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Water Policy and Regulations: A UK Perspective

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Introduction

Water resource management is at the forefront of policy objectives in both developed and developing countries. This originates from current water availability and stress in certain regions, as well as evidence of future resource uncertainty. UNESCO (2006) predicted that some 20% of the increase in water scarcity in the coming decades will be caused by climate change and stated that about 1.1 billion people around the globe already lack sufficient access to safe drinking water. Recent figures on Europe show that some 120 million people in the region do not have access to safe drinking water (UNESCO, 2012). The Intergovernmental Panel on Climate Change (IPCC, 2007) also predict that water stress will increase in Central and Southern Europe, and by the 2070s, the number of people affected will rise by 16 to 44 million. Similar to global action for the reduction in greenhouse gas emissions, the business-as-usual scenario is becoming less of an option. The call for action is, however, supported by pledges made by political leaders in global forums such as the Rio Earth Summit. In the UN Millennium Declaration (2000), the international community pledged to stop the unsustainable exploitation of water resources by developing water management strategies at the regional, national and local levels, which promote both equitable access and adequate supplies. Signatories also promised to halve, by 2015, the proportion of people who are unable to reach or afford safe drinking water.

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At the core of any demand management strategy is water efficiency; the optimised use of water commensurate with need, which is not based on objective indicators only but considers equally subjective need. This implies that water efficiency does not stop at water conservation. Water efficiency also acknowledges essential water use; this means that it does not simply advocate the reduction of water consumption to an extent detrimental to consumer health or welfare. Instead, an understanding of customer behaviour and need is realised such that water is used *optimally*. Water efficiency is also about systems-led integrated solutions such that water waste is eliminated through behaviour, technology and infrastructure efficiency.

This chapter presents the policy and regulatory framework for water and water efficiency in the UK. Using data from interviews, it explores the opportunities and constraints for proposing and implementing policy for human water use efficiency and concludes with some practical policy recommendations.

Water policy and context

Water policy encompasses the management of resources, regulation of abstraction activities, maintaining the balance between supply and demand through the efficient use of water, as well as consulting, informing and educating the public to make the choice to minimise water waste. The GWP Technical Committee (2004) report advocated an integrated approach to water resource management and water efficiency strategies, proposing that:

- Policies and priorities take water resource implications into account, including the two-way relationship between macro-economic policies and water development, management and use.
- There is cross-sectoral integration in policy development.
- Stakeholders are given a voice in water planning and management, with particular attention on securing the participation of women and the poor.
- Water-related decisions made at local and river basin levels are in line with, or at least do not conflict with, the achievement of broader national objectives.
- Water planning and strategies are integrated into broader social, economic and environmental goals.

UK policy, regulations and the industry context

Governance, policy and regulations for the water sector vary in the UK home nations and are informed in most parts by the nature of the water industry. For instance, Scotland and Northern Ireland operate a public-owned water industry whilst England and Wales operate a privatised

monopoly market system. In Scotland, Scottish Water – a public sector corporation, provides the public drinking water and sewerage services and the Water Industry Commission serves as the economic regulator to protect consumer interests and regulate the company's finances. This role is fulfilled by the Utility Regulator in Northern Ireland, who also regulates the electricity and gas sector. Non-domestic water customers in Scotland are billed according to metered consumption. For domestic customers, household water and sewerage charges are billed and collected by individual local authorities, together with Council Tax. The Council Tax is a local taxation used to part fund public services provided by local authorities. In 2013–14, the average household charge for water and sewerage services is £334, £54 less than the average charge in England and Wales (Scottish Government, 2013).

Northern Ireland Water (NI Water) is the only provider of public water and sewerage services in Northern Ireland. NI Water has dual status as a government-owned company and a non-departmental public body. Non-domestic customers are charged for these services and trade effluents, if applicable. Domestic customers do not pay direct water charges and, in March 2013, the decision to introduce charges was deferred to 2016.

In England and Wales, water and sewerage services are delivered by 21 private companies in a privatised monopoly market system. These water companies provide water only or water and sewerage services to customers in their area of operation. Domestic customers are served by the company that operates in their geographical location and have no choice over who supplies water and sewerage services. Almost all non-domestic customers are metered. However, a little over 40% of domestic customers are currently metered. The rest are billed at a rateable value (RV) calculated as a function of the value of their property.

The Department for Environment, Food and Rural Affairs (DEFRA) is responsible for water resources and associated matters in England. The Office of Water Services (Ofwat) has a duty to ensure that the water companies finance and carry out their functions properly, and protect customers' interests by promoting good quality service and value for money. Ofwat also regulates water prices in England and Wales. The Environment Agency (EA) is responsible for managing water resources in England and Wales. This role is fulfilled in Scotland by the Scottish Environment Protection Agency (SEPA) and in Northern Ireland by the Northern Ireland Environment Agency (NIEA). Together, they ensure that water is abstracted and used efficiently, water environments are conserved and relevant aspects of the Water Framework Directive are implemented. The Communities and Local Government (CLG) department is responsible for the Building Regulations and Planning laws, while the Drinking Water Inspectorate (DWI) for Scotland, Northern Ireland, England and Wales regulates water quality and associated factors.

The policy and regulatory framework in England and Wales compared with Scotland and Northern Ireland reflects the nature of the water industry. In England and Wales, public water and sewerage services are predominantly provided by private companies who do not compete for water resources or customers within their geographical jurisdiction. The Draft Water Bill (HM Government, 2012), if passed into law, includes provisions to:

- allow all business and other non-household customers in England to switch their water and sewerage suppliers;
- remove some of the existing regulatory requirements that act as a barrier to new entrants who wish to enter the market.

Current standards and regulations for water efficiency in buildings

In the UK, the Scottish, Northern Ireland, England and Welsh Governments require that all building work complies with standards specified in the relevant Building Regulations in accordance with the stipulations in the Building Act 1984. A landmark provision in Part 7 of the Building Regulations for England and Wales in April 2010 included explicit provisions for water efficiency. It imposed a maximum water consumption limit of 125 litres per person per day for new dwellings calculated in accordance with the methodology set out in the document 'The Water Efficiency Calculator for New Dwellings' (Building Regulations, 2010). There is no such provision in the building regulations for Scotland and Northern Ireland.

There are other voluntary methods used to measure and implement sustainability, including water efficiency standards in buildings. Examples include the Code for Sustainable Homes (CSH) Standard. CSH Level 3 compliance is required for all new housing funded by the Homes and Communities Agency (HCA), all new social housing in Northern Ireland and all that are promoted or supported by the Welsh Assembly Government or associated bodies, the EU water label by the Bathroom Manufacturers Association and the BRE Environmental Assessment Method (BREEAM) for domestic refurbishment projects.

The water industry and the regulatory processes in the UK offer unique policy challenges and opportunities. This affects the extent to which the efficient management and use of water resources can be promoted to meet requirements such as those stipulated in the EU Water Framework Directive: to minimise water stress and contribute towards achieving the 80% carbon emission reduction target by 2050. The next section reviews policy for water users and the rest of the chapter proceeds to investigate opportunities for and constraints on the effective delivery of water efficiency policy in England and Wales. This region of the UK was selected due to the unique nature of the water industry as previously described.

Policy for water users

In any political entity, supply and demand-side efficiency is needed to achieve water resource objectives. The GWP Technical Committee (2004) classifies efficiency as *allocative* and technical. Technical water efficiency comprises user efficiency, water recycling and reuse, as well as supply efficiency. User efficiency, managing human consumption, is a significant part of any demand management strategy and therefore should be an integral part of any water efficiency policy.

More than half of the water supplied in the UK is distributed for human consumption (EA, 2008). Furthermore, water – as a 'public' service – is often perceived according to the amount of wellbeing people derive from it (Larson, 2010). But to devise policy to incorporate the socio-psychological dimensions of water and the subjectivity that this brings can be a major challenge for policy makers. To this end, a combination of different factors – including changes in the social role of science, complexity and uncertainty – has contributed to the emergence of the general public as an important 'actor' in water management and efficiency (de Franca Doria, 2010). After all, the active involvement of stakeholders brings new insights, information and knowledge into evaluation and decision-making processes (Edelenbos *et al.*, 2011).

It is therefore essential to debate how and when to engage with the public on water issues. For example, Hartley (2006) identified a number of themes that are crucial in maintaining public confidence – for example, in water reuse. This includes promoting communication and public dialogue and managing information for all stakeholders. Dessai and Sims (2010) proposed that public behaviour can be influenced by effective communication through recognised government bodies such as the Environment Agency. However, Russell and Hampton (2006), in an Australian case study, discuss the challenges in understanding public responses and providing effective public consultation on water reuse. They argue that current understanding of public reactions to these issues is insufficient, and there needs to be a broad appraisal of the information needs of the public so that this strategy can be effectively deployed.

Other studies suggest that water issues often come to the fore in public life after risk events such as floods or prolonged droughts, also citing the prolonged drought in Australia as an example. Some evidence agrees with this claim. A study of public perception in South East England, an area of water stress, found that members of the public had a good awareness of the water shortages in 2006 (after a period of drought), concluding that consumers are willing to change their behaviour if a threat is obvious or to protect the environment (Dessai and Sims, 2010). However, there is little evidence to suggest that this level of awareness was sustained beyond this period. Therefore, public campaigns at times of crisis should be carefully devised. This is to avoid

the 'rebound effect', particularly when campaign claims *appear* to contradict natural trends. The UK context provides a good example of this. In 2012, the UK annual rainfall total was 1331 mm (115% of average) – the second highest since 1910, narrowly beaten by 2000 (1337 mm) and the third wettest year in England and Wales since 1766 (UK Met Office, 2012). This deluge of rainfall was preceded by a period of drought, hosepipe bans and several media campaigns about water shortages. The unpredictable weather patterns resulting in increasing variability in seasonal rainfall are now referred to as the 'new normal'. However, public perception of water as a natural resource, public service or commodity does not always correlate with the science of climate change and water availability. This fact cannot simply be dismissed, as high public participation is required to achieve water efficiency goals (McKenzie-Mohr, 2000) and ignoring public perceptions or sentiment can prevent water policy goals from being achieved (Dolnicar and Hurlimann, 2010).

Public engagement is crucial for water efficiency, which is also about eliminating waste in water processes. Reducing water waste is about the essential and appropriate supply and use of the right amount and type of water for the necessary functions for which it is intended. This forms the argument for water recycling and reuse in buildings, where approximately a third of potable water demand is – to coin a phrase – flushed down the toilet. Leakage is also a source of waste. Dripping taps in buildings is an example. For this reason, most water companies have or are installing Automatic Meter Reading (AMR) in properties, which help to detect leakage inside property boundaries. However, 2559 megalitres of water per day (22%) were lost through leakage in England and Wales during 2010–11, primarily in the water distribution infrastructure (17%). This is a rise of 2.6% over the previous year but a fall of 34% since the peak in 1994–5 (Ofwat, 2012). It is worth adding that these figures compare favourably with other countries in Europe and Northern America.

Water companies are set a leakage target by Ofwat based on the Sustainable Economic Level of Leakage (SELL). This is the level at which the cost of further reducing leakage exceeds the cost of producing water from another source. However, acceptable levels of leakage are still a highly sensitive public perception issue that needs to be demystified to the water customer. The media and customer interest groups can work with policy makers, regulators and water companies to better engage with the public on this issue. Public involvement, particularly through pressure from interest groups and the media, has led to many positive developments in recent years. Franceys and Gerlach (2011) surmise that changes such as the ban on disconnections, the introduction of the vulnerable charging scheme for those on low incomes with large families or specific illnesses, the growing emphasis on domestic metering (at considerable but unknown cost to customers) and leak detection sometimes beyond the 'economic level of leakage' can be traced back to specific television programmes more easily than to any outcomes of stakeholder discussions.

The Water White Paper (HM Government, 2011) identified steps to improve the government's understanding of the motivation of individuals to

adopt water-efficient behaviours, as well as the barriers. Proposed strategies include developing and testing messages around why saving water is important and considering how these can be applied to encourage more water-efficient behaviour, then using this to inform a campaign to save water and protect the environment. Also, it was identified that there is a need for better coordination between water companies, regulators and customers to disseminate consistent messages and raise awareness of the connection between water use and the quality of rivers and ecosystems.

Methodology

This study utilised the critical research approach using semi-structured interviews. The semi-structured approach was applied with the specific use of open-ended questions. In an open-ended interview, the interviewer poses a question and then allows the subject to answer as they wish. The interviewer may probe for more details but does not set the terms of the interview. This allows a less constrained interaction between the interviewer and the interviewee. However, this method is limited by the need for the participants to share basic concepts and methods, without which they will be unable to negotiate shared meaning for the questions asked (Coughlan and Macredie, 2002).

Interview participants comprised nine strategic stakeholders and four strategic policy makers within DEFRA responsible for water resource management, water efficiency, charging, etc. Other participants were one academic expert on water and waste treatment, two water company representatives, one representative from the building regulatory bodies and one participant from a Non-Governmental Organisation (NGO).

The interviews provided further insights and understanding of the problem setting by examining narrative, text-based data. It is a very good way of accessing stakeholders' perceptions, meanings and definitions of situations, as well as the constructions of reality in the subject of study (Punch, 2005).

Interview findings

The interviews were recorded, transcribed and subjected to text mining: content and context analysis (Delen and Crossland, 2008) to identify recurring key words and the context in which they occur. Findings from the analysis were then clustered under seven main themes: Water Demand, Water Supply, Water Efficiency, Water Quality, Water Initiatives, Economics and Market Factors, Climate and Environment. Sub-themes were also identified, as shown in the interview summary in Table 1.1. The summary shows interviewee comments in italics.

Table 1.1 Interview summary, excluding water supply and quality objectives

Policy objective	Points raised	Constraints	Opportunities
Water demand	"*Mitigation is using innovation – technology, processes, etc. to reduce pressure on water resources and the environment. It can be climate change mitigation, reducing carbon emissions, etc.*"	Supply and demand is a balancing act to find the optimum point and it is difficult to ensure that one does not outweigh the other.	Apply maximum flow rates to taps/showers, etc. based on real performance studies.
	"*The best approach is always the integrated strategic solution; non-coordinated measures can sometimes work against each other.*"	More research/evidence is needed to ensure that the theoretical water demand figures compare with what exists in reality.	Avoid penalising people for their need to use water but explore the opportunity to penalise waste.
Water supply	"*Supply issues: few or no new abstraction sources, need special agreements for new reservoirs, climate/environmental factors, e.g. droughts) and the impact on the replenishment of sources, wholesomeness of water and environment, expensive and not easily deployable alternatives, e.g. desalination.*"	Dual supply is easier in new build but potentially difficult in existing buildings. With leakage, the focus is on the cost/benefit argument with more emphasis on cost than benefit.	National grid – consider water sharing by linking up regional infrastructure 'at the edges', thereby facilitating licence trading and relieving pressure on stressed sources.[1]
	"*Abstraction licences are not based on what people abstract, they are based on licensed capacity which is equivalent to rateable value for customers.*"		Revise abstraction licences to reflect amount abstracted and perhaps add a catchment coefficient (environmental factor, improvements needed, administration costs, etc.). This should then be reinvested to support catchment management schemes. Charging for actual abstraction will encourage abstraction transfers and encourage better balancing without the need for regulation.

Alternative water supply	Short-term carbon argument – alternative supply technologies can be carbon intensive. They can also be expensive and there is little evidence about their effectiveness.	Is rain/grey water more sustainable than mains water?	Opportunity to introduce a long-term (lifecycle) analysis approach to discussions on technological interventions.
	"*Even if not effective, perhaps it is good for the message?*"	There are issues of ownership with communal solutions – maintenance, etc.	Provide policy guidance on water reuse/recycle systems.
Water efficiency	"*Water efficiency hierarchy is first to reduce, then reuse (the first two deal with demand and supply issues), then recycle (similar to the waste management principles)*."	The challenge is the dispersed ownership and responsibility. Water use in domestic buildings is difficult to target or control.	Opportunity for localised water efficiency measures, which are more likely to increase impact.
	"*There is a rationale for water efficiency: over-abstraction in some areas due to increased pressure from demand, increasing population (growth points)*."	The problem with water efficiency discussions is that the short-term cost/benefit argument always outweighs everything else.	The water efficiency programme should include a package of measures. Single measures will have less impact.
	"*Lots of pilot schemes, but do we know whether water efficiency schemes, devices, etc. are effective? The evidence available so far is highly subjective*."	The key burden for water efficiency is on water companies – especially the sustainability of abstraction, supply, leakages, etc. Water efficiency in existing buildings is also the responsibility of water companies.	Include consumer awareness and allocate ownership and responsibility for water consumption and waste accordingly.
People and behaviour	"*Advise, incentivise then regulate*."	Do technological interventions change behaviour in the long term?	Reduce ambiguity and assumptions in occupancy and user behaviour data. Study actual building use and consumption.
	"*Savings on water bills should not be the singular argument. Water is relatively cheap. However, save water and save on sewerage bills is good, then commoditise sewerage. Or similarly use the energy argument*."	Cost/benefit argument supersedes the transformational change argument. Customer perception is either water as a commodity or as a right. Not charging for its worth reinforces the social paradigm.	Promote customer choice as a means to behaviour transformation.

(*continued*)

Table 1.1 (*Cont'd*)

Policy objective	Points raised	Constraints	Opportunities
	"*There may be a regional or localised perception of water that may need to be taken into account*."	Public perception of taxing for essential water use. Introducing an additional green or environment tax generally leads to negative public perceptions.	Instead, engage with social paradigms – compare household bills with street/neighbourhood average for example.
	"*The sociology of water should include creating a more clever way for how people act and interact with water. Better message in the broadest sense: waste water, waste energy*."	Visibility and transparency is important from all parties in order to change perception.	Promote strategies that target fitting/equipment replacement cycles and building retrofitting/ renovation cycles. Improve the perception of quality/ performance of water-efficient products.
	"*It is about managing expectations and putting responsibility in the right place*."	"*Push the message too far and risk losing the message altogether*."	To transform demand, make the link between energy and water and present it rationally, not as sentiments to the customer.
Technology	"*Avoid quick fix technological solutions, seek long-term sustainable solutions*."	Government involvement in promoting water-saving technologies may imply liabilities: functional, maintenance and operational.	Opportunities to implement policy frameworks for technologies based on quality/performance, appropriate installation/use, etc.
	"*Technology in itself is not usually the problem – it is often when it breaks down due to improper use or lack of maintenance, etc*."	Investment cost and payback for new technologies is still an issue.	Allowing market forces to prevail sometimes means that if a technology fails, the customer is empowered to take action against the manufacturer either through statutory or legal means, which in turn will make manufacturers guard against poor quality products.
		Water-saving devices and technologies may be functional but may not be effective for transforming demand or changing behaviour.	Explore the integrated approach and personalised solutions.
Buildings	"*It is expected that measures for new buildings (Code for Sustainable Homes, Part G Building Regulations, etc.) will influence the standard replacement market*."	Lack of lifecycle, post-occupancy considerations in provisions for domestic buildings is an issue.	New houses provide an opportunity to deploy innovations in building services. The new regulations may promote this.

		The risk that new regulations may increase the price of building or providing houses.	In the building industry, developers generally give clients what they want. So influence the client, you influence the developer/market.
Water quality	"*Water quality is about managing expectations and controlling risks. The misconception is that it is about controlling hazards*."	Contamination can still occur when technology breaks down or with too much trust by people (e.g.. farm camp sites, city centre fountains and the expectation that all water sources are of drinking water quality).	Good measures should include catchment treatment and then educating the public on the benefits and how to respond.
	"*A socio-psychological paradigm: good drinking water is considered a right by some*."	It is considered part of the role of government to provide public health initiatives. Depending on the political outlook of the government, water can alternate between being a commodity (sufficiently regulated) and a social resource (heavily regulated).	Educate and improve public awareness.
Treatment	"*People need to be rational about the risks. There is too much focus on the hazard rather than the risks; this has led to a broad brush approach*."	Centralised treatment is cheap, which constrains the uptake of new technologies such as grey-water recycling that decentralises water treatment.	Opportunity for treatment to be cheaper through decentralisation, then apply the difference to innovation and improved services to customers.
	"*Water treatment is not water sterilisation. Ultimately, it reduces the hazard but it does not take away the risk*."	Diffused pollution and other factors such as turbidity in rivers due to excessive rainfall and excess surface water tepidity or movement in chalk are issues affecting water treatment.	Alternatives can be a broader catchment management approach or natural bio-film filtration processes.
			As with abstraction, waste licences/permits should account for the amount of discharge.
			Also for water customers, give incentives for savings and penalise excesses. Link with the WFD 'polluter pays' principle.
Water initiatives/ measures/ schemes	"*Encourage labelling schemes, but they should be standardised across the industry and not just voluntary, and this can be done within the water fittings regulation*."	Public take-up of technologies and initiatives is generally low. A large-scale study is required; small-sample studies here and there do not present a holistic view of what is going on and what is needed.	Target professional certification schemes, e.g. plumbers. This is not only good for planners and developers but can be used to inform and educate the public too.

(*continued*)

Table 1.1 (*Cont'd*)

Policy objective	Points raised	Constraints	Opportunities
		The dynamics of paying/bills does not necessary impact on the willingness to change or increase uptake of initiatives. There is the current difficulty of knowing the impact of existing measures or campaigns.	Consolidate measures/initiatives, e.g. labelling schemes, WRAS schemes, etc. Avoiding new measures without a strategy for monitoring and measuring the impact of existing ones.
Metering	"*Metering is a useful solution for maintaining the water balance*."	100% metering might be expensive, especially in some types of building (e.g., flats).	Potential benefits: demand information for future forecasting/decisions, better interactions with customers (unproven), opportunities to promote water efficiency, scope for smart metering and innovative tariffs.
	"*The Walker report (2009) recommended 'metering in certain cases', however, it should be compulsory metering with certain exceptions. Eliminate the cost/benefit argument, eliminate the high discretionary use argument*."	Some metering arguments: fairness (pay for what you use), paying makes people conserve water in the short term (an untested premise for the long term). Metering could also lead to increased bills/tariffs, especially for RV properties.	There is the option to deploy minimum water allowance to a property and charge for the rest.
	"*The problem with metering is that water is still cheap and it is not on people's big list of things to save*."	Metering is seen as one of the ways to deliver demand management without the cost.	An opportunity for market transformation. Metering will make people think about what products they use and the type of fittings.
	"*The challenge with metering boils down to the new build/existing build dichotomy. There is the need to 'bite the bullet' on this and try the public engagement route, measure impact, then regulate if necessary*."	Metering requires providing information and choice to translate into increased water efficiency.	Opportunity for compulsory metering should be combined with measures that help certain households mitigate their bills. This will in turn reduce the cost for debt collection and debts being shared across the customer base.

Tariffs	"*Some water companies are trialling or using different tariffs, such as seasonal or rising block*…"	Tariffs should be flexible and promote choice. For tariffs and metering policy to be effective, an understanding of people's perception and usage pattern is needed.	Provide better, more visible and useful information on bills. Smart billing provides opportunities to feedback to households on overall water use, etc.
Government		Lack of continuity in government can be a limiting factor to long-term policy.	A joint/integrated approach within government departments is beneficial. Water policy makers may need to get involved with regulators and interact with other government departments to better implement the 'spirit' of a policy/policies without trying to solve all the problems; physical, social, economic, etc.
Regulation	"*Regulations regime should aim to reduce obstacles to change. Be more willing to take risks/explore new ideas and solutions*."	Legislation/regulations/policies impact on how the sector evolves and the uptake of technology.	A more holistic approach to regulation, is required, otherwise strategies may work against each other.
	"*If you can't enforce it, don't regulate for it*."	"*It is the gaps … drinking regulations are strict but you could still get problems from poorly manufactured taps*."	
	"*The regulations are 90% there but the extra 10% is still needed to make real impact*."	Easier to focus on cost benefit, but efficiency is less easy to implement. Supply/demand balance excellent but cost always takes over the argument, e.g. universal metering.	Better balance between cost and benefits or accruable water savings and efficiency.
Water companies	"*Water company planning strategies and priorities are predominantly based on peak demand. This influences storage and infrastructure planning, etc*."	Positive relationship between water companies and their customers can increase water efficiency, and this is sometimes lacking.	Better customer service is needed from water companies. For example, giving a discount on direct debit payments, more transparent bills, etc.
	"*Water companies generally do things if instructed and based on funding systems. This stifles improvement, innovation*."	Water companies in the UK are not 'real' private enterprises.	

(*continued*)

Table 1.1 (*Cont'd*)

Policy objective	Points raised	Constraints	Opportunities
Economics/ market	"*To transform the market, make everything beyond the water meter a customer issue*."	At present, the market works but it is not transformatory.	Empowering the customer leads to market change similar to changes seen in white goods for energy.
	"*If you have to regulate, it is because there is a market failure*."	Many people understand the nature of the market, very few people understand policy making.	Make consumers aware, it drives the market.
		Currently, there are premiums on water-efficient products.	Increase awareness to promote the choice for more efficient fittings and products. Less efficient products will be phased out and prices may normalise.
Price of water versus value of water	"*The question is not whether or not there is a value to water. The problem is the perception of that value*."	The value of water is defined by its social, physical and environmental cost. Not how much it costs or how much people pay for it.	The cost of water should reflect the environment or social impact and not simply the cost of supplying it.
	"*Commoditising water through metering will help as the human culture is generally not set around restraint. We only value what we pay for*."	Water is cheap and generally costs about a third of the price of gas and electricity.	If paid for as a commodity, better service will be expected and water companies will be perceived to be more accountable.
Climate/ environment	"*Disproportionately, water companies are penalised as the main polluters. This unfairness should balance out with a better understanding of who the polluters are and what the solutions are*."	Natural crises, e.g. droughts, sometimes help change perceptions but this may become exaggerated and evoke a negative response.	A regional/catchment approach is better than a national approach on a wide range of localised issues and decisions should be made at this level.

[1]Some of the recommendations under "water supply" are reflected in the Water Bill (HM Government, 2012).

Discussion

The clusters revealed that important policy considerations for water efficiency include people, awareness and engagement, evidence-based information, managing the use of water in buildings, promoting technological innovation and regulating for innovative change in the water industry/market. This multifaceted yet integrated policy approach is shown in Figure 1.1.

On the people factor, the main constraint was the lack of capacity in water users to make the choices to 'adopt and adapt' in order to achieve better levels of water efficiency in buildings. Phrases such as *the perception of fairness*, *increased responsibility*, *the willingness and the potential to change*, *resource resilience versus individual and community resilience in the current economic climate* were used. At the household level, the opportunity to inform and educate was considered high priority. Recommendations include understanding the psychology of households, launching media campaigns that target building refurbishment and replacement cycles (the DIY culture) and offering incentives and rewards as appropriate.

The unavailability of credible and usable evidence, the disparate methodologies used for evidence gathering and the lack of clarity in defining the user factors and the performance criteria of water-efficient technologies were also identified as constraints to effective policy making.

With technology, the opportunity lies in readily available technologies that can be deployed to improve water efficiency in buildings. However, levels of adoption and implementation are low. The need for grants and incentives to encourage more innovative products and remove bureaucracy to shorten time-to-market was mentioned. There are several government incentive schemes for promoting energy efficiency, but these are lacking for water. Engaging with and training building professionals, builders and installers were also considered essential for achieving water efficiency policy goals. Lastly, building users and the water dynamics between users and buildings need to be understood further.

The debate on the hierarchy of relationships between stakeholders was mentioned previously. Owing to the poor levels of awareness, and poor capacity in water users, the findings allude to a bottom-up demand management strategy which is inclusive of existing buildings as well as new ones. This strategy should, however, not ignore the user's perception of comfort and control, health and welfare, confirming that the socio-psychological dynamics of people (e.g., in their homes) is often different from what is demonstrated in other building types. However, these findings require further exploration.

In addition to market and resource management issues, all of the above has a direct bearing on water policy. It was found that policy should be developed and implemented for the various tiers of society and should not

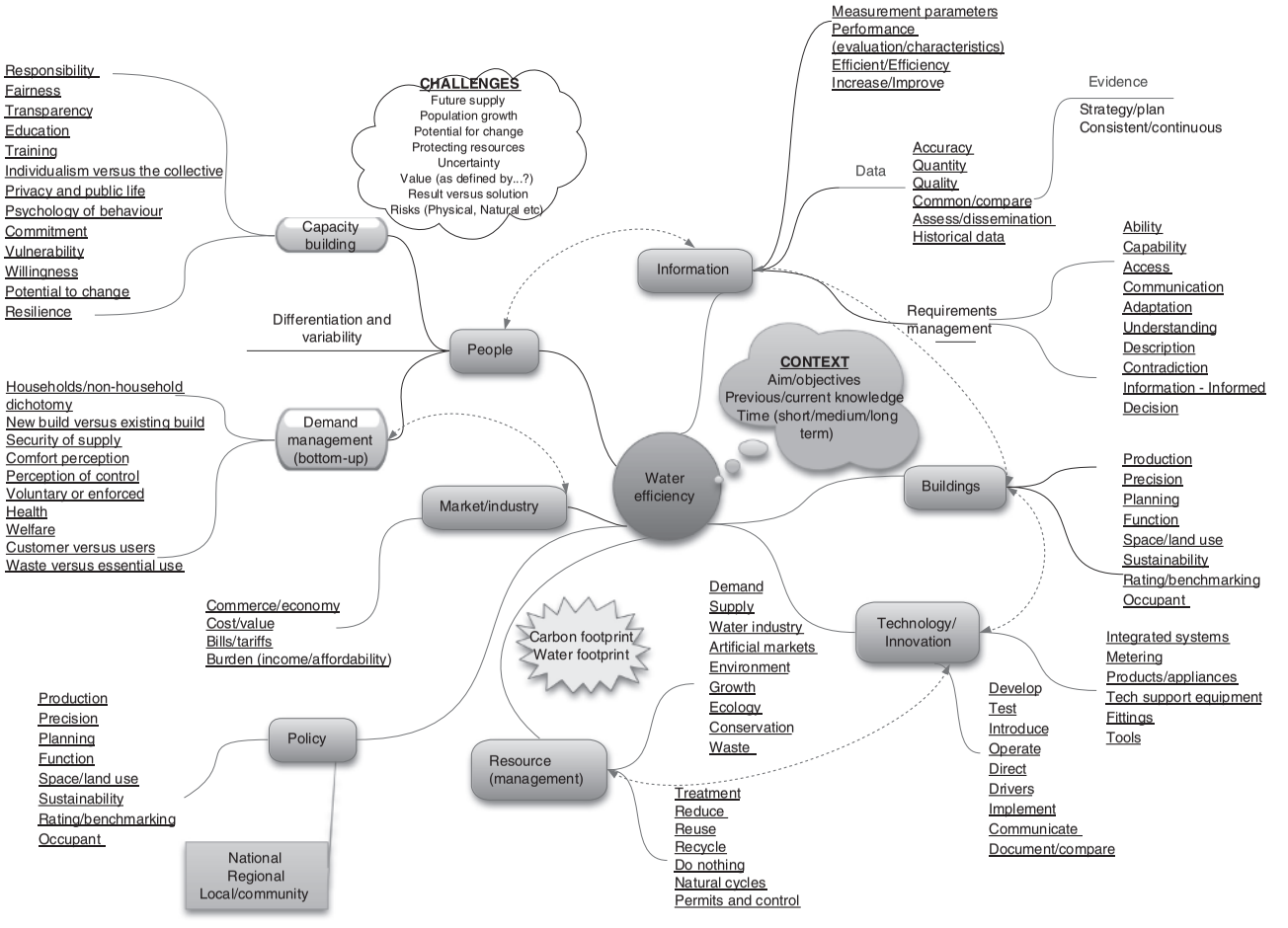

Figure 1.1 Policy framework for water efficiency

ignore regional differences; climatically, economically, environmentally, socially. Some strategies or measures will be beneficial at the national scale, for example the building regulations. Others will be more effective at the local or community scale because, for most people, water is a local issue.

Further recommendations

The general recommendation was to better engage with the other end of the policy spectrum – the water user – and to establish and maintain an evidence-led feedback culture, which is an integral part of the policy-making process and not a separate entity. Other recommendations include:

- To develop a sustainable data/evidence collection system, especially on household consumption. This can be used to create knowledge, which can then be utilised to co-create value with consumers.
  - An integrated and credible consumer database will be beneficial to water companies for setting innovative tariffs to reward fair use.
- Policy makers should provide clear guidance and standards for water-saving fittings and products as well as water reuse and recycling products. This may be through certification, accreditation or labelling schemes. To this end, performance metrics are required and these can be deployed by revising existing regulations or standards.
- Monitor and control growth in water demand by deploying appropriate strategies and technologies for improving the capacity of consumers to adapt and change behaviour.
- Water efficiency policy should be extended to existing domestic buildings.
- Promote retrofitting to improve water efficiency and give appropriate incentives.
- Introduce overall performance ratings for combined measures to promote flexibility and personalisation of solutions for the water user.
- Invoke some market factors – choice, competition, etc.
- Encourage speedy development to commercialisation processes of new technologies for water efficiency (starting with clearly defined guidelines on health, safety and performance by the government).

Conclusion

There are economic, social, technological and environmental challenges to the development and deployment of effective policies to mitigate current and future water challenges. Improving efficiency throughout the water supply and demand spectrum and through existing policies and new regulations is therefore an important policy priority. The consumption of water in

buildings has undergone a steady increase in the past decades. Owing to current resource challenges from climate change and associated factors, this increasing trend needs to be controlled and policy has a vital role in this.

This chapter presented findings from qualitative interview data which explored the opportunities and constraints for water efficiency policy – primarily in England and Wales, but which may be relevant in other countries and contexts. The interview findings were summarised and integrated into a multifaceted clustered framework for water efficiency policy. From these findings, it can be concluded that effective policy should not rely heavily on water companies. It should aim for greater buy-in from the public and this can be achieved by working with interest groups, water companies and the media to devise and deliver a coherent message and engagement practices on water efficiency. It was also found that the water efficiency requirement is a good start. However, clear guidance is still required on other aspects of the water efficiency solution, for example water recycling and reuse and building retrofits. Regulatory consideration should be given to the promotion of appropriate water-saving technologies in the right context for the right use, and to support personalisation to suit lifestyles and needs, to permit even more flexibility in how water efficiency solutions are combined and deployed.

Lastly, water efficiency policy is only as good as the evidence on which it is based and there is a need to streamline and optimise efforts in this area.

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