontaneously, for example that manufacturers should be compelled to remove non-permeable paving from sale altogether. This was because the choices that participants really cared about – and wanted to preserve - was the right to choose the style, cost and brand of paving, not whether the paving is permeable or not. Participants also expressed a desire for guided support, acknowledging that - given their lack of familiarity with 'new' systems like SuDS, rainwater harvesting and grey water recycling – they needed help choosing the most appropriate option.

- Participants were looking for policies to be **'fair'** – a concept which had various manifestations, including whether or not the policy *applies equally to everyone*, whether it *impacts disproportionately on vulnerable groups*, and – crucially - whether it would be *applied retrospectively or 'from this moment on'* (which was particularly relevant in the discussion about designated assets). Retrospective application of policies was widely considered unfair because it did not allow households to make a choice, whereas application of the same policy but moving forward was considered much more acceptable because a household could chose to do something or not, or buy the property or not.

- Responses to policies were also evidently influenced by **levels of trust** in water companies and the local council. Existing mistrust of the council, for example, led to scepticism that community scale deployment of SuDS would be 'done properly'.

Finally, it was noteworthy that participants appeared to prefer a strategic approach (involving a combination of coordinated policies, deployed sequentially over time) over single policies. Indeed, there was support for the notion of a policy 'road map' for water for the next 10 years, and some participants had suggestions for how the policy deployment should be phased. For example, there was a near universal view that the information campaigns, compulsory water metering and demonstration new build developments were a necessary 'starting point' to build acceptance for other policies (i.e. the information campaign would give a "big narrative"; the water metering would give households a reason to change behaviours and consider specific measures; while the demonstration homes would provide confidence and normality, and give households evidence that other people are doing this).

> *The first things are informing people and meters because I think those two would make the biggest immediate difference. The other thing that we all spoke about is obviously installing these systems into the new builds as well, which I think would be fantastic, because then, if you were looking at a new property, you could have it already done for you, rather than having it put on an older house where, you know, it could be a lot of upheaval. Then, finally, introducing the Pay As You Go scheme for people in the older houses as well.*
>
> Female, Segment 2, Cambourne

> *You can't have these policies without water metering, because otherwise it doesn't make sense.*
>
> Male, Segment 1, Watford