The Role of Social Marketing in Household Water Conservation: A Moral Perspective

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Abstract

Water resources are facing unprecedented pressure to meet the increasing demand, yet water is still taken for granted. In theory and in practice, water conservation is gaining less attention than other environmental issues such as energy consumption and waste management (Grilli and Curtis, 2021). This study aims to contribute to this gap by providing in-depth insights on household water conservation – in the UK and Egypt. Household water demand accounts for more than 60% of total water usage in the UK and is higher than industrial water usage in Egypt. This pattern indicates that household water conservation offers great potential in ensuring the long-term sustainability of water resources. Hence, it is the focus of this study. A qualitative approach is adopted to explore and understand water conservation from the households' perspective, as well as, uncover the underlying (mis)perceptions associated with water in two contrasting contexts (i.e. UK and Egypt). The study aims to provide practical implications to inform the design and implementation of social marketing interventions targeting water conservation. In this study, water conservation is not only perceived as a pro-environmental behaviour (PEB), but also a moral behaviour. To explore this proposition, the Issue Contingent Model (Jones, 1991) – a well-established theory in ethical decision-making literature which has not been used before in PEB or social marketing literature – is used as a reference to guide inquiry, along with the Norm-Activation Theory (NAT) (Schwartz, 1977). Overall, findings indicate that despite several participants acknowledging the importance of water conservation, they still perceive it as unnecessary. Thematic analysis identified six main themes that provide a comprehensive understanding of water consumption behaviour and its relevant (mis)perceptions. Further analysis revealed insights about the underlying factors contributing to these perceptions and has uncovered aspects which interplay to shape water consumption behaviour. Morality is found relevant to water conservation and offers an innovative lens for social marketers to approach PEB.

Author’s declaration

I declare that this thesis is a presentation of original work and I am the sole author. This work has not previously been presented for an award at this, or any other, University. All sources are acknowledged as References.

Research Impact

Insights from this study have been used to inform various collaborations with practitioners in the water sector in the UK and Egypt, as well as, with the student and public community at the University of York.

In the University of York:

- Organised and led an event during the One planet week event to raise awareness about water - in collaboration with the University of York sustainability group and a guest speaker from Waterwise.
- Invited by a team of PhD students in the computer science department to act as the expert adviser for their project to develop a computer game on water conservation.
- Shortlisted for the PhD spotlight competition aiming to engage the public with academic research.

Water sector in the UK:

- Invited to the launch of a project by Ofwat (the economic regulator for the water and sewerage sectors in England and Wales) on "water efficiency in faith and diverse communities" to share insights from research on the role of religion in water conservation. The event was hosted by the University of Cambridge - Faculty of Divinity.

- Invited as a speaker in a webinar by the Institute of Water on water in Islam, as part of a series of webinars on "Faith in water" and a consultation session by DEFRA (Department for Environment, Food and Rural affairs in UK) on household water efficiency.

- Advised Northumbrian water demand management team on how to enhance the effectiveness of communication with their top 5% water users and how to redesign their communications accordingly. Later, I received an invitation from the water efficiency manager to give a talk to his team and apprentices.

Water sector in Egypt:

- Virtually participated in round-table discussion on water issues in the city of ElMinya (Egypt).

List of Conferences

Parts of this research has been r presented at the following conferences:

Date	Conference	Location
9-11 June, 2022	American Marketing Association (AMA) Marketing and Public Policy	Virtual
22-24 June, 2022	European Social Marketing Association (ESMA)	Thessaloniki, Greece
5-7 September, 2022	International Social Marketing Association (ISMA)	Brighton, UK
20-23 June, 2023	International Conference on Environmental Psychology	Aarhus, Denmark
13-15 September, 2023	International water association (IWA) conference – Efficient	Bordeaux, France

Acknowledgement

"The journey is more important than the destination" and the PhD has been one long journey. All praise is due to God who granted me the strength and the patience throughout the process and blessed me with people who made this journey possible.

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Glossary

Household water conservation	Reduction of water quantity used in typical daily activities at a domestic setting (indoor or outdoor) – achieved mainly by a conscious change of behaviour rather than water efficiency "technological improvements" (Nemati et al., 2023). In this study, water conservation and efficiency are sometimes used interchangeably.
Moral behaviour	A behaviour that has potential consequences (positive or negative) on others, beyond oneself (Jones, 1991). Moral and ethical are used interchangeably in this study.
Pro-environmental behaviour (PEB)	Any behaviour that "harms the environment as little as possible, or even benefits the environment" (Steg and Vleg, 2009, p. 309).
Social Influence	"Change in an individual's thoughts, feelings, attitudes, or behaviours that result from interaction with another individual or a group" (Rashotte, 2007, p. 1). Social influence of norms perceptions is explored in this study.
Collective efficacy	"Belief that one's social group can effect change or reach a goal" (Seger et al., 2019, p. 44).

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CHAPTER 1: INTRODUCTION

Water is referred to as the "blue gold" (Barlow and Clarke, 2017) because it is the most vital resource on the planet and it has no substitute. It is crucial for our survival and our wellbeing. Nonetheless, almost four billion people across the world are experiencing severe water scarcity, with factors such as population growth and climate change causing an increase in water demand (UNwater, 2023). It is expected that by the year 2050 water demand will increase by 20–30% (UN, 2019), putting extra pressure on available water resources and further expanding the gap between supply and demand.

As potable water has become a scarce resource, securing its long-term availability through sustainable consumption has become a critical issue for both academics and practitioners. However, some geographical locations which are more prone to water shortages have captured more attention. A recent literature review on water conservation, indicated that most articles focused on areas such as the US west coast and southern Europe (Cominola et al 2023). Several previous studies focus on areas with a high-risk of drought or have experienced a recent drought (Perren and Yang, 2015) such as: Australia (e.g. Dolnicar et al., 2012; Fielding et al., 2012), Mexico (e.g. Corral-Verdugo and Frías-Armenta, 2006), Spain (e.g. Rodriguez-Sanchez and Sarabia-Sanchez, 2020) and Taiwan (e.g. Lam, 2006). On the other hand, other geographic locations have been ignored. There are calls for more research on water conservation in countries such as the UK which is usually not perceived as "drought-prone" because of its "temperate climate" (Lu et al., 2019). However, climate change is causing unprecedented impacts on water supply. In 2022, the UK experienced its "driest summer in 30 years" and reservoir capacity dropped to less than 50% across the country (Gov.uk, 2023). Therefore, this study contributes to this research gap by providing insights to better understand and encourage water conservation of households – the UK highest water demand sector (DEFRA, 2022).

Similarly, in Egypt, household water demand ranks second highest after agriculture, exceeding industrial water usage (AQUASTAT, 2016), yet research on household water conservation remains scarce. Relative to the UK, Egypt is a drier country that is highly vulnerable to water scarcity impacting its food security, welfare and economic development (Khedr, 2017). This study aims to explore and contrast perceptions about water and water conservation between two contexts (i.e. UK and Egypt) with relatively different water situations, in terms of water availability and potential future risks. This comparison between

the UK and Egypt has not been addressed before in previous literature. It will provide insights to understand antecedents of water conservation from different contextual perspectives and implications for social marketing interventions. A detailed discussion of factors relevant to different water situations (e.g. annual rainfall, fresh water available) in both contexts will be presented in the next chapter (Table 2.1, p. 19).

A qualitative methodology is used to allow for in-depth understanding of water conservation and its antecedents. Previous research mostly adopted quantitative methods to examine the impact of predetermined set of variables on water conservation intentions or behaviour (see review by Bhakta et al., 2022). The qualitative approach used in this study aims to broaden the scope of inquiry and allow for underlying variables that might not have been addressed before, to emerge. Therefore, providing implications to social marketing interventions targeting water efficiency.

Social marketing has proven its effectiveness in the public health domain (Truong, 2014). It has expanded into sustainable consumption and conservation behaviour (e.g. Green et al., 2019; Verissimo, 2019). Moreover, its role in achieving sustainable development goals is acknowledged (e.g Rodriguez-Sanchez, 2023). In the context of water conservation, there is a lack of research that adopts a holistic social marketing perspective – apart from the community-based approach (McKenzie-Mohr and Smith, 1999). Similarly, in the pro-environmental behaviour (PEB) literature, water conservation is gaining less attention relative to other issues such as energy consumption and waste disposal (Grilli and Curtis, 2021). Therefore, this study aims to further expand the application of social marketing beyond public health. Moreover, it contributes to the gap in the PEB literature by providing insights on overlooked household water conservation, from two similarly overlooked contexts – UK and Egypt.

A core proposition in this study is that water conservation is not just a PEB performed for environmental reasons, but a moral behaviour and put simply, the right thing to do. Previous studies have acknowledged that engaging in PEB is a moral imperative that could be perceived as an "ethical dilemma" (Culiberg and Bajde, 2013) that involves "moral considerations" (de Groot and Steg, 2009). Nevertheless, understanding whether or not individuals perceive water conservation as a moral behaviour and how the notion of morality is manifested in the context of water conservation was not explored in previous studies. To contribute to this research gap, this study adopts a qualitative approach to explore morality

through the lens of "issue-contingent model" – a well-established theory in the moral decision making literature (Jones, 1991), which has not been previously employed in the water conservation domain.

The significant impact of social influence (e.g. social norms or interactions) on behaviour is emphasised in water conservation, social marketing, as well as in the moral-decision making literature. In the social psychology literature, one popular explanation of why humans conform with social norms is the desire for conformity and fear of social sanctions (e.g. Rettie et al., 2012; Cialdini et al., 1990; 2006). While this explanation is valid in a socially visible behaviour such as littering, it would not be expected to apply to a relatively private behaviour such as household water conservation. Better understanding of the mechanism and "paths" through which social norms influence behaviour is needed (Thøgersen, 2006). Therefore, this study aims to explore the notion of social influence and how/why it is still relevant to household water consumption behaviour, beyond conformity and sanctions. Therefore, provides insights to better understand individuals' perceptions of social norms.

This thesis is organised as follows:

Chapter two is a review of relevant literature and is classified into three main sections to address the three main subjects in this research: water, social marketing and the moral perspective. A separate subsection for social influence is presented in each of the three sections. A summary of the literature review and the main research questions are presented at the end of the chapter.

Chapter three provides a discussion of the underpinning philosophical assumptions and the qualitative approach adopted in this study. Details of the sample type, recruitment, quality assurance and reflexivity procedures are provided.

Chapter four discusses the data analysis process/approach and presents the research findings. Six identified themes are discussed thoroughly and a conceptual framework with the suggested links between them is developed. A summary of the chapter is provided and includes an overview of findings, a diagram of all identified themes and sub-themes, as well as a table illustrating the similarities and differences between the UK and Egypt.

Chapter five illustrates how the findings answer the research questions and discusses the main contributions of this study (theoretical, practical and methodological). In the practical contribution section, detailed implications for social marketing interventions (downstream, midstream and upstream) are provided.

CHAPTER 2: LITERATURE REVIEW

2.1 Water

This section will, firstly, provide an overview of the water situation in the study contexts; UK and Egypt. Second, it will present a discussion of water management strategies and the associated challenges addressed in previous literature. Third, household water conservation literature is reviewed and the antecedents examined in previous studies are discussed. Finally, a review of social influence in water conservation is presented.

2.1.1 Water situation in the UK and Egypt

In the UK, clean water supply is taken for granted although increasing population and climate change are putting pressure on the available water resources (DEFRA, 2018b). In the UK, there is a low level of awareness of the current water stress and low willingness to act on water scarcity issues as drought is not regarded as an "immediate threat" (Lu et al., 2019) but as an "exceptional occurrence" and an unlikely event (DEFRA, 2018b).

Nevertheless, climate change is causing unprecedented impacts on water. In 2022 the UK experienced its "driest summer in 30 years" and reservoir capacity dropped to less than fifty percent across the country (Gov.uk, 2023). Similarly, in 2018 a report issued by Water UK (2018) stated that climate change has resulted in the "hottest summer in England" which witnessed a severe decrease in rainfall by almost 50% and an increase in water demand by more than 30% across the country. This has caused a substantial burden on available water supplies. Moreover, it represented a water management challenge to water companies which had to handle the consequences of "extreme weather" by pumping more water from groundwater or lakes into the system to meet the demand. For instance, Yorkshire water had to supply an extra 300 million litres every day, while Thames water added 450 litres per day to meet the increasing demand (Water UK, 2018). In addition to climate change, the impact of population growth should be accounted for. DEFRA (2018a) note that in some areas in the UK population growth has caused the per capita water share to be less than many countries in drier areas such as the Mediterranean. Furthermore, it stated that by the year 2050, in addition to higher temperatures and lower rainfall, the UK population will grow by over ten million people. Ultimately, it is estimated that the risk of droughts in the UK will increase and an additional capacity of at least three billion litres per day in the water supply system by 2050 is needed. Furthermore, DEFRA (2018a) indicated that average daily water consumption per capita in England in 2017-2018 was 141 litres, while an average of 100 litres per day is

required to be able to secure enough water by 2050 with the current water supply. According to the latest report by DEFRA (2022), household water usage across the UK is the highest compared to non-household sectors and accounts for approx. 56% of total water demand, while leakage and non-household usage account for approx. 40% combined.

On the other hand, in Egypt water scarcity is a crucial issue (World Bank, 2018). According to Abdelkader et al. (2018), Egypt is the most populated country in the Middle East and North Africa (MENA) region with a population of almost 98 million (Central Agency for Public Mobilization and Statistics CAPMAS, 2019). They argue that Egypt's rapid population growth rate with its limited water resource has caused a "national water gap" that makes it a "water-poor country". The water shortage in Egypt is almost 14 billion cubic metres (BCM) per year and is expected to continue to increase to reach 26 billion cubic metres (BCM) by the year 2025 (Mohie El Din and Moussa, 2016). Therefore, according to a report published by the Egyptian ministry of water resources and irrigation (2005), securing water resources for the future is a major challenge in Egypt. It is stated that population and industrial growth are putting pressure on available fresh water supplies. Moreover, it stated that water pollution has affected the quality of water and reduced the amount of available clean water even further. The available annual water supply per capita has decreased from 30 cubic metres[1] in the 1960s to 9 cubic metres in 2020, compared to 2,162 in the UK(World Bank, 2020, see Table 2.1, p. 19).

In addition to the influence of population growth and industrial development, the Middle East and North Africa (MENA) region is one of the world's regions most negatively affected by climate change (Waterbury, 2017). Factors such as increases in temperature and a decrease in the rate of rainfall have affected the availability of water resources in the Mediterranean region which is therefore expected to encounter severe water shortages in the future (Garcia et al., 2013). Egypt, in particular, is located in a dry region characterised by hot and dry summers and little rainfall in winter (CAPMAS, 2019). A report by the United Nations indicated that rainfall in Egypt is "very low, irregular and unpredictable" (AQUASTAT, 2016). Similarly, Khedr (2017) argued that Egypt is one of the most vulnerable countries threatened by climate change as the negative impacts of temperature increases and a decrease in rainfall would lead to national water scarcity which could cause pressure on food security, health and welfare as well as economic development. Furthermore, the River Nile –Egypt's main water source providing 98% of water supply (World Bank, 2018) is

[1] One cubic metre is equivalent to one thousand litres.

anticipated to be affected by a project in a neighbouring country. It is argued that the Grand Ethiopian Renaissance Dam (GERD) under-construction will have several negative impacts on Egypt's water supply when completed (El-Nashar and Elyamany, 2018).

Furthermore, according to a report by AQUASTAT (2016) the amount of water withdrawal was classified by sectors, and water demand in the municipal sector – which includes households, ranked second highest after agriculture and higher than industrial use, with approx. 14% of total water consumption. It was stated that an average of 10.75 cubic kilometre[2] water was used by the household sector in 2016, during which the population was almost 92 million (CAPMAS, 2019), thus, water consumption per capita could be calculated to approx. 320 litres per day.

From the above, it can be concluded that the water situation, in terms of water availability and future risks, in the UK and Egypt is different. This study aims to explore and contrast how perceptions about water and the importance of water conservation differ across contexts with different water situations. This comparison is not addressed in previous literature. The following table provides a summary of the main indicators such as annual rainfall; available freshwater and others that illustrate the different water situation in both contexts.

Table 2.1: UK and Egypt water situation indicators

Annual figures (as of 2020)	UK	Egypt
Precipitation volume (i.e.rainfall, in billion cubic metres)	297.2	18.1
Renewable internal freshwater resources (in billion cubic metres)	145	1
Renewable freshwater per capita (in cubic metres)	2,162	9
Annual freshwater withdrawal (in billion cubic metres)	8.4	77.5
Water stress level (freshwater withdrawal as a proportion of available freshwater resources)	14	141
Water withdrawal by sector (as percentage of total freshwater withdrawal) - Agriculture - Industry - Domestic	 14% 12% 74%	 79% 7% 14%

Source: Data compiled by author from World Bank website publishing data from Food and Agriculture Organization (FAO) AQUASTAT (World Bank, 2020).

[2] One cubic kilometre is equivalent to one trillion litres.

2.1.2 Water Management Strategies

Sustainable water management is not only an ecological issue, but also a vital social and political issue (Lowe et al., 2015). In order to secure future water demand, it is essential to invest in developing and adopting water management approaches (Willis et al., 2010). There are usually two approaches to manage water resources; supply-side and demand-side strategies. According to Kanta and Berglund (2015), supply-side strategies aim to expand water sources, while demand-side strategies' main objective is to achieve reductions in the demand of available water supply. They added that supply-side strategies include measures such as: expanding the water system infrastructure (e.g. increasing capacity of reservoirs) or developing new water sources (e.g. desalination plants). On the other hand, demand side strategies seek to reduce the use of or better utilise the "pre-existing" water supply (Brooks, 2006) and ensure its efficient and sustainable use.

Broadly, demand management strategies can be classified into price or non-price measures (Kanta and Berglund, 2015; Lu et al., 2019). These strategies include measures such as water pricing and restrictions, installing water efficient devices, water conservation campaigns or educational interventions and fixing leakage within domestic setting[3] (e.g leaking taps/shower heads) (Inman and Jeffrey, 2006). It is argued that in order to effectively contribute to the sustainability of water resources, it is necessary to acknowledge that demand management complements supply management strategies (Brooks, 2006). Similarly, it is stated by Inman and Jeffrey (2006) that both strategies should be employed "in conjunction" to better address water shortages and balance between supply and demand. Nevertheless, there are calls for more "sustainable consumption" of natural resources that are limited in supply (Lowe et al., 2015). Similarly, it is argued that water supply could be sustained by water conservation and efficient use rather than investments in projects to develop new supply sources (Pimentel et al., 2004). Thus, water conservation is essential for sustainable management of available water supplies (Dolnicar et al., 2012). It is worth noting that the notion of "water conservation" is a core aspect of water demand management and both terms are often used synonymously (Russell and Fielding, 2010). Different approaches to water conservation and some of their drawbacks are presented in section (2.1.3). Water management in the UK and Egypt is discussed next.

[3] A review of the effectiveness of these different measures is discussed in more detail later in this section p. 21.

UK Water Management Strategies

In the UK, it is argued that to ensure the future availability of water a "twin-track approach" of increasing supply and decreasing demand is required (Lu et al., 2019; DEFRA, 2018_a). A recent report by DEFRA (2022) stated that more "investment" is needed on the supply side to increase "water capacity". Moreover, it argued that on the demand side water conservation in terms of household and non-household water efficiency, as well as, fixing leakage in domestic settings is essential. As a supply-side measure, three new reservoirs are to be built (OFWAT, 2023). In addition, a report by Water UK (2018) stated that investments made by companies to increase water supply have reached almost eight billion GBP per year which makes supply management a relatively costly alternative. Moreover, abstracting water (from rivers, lakes and groundwater resources) puts "pressure" on the environment (DEFRA, 2022). On the demand side, it added that to manage excess demand during the heatwave of 2018 companies used promotion to spread water efficiency messages urging consumers to use water more wisely. For instance, it was stated that the Severn Trent Water Company spent around one million GBP on communications. However, the results of such campaigns on the actual water consumption behaviour were not reported. Demand-side strategies mainly target household consumers and are administered by water companies mostly in the form of informational campaigns communicating how-to save water tips, as well as, technical tools such as offering water-efficiency devices "retrofits" (see Lu et al., 2019).

DEFRA (2018a) argued that the government is committed to water conservation as a part of its 25-year Environment plan by encouraging more water efficiency and less per capita consumption. Hence, it argued that per capita consumption has a major impact on efficient water management. In order to better manage water demand, metering was emphasised as an essential tool as it accurately monitors consumption. It was stated that customers who use metres consume less water and save almost 20% on their water bills compared to customers who don't. Despite the benefits that metering could offer, it was stated that only half of households in England use water metres. Metering varies by geographical location (i.e. southern parts of the country have more metres installed) and most water companies still offer optional metering (Lu et al., 2019). Finally, the report recommended that water companies should be allowed to apply "compulsory metering" especially in areas with more water stress and more drought vulnerability.

Water charges vary across regions and water suppliers, but a price limit is set and reviewed regularly by OFWAT[4]. A typical household water bill includes a charge for water consumption rate as well as a fixed charge for sewerage and drainage services. Water consumption is priced per cubic metre (one thousand litres) and prices vary across water companies. For instance, one cubic metre is charged approx. £1.91, £1.79 and £1.39 by Thames Water, Yorkshire Water and Northumbrian Water, respectively. Water UK (2023) announced new water charges from April 2024 and an anticipated average annual increase of £27.40, equivalent to about £2.30 a month (OFWAT, 2024). Nonetheless, water bills remain relatively cheaper than other utilities, with the average annual water bill costing £473 (Discoverwater UK, 2024), while the energy bill (gas and electricity) £1,764 per year (see analysis by NimbleFins UK, 2024).

Egypt Water Management Strategies

In Egypt, water resource management is regarded as a "top national security priority" and is crucial for handling any anticipated negative water shortage scenarios (Khedr, 2017). According to a report published by the Egyptian ministry of water resources and irrigation (2005), the government in Egypt is committed to managing water resources and has adopted an integrated water resource management (IWRM) approach. It was stated that this approach involves a range of measures from developing additional supply and better utilising available resources to ensuring water quality through preventing pollution and investing in sewage treatment. Nonetheless, it was stated that alternatives to develop extra supply are limited and it would mainly involve drawing on deep groundwater; which is not a "sustainable solution". In addition, it was stated that the amount of water that could be extracted from other alternatives such as collecting rain and floods are insufficient. On the other hand, it stated that government measures to best utilise available water resources include increasing the efficiency of water use in agriculture, domestic and industrial sectors. For instance, it was stated that in agriculture water efficient irrigation systems are used, while in the industrial and municipal sector the main focus was on upgrading the water system infrastructure as well as having financial incentives and/or sanctions to encourage water savings. However, no additional details were provided about the effectiveness of such measures. Nevertheless, it was stated by the World Bank (2018) that the integrated approach has enhanced water resource management in Egypt and has improved surface as well as underground water utilisation. Hence, it has ultimately achieved substantial water savings especially in the

[4] OFWAT is the economic regulator of the water sector in England and Wales.

agricultural sector. Recently, as a supply-side measure, Egypt has invested in building desalination plants across the country to meet the increasing water demand of a rapidly growing population, 21 new plants are announced to be built as a first phase (Reuters, 2022).

An early report published by the Egyptian ministry of water resources (2005) emphasised the role of both farmers and citizens of Egypt in the water management process and considered them as core "stakeholders". Moreover, it proposed that developing their sense of "ownership" towards public property could encourage them to engage in more efficient water behaviours. In conclusion, it argued that water management, especially conservation of current available resources (i.e. demand-level approach), is crucial for the socio-economic development of Egypt. Nonetheless, unlike the UK, demand-side measures and efforts are mainly targeting the agriculture sector as the major water consumer. According to Fouad et al. (2023), the majority of communication is in the form of educational "capacity building" campaigns for farmers as the "primary target", encouraging them to engage in more water-efficient irrigation. In addition, contests – as a tool to promote behaviour change, among farmers across different areas are organised by the government and the winner is recognised as "modern irrigation hero". Similarly, a national competition is organised in primary schools (see Fouad et al., 2023). According to the Egyptian Holding Company for Water and Wastewater, campaigns targeting household consumers include an annual water week in schools and public libraries, as well as, providing training for religious leaders to encourage water conservation in religious institutions (i.e. mosques and churches). Mass-media communications targeting household consumers are scarce. However, new legislative/ups-stream measures to encourage water conservation are enforcing installing separate "prepaid" metres for each flat/apartment (Egyptian Holding Company for Water and Wastewater website, 2023).

The water charges structure in Egypt is different from the UK, with an increasing block tariff applied, the charge per cubic metre increases as consumption increases. The latest announced water charges for one cubic metre is 0.65, 1.60, 2.25, 2.75, 3.15 Egyptian pounds[5] for increasing blocks of 0-10 cubic metres; >10-20; >20-30; >30-40; and >40 cubic metres, respectively (cairo24 news website, 2024). These water charges are an increase from water prices in 2018, however, it is met with a recent increase in the minimum wage and pensions by 50% (Egyptian government website, 2024). Thus, the implications of increasing water charges on household water consumption remain limited.

[5] One Egyptian pound is equivalent to approximately 0.017 British pounds, as of March 2024.

Overall, in both contexts the demand-side strategies to manage/reduce water consumption and encourage water conservation are information-oriented, which have limited effectiveness in achieving sustained change in behaviour. This suggests a potential for social marketing in a water conservation context as a holistic approach that utilises a broad range of tools beyond information. The next table summarises the differences in water management in the UK and Egypt (Table 2.2).

Table 2.2: UK and Egypt water management

	UK	**Egypt**
Water supplier	Private water companies	Government owned water company
Water charges for households	Vary across regions and water suppliers	An increasing block tariff structure is applied and fixed across the country
Water management strategy	Twin-track approach (both supply and demand side)	
Major Supply-side measure	New reservoirs	Desalination plants
Demand-side measures: - Main target audience	Household customers	Farmers
- Tools	Informational campaigns and water efficiency devices "retrofits"	Educational campaigns (training, workshops, national competition)

2.1.3 Water conservation: A theoretical background

Previous research examined the effectiveness of different supply and demand side strategies on water conservation and highlighted their advantages/disadvantages. Overall, supply-side strategies are usually criticised because of their high economic as well as environmental costs (WaterUK, 2018; Perren and Yang, 2015). For instance, Kanta and Berglund (2015) indicated that supply-side measures to expand water supply usually require investments in large infrastructure projects (e.g. reservoirs, desalination plants) that involve extracting and transferring large amounts of water from the ecosystem. They added that such a process is not only high in monetary cost but causes degradation to the environment. On the other hand, it is suggested that these costs could be avoided by water demand-management

measures that aim to reduce water consumption rather than exploit additional water supply (Willis et al., 2011).

Consequently, there has been a “growing consensus” that decreasing water demand (i.e. water conservation) is a “more sustainable” tool than supply-side measures to balance between supply and demand (DEFRA, 2018; Inman and Jeffrey, 2006). Hence, demand-side management has emerged as an essential water management approach to secure future water needs (Russell and Fielding, 2010) and hence, water conservation has become a priority worldwide (Perren and Yang, 2015).

The great potential that water conservation presents as a “mitigation” strategy to ensure future water availability (Sarabia-Sanchez et al., 2014) has captured research attention to examine the effectiveness of its different measures. Strategies for water conservation are generally classified into: price and non-price measures as noted above (Lu et al., 2019, see section 2.1.2, p.18). Although adjusting pricing structures is a widely used measure to control consumption, a recent review of literature has concluded that its effectiveness is “controversial” as previous research has reported mixed results (García-Valiñas and Suárez-Fernández, 2022). For instance, several studies have stated that the relationship between water demand and price is often “inelastic” (e.g. Garcia et al., 2013; Russell and Fielding, 2010; Willis et al., 2011). On the other hand, other studies have found that increasing water prices would cause a decrease in consumption but only in the short run (Jorgensen et al., 2009) and water usage usually “re-bounds” to the higher patterns that existed before price interventions (Nemati et al., 2023; Inman and Jeffrey, 2006). These findings show that water conservation behaviour is not simply a trade-off between cost-benefits, personal/internal variables should also be taken into account to avoid reluctance to behaviour change. For instance, individuals' “trust” and “emotions” were found to impact the “acceptance” of water charges (Rodriguez-Sanchez et al., 2018). Furthermore, there have been concerns about the impact of increasing water prices on fairness and equity in society (Lu et al., 2019; Russell and Fielding, 2010). For example, Perren and Yang (2015) argued that making water more expensive would affect low income households, while higher income levels will be able to pay for such an increase without changing their consumption habits. Similarly, Brick et al (2023) reported that financial feedback affected behaviour change in low-middle income households, while high-income households were less responsive.

Regarding non-price measures, these could vary from educational (e.g. water conservation campaigns), technological (e.g. water saving devices), legislative (e.g. water restrictions) and maintenance measures (e.g. fixing leakage) (Inman and Jeffrey, 2006). Educational campaigns and information provision are one of the most widely used non-price interventions. In a recent report by the Institute of Water, Kamat et al. (2022) indicated that more than 60% of interventions by the water sector in the UK are information-based. Nonetheless, previous research indicates that these types of interventions have limited success. A review on water conservation research by Ehret et al. (2021) concluded that pure-information interventions have an insignificant impact on behaviour. Furthermore, some previous studies indicate that information could positively influence audiences' awareness about water issues, nonetheless, these are not translated into actual behaviour change to conserve water (e.g. Jorgensen et al., 2009). Therefore, having relevant knowledge is insufficient for behaviour change to occur. As for the technological measures, several water companies in the UK are inviting their household customers to sign-up for "retrofitting programmes" to install water saving devices such as low flow shower heads and dual flush systems (Lu et al., 2019). However, some previous research reported that when a water-saving device is installed people usually engage in "off-setting behaviour" by increasing their water consumption in a misbelief that less water is used because a device is installed (Inman and Jeffrey, 2006). Therefore, it is argued that even engineered savings would be "diminished by human behaviour" (Willis et al., 2010, p. 1119). Regarding legislative measures such as enforcing water restrictions (e.g. hosepipe ban), they are not a durable solution to water shortages (Dolnicar et al., 2012). Water consumption usually "rebounds" to previous rates as soon as measures are lifted and hence, such "mandatory" measures are only effective in the short-run (Nemati et al., 2023; Jorgensen et al., 2009).

From the above arguments, it is clear that there is no one best way to encourage water efficiency. Moreover, the short-term effectiveness of different measures indicates that "conservation ultimately comes down to people" (Butler et al., 2013, p. 2). Thus, it is crucial to understand water consumption from individuals' perspectives to achieve more durable results. In an attempt to understand why individuals "rebound" and what factors could enhance long-term behaviour change, a review of previous research on household water conservation was conducted. However, it did not provide comprehensive answers for these issues, as illustrated next.

Antecedents of household water conservation

An early review of literature by Russell and Fielding (2010) argued that beside external contextual variables (e.g. house size/ownership status, water prices), there are four main individual aspects which can predict water conservation: attitudinal factors (e.g. attitudes towards water conservation, perceived behavioural control), personal capabilities – in terms of socio-demographics (e.g. age, gender, income), habits, and finally, environmental and water beliefs.

There is no consensus in the previous literature on the effectiveness of these internal variables in driving water conservation. For instance, mixed findings were reported by studies that examined attitudinal factors and especially, constructs of the Theory of Planned Behaviour[6] (TPB, Ajzen, 1991) – attitudes, subjective norms and perceived behavioural control. Few studies found all constructs to be positively associated with water conservation (e.g. Lowe and Lowe, 2015; Lam, 1991). In another study, only subjective norms and perceived behavioural control, but not attitudes, had a positive influence on water conservation (e.g. Perren and Yang, 2015). Similarly, with regards to socio-demographic variables a while few studies reported that only age has a significant impact on water conservation (e.g. Garcia et al., 2013), another found income level to be the only significant variable (e.g. Trumbo and O'Keefe, 2001), another reported no difference between age groups but noted a significant effect of gender (e.g. Sarabia-Sánchez et al., 2014), and others found no correlation between any of the socio-demographic variables and water conservation (e.g. Perren and Yang, 2015). As for beliefs, they are examined by a few studies in terms of beliefs about the "human-nature relationship" (e.g. humans need to maintain balance with nature) and are found to predict water consumption patterns (e.g. Corral-Verdugo et al., 2008). On the other hand, other studies found that such general environmental beliefs do not correlate with water consumption, but more specific water-beliefs (e.g. water is a limited resource) are a more significant predictor (e.g. Corral-Verdugo et al., 2003; Lam, 1999). As for habits, a limited number of studies explored the influence of habit despite its great relevance to household water consumption. This is discussed in more detail next.

According to a review by Koop et al. (2019), several studies mainly focused on the "reflective route" that provides information to enhance awareness, attitudes and self-efficacy

[6] A review of theories used to explain PEB, criticism of TPB and discussion of the theory adopted in this study will be discussed in more detail in section 2.3.3, p. 58.

to eventually trigger water conservation. However, they noted that results were usually "disappointing" and knowledge does not translate into action – inline with the well-documented knowledge-action gap in PEB literature (see Kollmuss and Agyeman, 2002). One potential reason why these "reflective routes" fail to achieve sustained behaviour change could be because household water consumption is mostly habitual and hence, less-reflective. In the social psychology literature, a habit is defined as "behavioural dispositions to repeat well-practised actions given recurring circumstances" (Wood et al., 2005, p. 918). This applies to household water consumption, as the same practices are performed repetitively in the same context/setting (e.g. brushing teeth, showering). The less-cognitive nature of water consumption was acknowledged by one of the few studies that examined habits in water conservation by Gregory and Di Leo (2003). It was indicated that "unreasoned influences" (i.e. habits) help explain the variance of water consumption behaviour "beyond" the "reasoned influences" (e.g. attitudes and awareness). Thus, it is argued that strong habits are difficult to change through typical information-based interventions. For instance, Verplanken and Wood (2006) stated that because habits are "automatic" they do not necessarily reflect attitudes or intentions but are triggered by "cues" in the context. Thus, they stated that behaviour change interventions should aim to "disrupt" these habits by altering the environmental "cues"– which they proposed could be "downstream-plus" (e.g. information) or "upstream" (e.g. legislation).

In the water conservation literature, despite the limited number of studies on habits, there is evidence that habits are a significant predictor of water conservation (e.g. Russell and Knoeri, 2020; Gregory and Di Leo, 2003; Aitken et al., 1994). Nonetheless, it is noted that habits were always examined quantitatively in terms of frequency of engaging in a specific behaviour. Factors that shape and "cues" that maintain those habits were not examined. This calls for more research to understand how/when water usage habits are shaped and what are the "cues" that trigger them.

Recently, studies are moving beyond typical variables (e.g. attitudes, socio-demographics) to include relatively more novel perspectives on water conservation. Emergent research is showing evidence that individuals' perceptions about different water-related aspects are also relevant. For instance, perceptions about their water usage rates relative to others (e.g. Vazquez-Casaubon et al., 2023; Haeffner et al., 2023) and perceived risk of water scarcity (e.g. Cauberghe et al., 2021; Sarabia-Sanchez et al., 2021) are found to help explain water conservation intentions. This trend is promising and would provide better

understanding of individuals' underlying (mis)perceptions that are shaping their water consumption behaviour. A recent review of literature by Cominola et al. (2023) indicated that these "latent" determinants of water consumption – that reflect how individuals "think and feel", are the least studied relative to "observable" (e.g. household size) and "external" (e.g. rainfall rates). Similarly, a review by Salas-Zapata et al. (2023) noted that despite its importance, "knowledge" of participants – about water issues, water availability and water saving strategies, is the least studied variable relative to other factors influencing water conservation behaviour (i.e. attitudes and practices). This suggests that more research is needed to explore and understand participants' knowledge and perceptions about these different water issues.

It is worth noting that one aspect in particular showing mostly positive results on water conservation is social norms. There is growing evidence of norms being one of the main antecedents of water conservation – which is consistent with the well-established influence of social norms in PEB literature. This will be discussed in more detail next.

Social influence in water conservation

Despite the reported limited effectiveness of pure information interventions on water conservation (e.g. Ehret et al., 2021; Lu et al., 2019), one type of information specifically is found to achieve more consistent positive results. Information about social norms or normative messages (e.g. most of your neighbours are taking shorter showers to save water) which communicate the prevalent behaviour in a social group have shown positive results in driving water conservation (e.g. Lede et al., 2019; Landon et al., 2018; Fielding et al., 2013). A meta-analysis of interventions targeting household water conservation concluded that messages appealing to social norms (e.g. social comparison feedback) have a bigger effect-size than messages highlighting financial benefits of water conservation (see Nemati and Penn, 2020). This pattern begs the question of how/why social norms influence household water consumption, despite it being a mostly private, socially-invisible behaviour as noted above. To further explore this argument, a broader review of social norms literature is conducted and will be presented next.

Social norms are defined as "rules and standards that are understood by members of a group, and that guide and/or constrain human behaviour, without the force of laws" (Cialdini and Trost, 1998, p. 152). Another definition states that social norms are "the common and accepted behaviours for a specific situation" (Göckeritz et al., 2010, p. 515). This implies that

social norms are not only behaviours that are common or performed by the majority, but also behaviours that are socially accepted by members of a social group. Thus, it is argued that people tend to comply with social norms to avoid "social exclusion" (Bamberg and Möser, 2007).

According to a Cialdini et al. (1990), social norms guide individual behaviour in two distinct ways and hence, they distinguish between two types of social norms: descriptive and injunctive norms. They state that descriptive norms involve behaviours that are typically performed by a social group (i.e. what others are actually doing). On the other hand, injunctive norms involve behaviours which are typically approved or disapproved by others (i.e. what others think one should do). Furthermore, they argued that each of these norms affects behaviour differently because each influences a separate source of human motivation. For instance, descriptive norms affect behaviour via setting an example, while injunctive norms affect behaviour via informal sanctions (e.g. social disapproval). The two types are interrelated as a descriptive norm can implicitly communicate injunctive norms. For example, in Cialdini et al.'s (1990) littering experiment, participants' tendency to litter was more when they were located in a place that was already littered. Thus, they assumed that since the place is littered, all people must be littering (i.e. descriptive norm), hence, it is acceptable to litter (i.e. injunctive norm).

This pattern indicates the influence of social norms on human behaviour is indeed a "double-edged sword" (Andreasen, 2006, p.84). Positive norms would encourage compliant favourable behaviours and vice versa. Compliance with negative norms raises questions about personal discretion and internal moral standards that guide actions beyond social norms. In this study, one of the main aims is to explore if there is an internal moral compass when it comes to water consumption. In environmental psychology, it is argued that "personal norms"[7] are one of the strongest predictors of PEB (see meta-analysis by Helferich et al. 2023). Therefore, this research explores whether or not water conservation is relevant to morality – guided by an internal "moral obligation" (Schwartz, 1978) to act in a favourable manner, regardless of social norms. This will be discussed in detail in section 1.3: a moral perspective (p. 56).

[7] Personal norm is a core construct in Norm-activation theory (Schwartz, 1977) that explains altruistic behaviour. It reflects the individual's "moral obligation" and "expectations that people hold for themselves". A detailed discussion of this theory and its great potential to explain water conservation is presented in section 2.3.3, p. 61.

In the PEB literature, the impact of social norms is widely acknowledged. A meta-analysis by Bergquist et al. (2019) indicates that social norms interventions have a positive main effect on PEB. Thus, it is argued that social norms have a "persuasive power" that encourages consumers to engage in sustainable behaviours (White and Simpson, 2013). For instance, social norms appeals are reported to positively impact littering (Cialdini et al., 1990), environmental theft (Cialdini et al., 2003), household energy conservation (Schultz et al., 2007) and composting (White and Simpson, 2013). In the PEB literature, tools that utilise social norms, go beyond explicitly communicating descriptive and injunctive normative information with a target audience. A meta-analysis by Abrahamse and Steg (2013) identified various tools employed in the PEB literature. They argued that in addition to communicating social norms through information provision, other tools such as public commitment, social networks, modelling and comparative feedback are also effective. For instance, regarding public commitment Abrahamse and Steg (2013) reported that making a commitment in public develops a sense of "social pressure" to abide and maintain their "public image". Similarly, they noted that information dispersed within social networks through people you "personally" know tend to have more impact on behaviour. Similarly, McKenzie-Mohr (2011) stated that conversations that we have with people whom we trust and find similar to us have a greater influence than other non-personal sources of information (e.g. brochures, advertising). As for modelling, it provides an example for recommended behaviour (Abrahamse and Steg, 2013) and can make the social norm associated with such behaviour more "salient" (McKenzie-Mohr and Smith, 1999). Finally, comparative feedback in terms of providing feedback on personal performance relative to the performance of "relevant others" in a social group is argued to have a significant impact on behaviour (Abrahamse et al., 2005).

In the water consumption literature, despite the positive main-effect of norms on behaviour/intentions, studies have reported mixed findings in terms of the effectiveness of different normative messages. For instance, some studies reported that both descriptive and injunctive norms were effective drivers of water conservation (e.g. Warner et al., 2023; Lede et al., 2019). On the other hand, few found descriptive norms only (Jaeger and Schultz, 2017) to be effective, while another found that descriptive norms had no effect on message effectiveness (Fielding et al., 2013). It is worth noting that one type of normative message shows a relatively consistent result, namely social comparison (e.g. Landon et al., 2018; Schultz et al., 2016; Ferraro et al., 2011). The following Table 2.3 summarises the findings of these studies.

Table 2.3: Social norms in promoting household water conservation

Author	Target behaviour	Message type	Main Finding(s)
Warner et al. (2023)	Outdoor irrigation	Descriptive and injunctive norms	Descriptive norms are the strongest predictor of water conservation.
Landon et al. (2018)	Outdoor water use of households	Normative comparison (with neighbours and efficient standard)	Significant reduction in water consumption that persisted in following years.
Lede et al. (2019)	Indoor water consumption (e.g. showering and installing water-efficiency devices)	In-group social norms (descriptive and injunctive)	In-group social norms appeal are more effective than control, information-only, and general social norms conditions.
Jaeger and Schultz (2017)	Households water consumption	Descriptive norm	Participants who received a normative message reduced their water consumption during the intervention period and 4 months after.
Schultz et al. (2016)	Households water consumption behaviour	Social comparison	Normative messages led to a significant reduction in water consumption, while information only messages were ineffective.
Fielding et al. (2013)	Households water consumption	Descriptive norm	Adding descriptive norms to information message was equally effective to other messages (i.e. information only, information and feedback)

Ferraro et al. (2011)	Households water consumption	Social comparison	Social comparison messages had an effective and long lasting (i.e.two-year post-intervention) impact on water consumption.

From the above table, it is noted that normative messages usually achieve water reductions in both outdoor (e.g. irrigation) as well indoor (e.g. showering) behaviour. These findings imply that social normative approaches are equally effective for different types of behaviours regardless of being socially observable or not. A similar pattern was noted by some studies looking at household energy usage. For instance, Nolan et al. (2008) indicated that descriptive normative messages were the most effective in encouraging households' energy saving despite the "private nature" (p. 920) of such behaviour. Furthermore, some studies provided evidence of the sustained long-term impact of normative messages on behaviour ranging from a few months after the intervention (e.g. Jaeger and Schultz, 2017) to several years (e.g. Landon et al., 2018; Ferraro et al., 2011).

Despite the evidence that social norms influence water conservation behaviour, previous studies did not explain why some types of normative messages are more effective than others and how to enhance their effectiveness. The literature review indicates that previous studies adopted a quantitative methodology – especially experimental, while utilising a qualitative approach that offers a more in-depth understanding of how social norms are perceived is still lacking. Therefore, there are no clear insights on how individuals interpret normative messages and the mechanism through which social norms influence a behaviour – especially when it is not socially visible. This is a research gap that calls for further investigation. This is in line with an early review of social norms literature by Chung and Rimal (2016) which noted that "pathways" through which norms influence behaviour are still unclear. It concludes that the literature is "quantitatively oriented" and calls for more qualitative studies to provide a "richer perspective".

Similarly, in environmental psychology, it is argued that social influence is often "automatic" and "non-conscious" (Ölander and Thøgersen, 2014) and there have been calls to explore the "paths" through which social norms influence behaviour (Thøgersen, 2006). This suggests that normative messages influence individuals through a non-cognitive path that

might not be captured by using quantitative measures. This further supports the adoption of qualitative data collection methods to contribute to this research gap, gain better understanding of the influence of social norms on water conservation and help reveal underlying factors. Therefore, providing insights for social marketing to best capitalise on and further enhance the benefits of social norms interventions.

Overall, the literature review indicates that previous studies have not reached a consensus about antecedents of water conservation behaviour. The mixed findings suggest that more research is needed to uncover and better understand the range of aspects shaping water consumption behaviour.

It should be noted that the majority of research on household water conservation is conducted in areas with high risk of drought such as the US east coast and Australia (see review by Salas-Zapata et al., 2023 and Cominola et al., 2023). This research aims to contribute to this research gap by providing insights from underrepresented areas such as the UK and Egypt. Research on household water conservation in both contexts is discussed in more detail next.

Household water conservation in UK and Egypt

A review of previous studies in the UK and Egypt confirms that research on household water conservation is still inadequate. This study addresses this research gap as household water usage accounts for a large percentage of total water withdrawal in both countries (see section 2.1.1, p. 17). Hence, household water conservation has a great potential to reduce water demand and ensure future water security.

In the UK, household water conservation is relatively more researched than Egypt. Previous studies have examined the impact of a broad range of variables on water conservation. For instance, Russel and Knoeri (2020) examined the impact of variables such as habits, attitudes, and perceived behaviour control on water saving intentions. They concluded that water usage habits were “the strongest predictor” of water conservation. Moreover, Bryan et al. (2019) examined households' drought perceptions and intentions to engage in drought coping responses. It reported that perceptions of a low likelihood of drought were prevalent. These studies mainly focused on individual and behavioural aspects. Furthermore, Glig and Barr (2006) noted that water saving activities are mostly habitual, with some performed more regularly than others depending on the degree of “personal sacrifice” involved. For instance, they reported that turning off the tap while brushing teeth involves

less sacrifice of comfort and hence, is more common than turning off the tap while soaping up in the shower. However, a few studies show that external aspects beyond individual psychological aspects could also be relevant. For instance, Sharpe et al. (2015) moved beyond individuals and adopted a more external perspective. They examined the impact of variables such as house ownership/occupancy and water bill cost on encouraging the installation of water efficiency devices. It concluded that homeowners are more willing to utilise efficiency devices. In the UK, few studies examined the effectiveness of different types of interventions on household water conservation (e.g. Lu et al., 2019) and suggest that social norms interventions in particular have a positive impact on water conservation. For instance, relative to other information-based interventions, provision of social comparative feedback (Lu, 2020) and communicating "in-group" norms (Lede et al., 2019) were found to be the most effective in the UK.

In Egypt, research on water efficiency is primarily focused on the agricultural sector, as the biggest water user. Only a few studies examined household water conservation and mixed findings are reported. For instance, a study stated that no difference was found between water usage rate and conservation intentions between urban and rural residents (Marzouk, 2019). However, another study has reported that "income induced" differences in diet and lifestyle caused a "gap in water footprint" (Wahba, 2021). Furthermore, antecedents of household water conservation in Egypt remain unclear. Only one study by Marzouk and Mahrous (2020) examined household water and energy usage. It has indicated that variables such as perceived behavioural control, subjective norms and public media influence are relevant to water conservation. They concluded that subjective norms had the most significant impact on water conservation intentions. Nonetheless, their proposed model is weak and was found to explain only 17% of variance in intentions. This calls for more research to uncover relevant constructs and better understand water conservation in Egypt.

2.1.4 Towards a more holistic approach

A systematic review by Echeverría (2020) identified two key themes in household water conservation literature, namely short-term effectiveness of interventions and the intention-behaviour gap. The prevalence of these issues implies that variables examined in previous literature do not fully reflect the antecedents of water conservation. In this research, it is acknowledged that water conservation is a "complex phenomenon" (Salas-Zapata et al., 2023) that should be tackled by a multi-level and "comprehensive approach" (Ehret et al., 2021). Thus, for a more comprehensive understanding and a broad view of aspects that shape water consumption behaviour a social marketing approach is adopted.

Social marketing has demonstrated its potential in promoting environmental issues and sustainable development (Gordon et al., 2018). Unlike other approaches to behaviour change such as education and law (Andreasen, 2002), social marketing does not only acknowledge internal/ individual aspects but also external (e.g. structural and social) factors that could influence desired behaviour. Hence, it allows for the design of multi-level interventions (i.e. downstream, midstream and upstream) that not only target individual behaviour but also social and structural aspects that could ultimately, facilitate or hinder such behaviour.

In the next section 2.2, social marketing is discussed in more detail. Special focus is given to insights on its emerging effectiveness in encouraging PEB, and the potential this presents for water conservation.

2.2 Social Marketing

This section will provide an overview of the social marketing approach, its definition and benchmarks. Moreover, it will illustrate the potential of social marketing in water conservation by discussing social marketing applications in the PEB context. In addition, the relevance of social influence to social marketing is discussed.

2.2.1 A brief historical background

The concept of social marketing can be traced back to the year 1951 when a scholar challenged the marketing community to "sell brotherhood" and "rational thinking" like they sell "soap" (Wiebe, 1951). This resulted in people thinking how the tools used in the commercial sector could be adapted to influence behaviour in a non-profit context (Stead et al., 2007). Later in early seventies, social marketing emerged as a "marketing sub-discipline" (Rundle-Thiele et al., 2019) proposed by Kotler and Zaltman (1971) who expanded the concept of marketing practice to include its role in behavioural change (Dann, 2010). Since then social marketing has attracted the attention of academics as well as practitioners in various disciplines especially in the field of public health, targeting issues such as smoking, drinking, and physical activity (Truong, 2014).

2.2.2 Social marketing Definition and Benchmarks

There are several definitions of social marketing in the literature (Stead et al., 2007). It is claimed that more than forty five peer-reviewed academic definitions of social marketing are available (Dann, 2010). Some of the definitions that show the evolution of social marketing are presented below in Table 2.4.

Table 2.4: Social Marketing Definitions

Author	Definition
Kotler and Zaltman (1971)	‘‘The design, implementation and control of programs calculated to influence the acceptability of social ideas and involving considerations of product planning, pricing, communication, distribution and marketing research.’’ (Kotler and Zaltman, 1971, p. 5)

Kotler and Roberto (1989)	"Social change management technology involves the design, implementation, and control of programs aimed at increasing the acceptability of a social idea or practice in one or more groups of target adopters. It utilises concepts of market segmentation, consumer research, product concept development and testing, directed communication, facilitation, incentives, and exchange theory to maximise the target adopter's response." (Kotler and Roberto, 1989, p. 24).
Andreasen (1995)	"Social marketing is the application of commercial marketing technologies to the analysis, planning, execution and evaluation of programs designed to influence the voluntary behaviour of target audiences in order to improve their personal welfare and that of society" (Andreasen, 1995, p. 7).
Smith (2000)	"Process for influencing human behaviour on a large scale, using marketing principles for the purpose of societal benefit rather than commercial profit" (Smith, 2000, p. 11).
Dann (2010)	"The adaptation and adoption of commercial marketing activities, institutions and processes as a means to induce behavioural change in a targeted audience on a temporary or permanent basis to achieve a social goal." (Dann, 2010, p. 151).
European Social marketing association (2013)	"Social Marketing seeks to develop and integrate marketing concepts with other approaches to influence behaviours that benefit individuals and communities for the greater social good." "Social Marketing practice is guided by ethical principles. It seeks to integrate research, best practice, theory, audience and partnership insight, to inform the delivery of competition-sensitive and segmented social change programmes that are effective, efficient, equitable and sustainable."

Kotler and Zaltman's (1971) early definition of social marketing is one of the most quoted definitions in the literature (Andreasen, 2002). Nevertheless, although it is one of the first and most cited definitions of social marketing (Truong, 2014), it was criticised for not stating the potential of social marketing in motivating behaviour change (Gordon, 2012). Accordingly, in 1989 Kotler and Roberto extended the definition of social marketing to include "social change".

Hence, social marketing could be considered as "*a process for developing social change programs*" (Andreasen 2002, p. 8). However, social marketing interventions seek to encourage *voluntary* behaviour change of target audiences and it is not about enforcement or compulsion (Stead et al., 2007). One of the definitions that acknowledge that social marketing seeks to achieve a voluntary rather than imposed behaviour change was proposed by Andreasen (1995). Similarly, Smith (2000) provided another definition of social marketing which acknowledged the impact of social marketing on behaviour change.Moreover, it has been argued that social marketing is not a theory in itself (Truong, 2014). However, it incorporates theories and concepts from other disciplines to better influence people's behaviour (Stead et al., 2007). This view is supported by Smith (2006) who stated that social marketing "relies on multiple scientific disciplines to create programs designed to influence human behaviour on a large scale" (Smith, 2006, p. i38). In addition, based on the argument that social marketing uses commercial marketing theory to develop social change campaigns; another definition of social marketing was proposed by Dann (2010).

Finally, the European Social Marketing Association (ESMA) collaborated with other bodies specialised in the field of social marketing (e.g. ISMA) as well as academics and practitioners and in 2013 they reached a consensus regarding the definition of social marketing. This definition will be adopted in this study as it captures a broader view of social marketing:

"Social Marketing seeks to develop and integrate marketing concepts with other approaches to influence behaviours that benefit individuals and communities for the greater social good."

European Social marketing association (2013)

A set of "benchmarks" have been proposed by French and Russell-Bennett (2015) to distinguish social marketing from other forms of interventions. They stated that such criteria would act as a "checklist" for both academics and practitioners to help them identify if an intervention could be labelled as a social marketing intervention. One of the first attempts

was the elements proposed by Andreasen (2002) who argued that a "legitimate" social marketing intervention should include the following six benchmarks: behaviour change, market research, segmentation of target audience, exchange, marketing mix and competition. These elements are explained in Table 2.3 next. Based on Andreasen's (2002) work, French and Blair-Stevens (2005) suggested an updated set of benchmarks. They proposed two additional criteria which are "theory" and "customer orientation". They argued that theory reflects the importance of using a behavioural theory or model in designing and evaluating interventions. Moreover, customer orientation reflects the significance of a customer or "citizen" perspective in the development and delivery of effective interventions. Furthermore, they changed the wording of some of the criteria to broaden its meaning. For instance, they changed behaviour change into "behavioural influence", marketing mix to "methods mix" and market research into "insight". The following table provides a summary of the final set of benchmarks and a brief explanation for each. It is worth noting that in the PEB context, Lynes et al. (2014) extended the community-based social marketing (CBSM) framework (McKenzie-Mohr, 2011) into another 21 benchmarks. This will be discussed in more detail in PEB in the social marketing section next (Section 2.2.3, p.42).

Table 2.5: Social Marketing Benchmarks

Andreasen (2002)	**French and Blair-Stevens (2005)**	**Explanation**
Behaviour change	Behavioural Influence	Social marketing seeks to influence rather than just change behaviours. In some cases, a favourable behaviour might need to be "sustained" rather than changed.
Market/consumer research	Insight	Conduct research to gain an "insight" and understanding of factors that could motivate and drive people's behaviour.
Segmentation of target audience	Segmentation	Identify groups who could be influenced by the same approach and "tailor" the intervention to match their needs.
Exchange	Exchange	Social marketing should seek to create attractive packages that minimise the cost and

		enhance the benefits for target audiences to voluntarily adopt the desired behaviour.
Marketing mix (4 Ps)	Methods Mix	Interventions should go beyond the traditional 4Ps and utilise any available methods that could better influence the target behaviour.
Competition	Competition	Analyse the factors that compete for the time and attention of the target audience, and seek to minimise their effect.
----	Theory	Intervention design and evaluation should be theoretically informed.
----	Consumer Orientation	Incorporate information from market research and other sources to gain better understanding of the target audience.

It is important to note that Andreasen (2002) stated that not all these criteria must be included in any intervention in order for it to qualify as a social marketing intervention. However, French and Russell-Bennett (2015) noted that Andreasen did not further explain which of these criteria is essential or "mandatory" for social marketing although they might not be equally important. Nevertheless, several studies reviewed the effectiveness of various social marketing interventions based on the extent to which such benchmarks are employed. For instance, Kubacki et al. (2015) examined alcohol interventions and stated that not utilising the full set of criteria limits the effectiveness of social marketing interventions. Similarly, Carins and Rundle-Thiele's (2014) review on healthy eating interventions concluded that applying all Andreasen's (2002) benchmarks is essential to ensure that social marketers' behavioural goals are met. Although these studies examined interventions promoting different health-related behaviours, they all concluded that the more benchmarks were evident, the more effective an intervention was in achieving desired behaviour change. Therefore, in order to maximise the effectiveness of interventions –ideally, social marketers should seek to use all benchmarks as a guide. This research will contribute to the market research stage/benchmark by providing insights on water conservation to guide social marketing interventions. Social marketing can achieve durable behaviour change in water

consumption patterns, as there is emerging evidence on its effectiveness in encouraging PEB, as illustrated next.

2.2.3 PEB in social marketing

Recently, several studies advocate the role of social marketing in achieving the sustainable development goals (SDGs) (e.g. Rodriguez-Sanchez, 2023; Galan-Ladero and Alves, 2023). However, this has not always been the case. According to a review by Truong (2014), early social marketing literature is dominated by studies in the health sector while limited attention was given to other areas such as environmental protection. He argued that social marketing strategies should be utilised in the field of environmental protection and natural resource conservation as they could contribute to consumption and waste reduction, recycling and sustainable living. Only one early review of social marketing literature in PEB was conducted by Takahashi (2009) who concluded that available literature was "dispersed and scarce" (p.137). However, he noted that since 1999 there has been an increase in the number of case studies employing social marketing to promote PEB. He added that such an increase could be caused by the development of community-based social marketing (CBSM) by McKenzie-Mohr and Smith (1999) as an approach to foster sustainable behaviour. CBSM will be discussed in more detail next. Similarly, Verissimo (2019) noted that since then, there have been developments in integrating social marketing with environmental sustainability, particularly in issues such as waste management, energy efficiency or water conservation. Hence, social marketing interventions are considered a powerful tool to improve global conservation outcomes (Green et al., 2019).

Community-based Social Marketing

Community-based social marketing (CBSM) was first introduced by McKenzie-Mohr and Smith (1999) as an approach to "foster" a wide range of "sustainable" PEB. (McKenzie-Mohr, 2000) referred to it as a "process" that aims to make "psychological knowledge" applicable and accessible to practitioners to design more effective interventions. Hence, although it is conceptually derived from social marketing, McKenzie-Mohr and Smith (1999) stated that CBSM offers a more "pragmatic approach" as it sums up the process into five main steps: select target behaviour, identify the barriers and benefits, develop a strategy that utilises the appropriate "tools", pilot the strategy, and finally, ongoing evaluation (McKenzie-Mohr, 2011). Each of these stages was later further expanded into 21 "benchmarks" by Lynes et al. (2014) (see Table 2.6). Despite the potential CBSM framework

and extended benchmarks could offer, they remain underutilised by many interventions. A systematic literature review has indicated that only 36% of CBSM research explicitly acknowledges the 5 stages framework (Rodriguez-Sanchez et al., 2023). Similarly, in the water conservation context, Fries et al. (2020) noted that only 4 out of the 21 benchmarks were fully integrated into the interventions under study.

Table 2.6: Expanded benchmark criteria

Lynes (2014) benchmark criteria	**CBSM Stages (Mckenzie-Mohr, 2011)**
1. Clearly identifies target audience 2. Select behaviours that are both non-divisible and end state 3. Evaluate list of selected behaviours for potential impact, penetration and probability 4. Limit number of behaviours to target in any given CBSM campaign (e.g. not more than five to six behaviours)	Step 1: Select target behaviours
5. Conduct research on barriers and benefits for each of the potential segments in the target group 6. Identify and distinguishes between barriers and benefits that are internal versus those that are external to the target segments	Step 2. Identify barriers and benefits
7. Create strategies that are appropriate for the barriers of the behaviour(s) being promoted and reduce the benefits of the behaviour(s) being discouraged 8. Develop commitment tools 9. Develop prompts 10. Engage well-known and well-respected people to be part of the campaign 11. Encourage the use of norms that are visible and reinforced through personal contact 12. Develop communication tools that are captivating and appropriately frame the message 13. Establish incentives/disincentives 14. Initiate convenience strategies	Step 3. Develop a Strategy that utilise appropriate tools
15. Develop a pilot to be compared with baseline measurements 16. Utilise a control group 17. Whenever possible, participants are randomly	Step 4. Pilot the strategy

selected and then randomly assigned to strategy or control groups 18. Whenever possible, evaluates strategy effectiveness through unobtrusive measurements of behaviour change rather than through self-report 19. Focus only on the strategies that can be implemented at a broad scale	
20. Measure activity prior to implementation and at several points afterwards 21. Utilise evaluation data used to provide feedback to community	Step 5. Ongoing evaluation

The community-based approach is employed in various PEB interventions and has shown great success in various areas. For instance, the UK National Social Marketing Centre website (www.thensmc.com) lists examples of campaigns that were effective in areas such as promoting sustainable living (e.g. Ecoteams), sustainable transportation (e.g. In Motion) and water conservation (e.g. Hinduism and H2O). Moreover, findings of successful interventions in addressing issues such as littering in public places (Al Mosa and Rundle-Thiele, 2017) and reducing carbon emissions of households (Aylesbury and Wood, 2017) were published in the proceedings of the world social marketing conference (2017). Furthermore, the CBSM website (www.cbsm.com) displays examples of successful interventions in different areas such as water quality and efficiency, energy saving, waste management, transportation as well as wildlife and forest conservation. In the conservation of species and natural habitat in particular an approach referred to as “pride campaigns" has shown great success. This approach was developed by “Rare” – a non-profit environmental organisation – and is based on social marketing principles and benchmarks (Butler et al., 2013).

In line with above arguments, a meta-analysis by Green et al. (2019) supports the significant impact of incorporating social marketing into conservation programs to address environmental threats. In the context of water conservation, there have been early calls for marketers to address water shortages by developing social marketing interventions (e.g. Kotler, 2011). Nonetheless, it is argued that social marketing concepts are still not widely applied in research examining households’ water consumption (Lowe et al., 2015).

Therefore, this study aims to contribute to this gap by offering an in-depth exploration of water conservation to guide the design of social marketing interventions. This would

contribute to the consumer research stage – one of the core benchmarks of social marketing (see above Table 2.5 p. 40), which is discussed in more detail next.

2.2.4 Formative market/consumer research

Social marketing "starts and ends with the target audience" (Carins and Rundle-Thiele, 2014, p. 1636). Social marketing is "audience centred" and hence, it is crucial for interventions to start with an in-depth understanding of the target audience whom they ultimately seek to influence (Andreasen, 2006). Similarly, Tapp and Spotswood (2013) emphasised the role of customer orientation in social marketing and argued that gaining "insights" about the target customers' behaviour should be the starting point. In addition, Stead et al. (2007) argued that such "consumer orientation" is an essential "guiding principle" in social marketing and emphasised the significance of understanding target audiences in developing interventions. They indicated that for an intervention to be defined as social marketing, it must have conducted "formative research" to gain more insight on target audiences' perspectives. Moreover, they noted that in the interventions they examined the impact on influencing behaviour was greater when a more extensive research had been conducted. Hence, due to the importance of understanding the target audience, Andreasen (2006) argued that the first step in the social marketing process should be conducting "formative research" – which he referred to as the "listening" stage. According to Lee and Kotler (2011), in formative research four main aspects should be identified from the audience's perspective: barriers and benefits, influential others and competition.

This study aims to contribute to the formative research stage by gaining in-depth understanding of water conservation from a household perspective. In previous social marketing literature, only two recent studies examined water conservation to inform formative research (Ibrahim et al., 2022; Warner et al., 2022). However, none of the studies employed a qualitative methodology. By adopting a qualitative approach, household perceptions about water conservation will be explored in more depth to identify the different sources of barriers[8] hindering behaviour change. Acknowledging the diverse types and sources of barriers would help tackle water conservation more holistically and achieve more durable results. More on different types of barriers and the multi-levels of social marketing is discussed next.

[8] Barriers represent "elements standing in the way of behaviour adoption" (Noble and Basil, 2011, p. 138) which could be either actual/real or perceived (Lee and Kotler, 2011).

2.2.5 Multi-levels of behaviour change: A holistic approach

Household water conservation is a complex problem that needs to be tackled by a "comprehensive approach" (Ehret et. al. 2021). Social marketing helps capture the complexity of such behaviour by offering a holistic lens which acknowledges that behaviour is usually a function of internal/individual as well as external factors. Systems social marketing (SSM) acknowledges that target behaviour is a part of a broader "system" that is a "network of individuals, groups and/or entities, embedded in a social matrix" (Truong et al., 2019, p. 183). Hence, external environmental (i.e. structural and/or social) aspects influence individuals' decisions to engage in a behaviour. Thus, focusing solely on individuals in social marketing has been criticised as a "victim blaming" strategy (Lefebvre, 2013; Hastings et al., 2000). Social marketing goes beyond the individual and accounts for structural/social aspects to facilitate behavioural change. It is stated that social marketing interventions have shown great potential and success in influencing not only "downstream" individual behaviour change, but also "upstream" behaviour change of policymakers, organisations and professionals (Stead et al., 2007). This "shift" beyond the individual downstream is argued to be the "most significant development" in social marketing (Truong et al., 2019, p. 181).

It has been proposed by Andreasen (2005) that social marketing interventions could be classified into three levels: downstream, midstream and upstream. A downstream approach seeks behaviour change on an individual-level by targeting individuals with "problem behaviour" (Andreasen, 2002) and whose behaviour needs to be changed. On the other hand, midstream interventions focus on the individual's "social environment" (Gordon, 2013) and acknowledge the influence of its different aspects on individuals' behaviour. According to Luca et al. (2016), mid-stream social marketing tackles "social, economic, institutional and cultural factors shaping the context of behaviour" (p. 1147). They added that it is concerned with the community, local institutions (e.g. religious or sports structures), public services (e.g. schools or health facilities) as well as personal networks (e.g. family and peers). Finally, upstream measures focus on structural aspects such as law and policy – which would ultimately drive individuals' behaviours – by targeting policy makers, regulators and politicians (Gordon, 2013). Such upstream efforts could support the desired behaviour by minimising behaviour "barriers" and making it more convenient (Borden et al., 2018). Eventually, it is stated that the upstream approach aims to change the context in which downstream individual decisions are performed (Gordon, 2012).

Interventions should not be restricted to select only one of the three approaches in addressing a specific social problem, as social marketing is "not a matter of either upstream or downstream, but both and everything in between" (Hastings, 2007, p. 108). Therefore, Gordon (2013) stated that social marketing strategies should utilise all three levels and adopt a more "holistic approach to behaviour change" (p. 1528). Furthermore, he indicates that such "holistic packages" would be more effective in influencing decision-making, tackling complex social issues and eventually, achieving the sought social change. Similarly, in the context of PEB, it is argued that a "combination" of behavioural (i.e. downstream) as well as structural (i.e. upstream) strategies would be most effective (Steg and Vlek, 2009).

Selecting the most appropriate approach depends on the nature of the social issue or behaviour being addressed. Formative market/consumer research is crucial to help identify and understand different factors that could be hindering the adoption of desired behaviour from the target audiences' perspective. Previous studies (e.g. McKenzie-Mohr, 2011; Steg and Vlek, 2009) criticised that the majority of efforts to promote sustainable behaviour are information-intensive based on "knowledge deficit assumption" (Tabianco and Schultz, 2007, p. 41). This approach does not acknowledge the complexity and diversity of barriers that could be hindering the behaviour. Therefore, social marketing interventions usually go beyond pure information provision and would offer tangible products as well as incentives for the target audience to change their behaviour (Peattie and Peattie, 2003). For instance, in encouraging and maintaining a PEB such as cycling, providing information about available routes and benefits of cycling would not be sufficient but offering access to bicycles and maintenance services are also essential (Peattie and Peattie, 2009). These changes would create an "opportunity" by making the environment more "favourable" and supportive to the desired behaviour and ultimately, motivate individuals to engage in behaviour (Rothschild, 1999).

Consequently, deciding which level of intervention is the most appropriate (i.e. downstream, midstream or upstream) depends on the source of actual/perceived barriers (Lee and Kotler, 2011) faced by the target audience. According to McKenzie-Mohr (2011) developing strategies and selecting the most appropriate behaviour change tools should be informed by a "solid foundation" of the identified barriers/benefits of the target behaviour. He added that the CBSM approach has shown "remarkable results" in encouraging PEB because the selected behaviour change tools are "tailored" to the identified barriers/benefits.

Broadly, barriers are classified into two types according to their source: internal and external barriers (McKenzie-Mohr and Smith, 1999) or in other words, individual and environmental barriers (Wymer, 2011). For instance, internal/individual barriers could be "ignorance" or "motivation" barriers due to lack of knowledge or lack of interest/desire to engage in a certain behaviour, respectively (Wymer, 2011). In addition, other factors such as an individual's skills, abilities and attitudes (Noble and Basil, 2011), as well as, perceptions about "self-efficacy" (Andreasen, 2002) could act as internal barriers to behaviour change. External/environmental barriers involve structural elements that hinder behaviour (Noble and Basil, 2011) in the surrounding "natural or constructed settings" including social, cultural, ecological, legal and political aspects (Wymer, 2011, p. 23).

Similarly, in the PEB context, Stern (2000) argued that behaviour is a function of the "organism and its environment" (p. 415) and a product of personal (i.e. internal) and contextual (i.e. external) factors. He added that based on attitude-behaviour-context "ABC" theory (Guagnano et al., 1995) behaviours are more consistent with personal attitudes when the contextual variables are supportive to the desired behaviour. Similarly, Steg and Vlek (2009) argued that interventions should acknowledge not only individuals' internal "motivational" and "habitual" factors, but also "contextual" factors such as physical infrastructure, technical facilities and the availability of products. They argued that such contextual factors could either facilitate or hinder a specific environmental behaviour, hence, influencing individual motivations towards adopting such behaviour.

A more comprehensive classification of barriers is offered by Andreasen (2002) who argues that "barriers to action" may be due to individual, community or structural causes. Thus, he further categorised external/environmental barriers into community aspects (e.g. norms and culture) and structural aspects (e.g. laws and infrastructure). This classification better captures the importance of social context and its influence as reflected in the "community" aspect. Thus, in line with water conservation literature (see section 2.1.3, p.25), the significance of social influence is emphasised in social marketing and will be discussed next.

Therefore, one of the aims of this research is to explore and identify the types and sources of barriers to water conservation from a household perspective. This will inform social marketing interventions on selecting the most appropriate level (i.e. downstream, midstream, or upstream) to target.

Social influence in social marketing

In the social marketing literature it is argued that before seeking to change individual behaviour it is essential to first understand the "social context" that "shapes" such behaviour (Peattie and Peattie, 2003). Lefebvre (2011) stated that "social networks" and communities influence individuals' behaviour and called for social marketers to give more attention to "social perspectives". Moreover, Gordon et al. (2011) argued that social marketing could achieve behaviour change by seeking to "challenge" social norms associated with sustainable behaviours. Similarly, Andreasen (2002) suggests that social marketing could influence key opinion leaders to initiate changes in community norms to motivate and sustain behaviour change. In CBSM, McKenzie-Mohr (2011) states that interventions which focus on community-level, direct and personal contact with people will be more effective than social marketing interventions seeking relatively large-scale change. Thus, he advocated the role of social influence and differentiated between social norms and "social diffusion", as "building community-support" and "speeding adoption" for new behaviour, respectively.

Insights on the significant role of social context and midstream interventions is provided in few studies in public health examining behaviours such as smoking (e.g. Luca et al., 2019) and alcohol consumption (e.g. Kamin and Kokole, 2016). Nonetheless, it is stated that social marketing research on targeting "higher-levels" beyond downstream to create more supportive social contexts to "micro-level" (i.e. individuals) behaviour change is still "scarce" (Luca et al., 2016). This research will contribute to this gap by exploring the social dimension of water conservation, as previously discussed (see section 2.1.3, p. 29). This would help identify aspects in the social context that contribute to shaping water consumption behaviour and hence, could be targeted by mid-stream social marketing interventions.

Furthermore, the relevance of social context to augment the value proposition of social marketing interventions was explored by a few previous studies in the literature. It is suggested that "meso-level" interactions and collaborations among "community networks" facilitate individual behaviour change and enhance the durability of interventions (Luca et al., 2016). Similarly, Wood (2017) emphasised the role of "conversations" and "supportive relationships" in value co-creation. Moreover, partnerships with "for-profit organisations" – a "neglected" stakeholder at the meso-level, is proposed as a potential tool to contribute to the success of interventions (French et al., 2017).

These arguments indicate that better understanding of aspects that contribute to value creation, as well as, value "destruction" or "devaluation" is crucial for "maintenance" of behaviour change (Zainuddin et al., 2017). The notion of value and its different types in social marketing is discussed next.

2.2.6 Beyond exchange: Value-in behaviour

McKenzie-Mohr and Smith (1999) argued that it is essential to understand the target audience's perceptions of cost and benefit as people are "naturally" more predisposed to engage in actions that have high benefits and low cost. However, the notion of trade-off between costs and benefits (i.e. exchange) does not usually apply to social marketing, as will be illustrated next.

The concept of exchange in marketing refers to the interchange of goods, services or resources between two or more parties *in return for* benefits that would satisfy their needs (Gordon, 2013). Thus, it is based on the idea of utility and the assumption that individuals assess value of a given behaviour based on a rational cost-benefit analysis and hence, is referred to as "value in exchange" (Gordon et al., 2018). Such emphasis on cost-benefit analysis of social marketing offerings was criticised as it perceived the target audience as "rational-economic beings" (Peattie and Peattie, 2003).

This perspective could be quite challenging to apply in social marketing because of the unique nature of costs and benefits associated with the promoted behaviours. In many cases behaviour change is inherently costly, in terms of requiring the target audience to "give up" certain things to engage in the desired behaviour (Noble and Basil, 2011). In social marketing, Wood (2008) indicated that interventions encourage the target audience to change their current behaviour – which they might actually enjoy and see no need to change, with another less attractive alternative. In addition, behaviours promoted by social marketing usually require "sustained" effort over a long period of time (Hastings, 2007). Such long-term commitment makes pro-social behaviours more complex (Gordon et al., 2018). Therefore, social marketing offerings are likely to be perceived as inconvenient, "hard work" and eventually, as "inherently unattractive" (Hastings, 2003). Similarly, in the PEB literature it is acknowledged that engaging in PEBs usually involves "personal sacrifices" (Niu et al., 2023). For instance, in the water conservation context, Perren and Yang (2015) noted that taking shorter showers might provide a monetary benefit in return by reducing utility bills (i.e. value in exchange). However, it is also perceived as an "unpleasant" act. Therefore, in

this case a typical value exchange and cost-benefit trade off would not be the most appropriate way to communicate value with target audiences.

Consequently, it is argued that interactions in social marketing "often go beyond a simple exchange" (Gordon et al., 2018, p. 57). In addition, Peattie and Peattie (2003) argued that it would be a "mistake" to believe that a form of exchange must take place in any social marketing intervention. Moreover, Wood (2008) stated that exchange in social marketing is not a "transaction between two parties" (p. 79). Alternatively, he added that if exchange must occur then, it is a behaviour that is being "exchanged" with another more desirable behavioural alternative. Therefore, the typical assumption that value is realised only through exchange would have limited applicability in social marketing (Peattie and Peattie, 2003). Hence, a relatively new concept of "value-in-behaviour" has been proposed in social marketing literature by French and Gordon (2015) to reflect the embedded value of the behaviour itself rather than what it offers in return. Value in behaviour is discussed in more detail next.

Value-in behaviour

According to Gordon et al. (2018), the typical notion of exchange or "value-in exchange" is not suitable for promoting pro-social behaviour. He noted that consumers do not only perceive value in exchange but also there is a value that is realised by the performance of the behaviour. In their study examining energy consumption behaviours, they concluded that consumers who perceived their behaviours as of "high-value" were more likely to engage in energy efficient behaviours such as unplugging cell phone chargers when not in use. In addition, they argued that the notion of "value in behaviour" would help social marketers gain a better understanding of how to influence and promote other socially beneficial behaviours. Similarly, a study by Butler et al. (2016) examined the value-in behaviour concept in energy consumption with a focus on embedded value in the actual performance of energy efficient behaviours (e.g. turning off lights when not in use). They found that participants associated the performance of energy efficiency behaviours with different types of value such as economic, functional, and ecological value. These findings indicate that perceived value-in behaviour would have a potential to explain other PEBs beyond energy consumption. Nevertheless, there is a lack of studies exploring the notion of value in behaviour in other environmental behaviours, except for one recent study on plastic waste (Muposhi et al., 2023).

This suggests that further inquiry to better understand audience perceptions of value-in behaviour is needed. Gordon et al. (2018) noted that the existing literature has examined the impact of positive consumer perceptions of value-in exchange however, the effect of value-in behaviour has not been sufficiently covered. They stated this needs to be addressed and recommended that future research should test the concept in other areas such as ethical consumption.

This research will contribute to this research gap by exploring the perceptions of value-in water conservation of households in the UK and Egypt. A special focus is given to exploring whether water conservation implies a moral value that would encourage behaviour change, a perspective that has not been proposed before. The potential for "societal value" as a value-in behaviour was proposed by French and Gordon (2015), however, was not addressed through the lens of morality in any previous studies. Consequently, to better capture the "societal" aspect and value beyond oneself, two well-established theories of moral behaviour are used as a reference in this study. The Issue-Contingent Model (Jones, 1991) and Norm Activation Theory (Schwartz, 1977) will provide useful frameworks to guide the exploration of water conservation from a moral perspective. The moral perspective and more on these theoretical models is discussed in detail in the next section (section 2.3, p. 56).

It is worth noting that a review of theories utilised in social marketing revealed that none of these theories had been used before in the social marketing domain. Only one study adopted the NAT model and shows evidence that it helps enhance interventions targeting waste sorting behaviour (Setiawan et al., 2020). Therefore, incorporating these theories in this study offers a theoretical contribution to the social marketing domain. An overview of the theories used in social marketing is discussed next.

2.2.7 Theory in Social Marketing

As previously noted, utilising theory is one of the core benchmarks of social marketing. Theories provide a framework that guide social marketers in the design and execution of social marketing interventions (Rundle-Thiele et al., 2019). It has been argued by Truong (2014) that although social marketing is not considered a theory, its strategies are based on various theories that guide the development of interventions by identifying the variables that might influence behaviour change. It has been noted that utilising behavioural theories in developing social marketing interventions is an essential aspect to their success (Spotswood

and Tapp, 2013). In addition, it was stated by Truong (2014) that theories could also be used to inform the design of communication messages, help in audience segmentation as well as guide the evaluation of interventions effectiveness. Thus, transforming the theoretical constructs into an applicable framework is crucial for developing persuasive and effective interventions (Stead et al., 2007).

Despite the importance of theories, they remain "underused" in social marketing (Willmott and Rundle-Thiele, 2022). Several studies are not based on a theoretical foundation and even if they are, it is noted that theories used to inform behavioural interventions are not always reported (Lefebvre, 2000; Luca and Suggs, 2013; Truong, 2014). Some of the most common theories used to inform the development of interventions that were reported in previous studies (e.g. Rundle-Thiele et al. 2019; Truong, 2014; Spotswood and Tapp 2013; Stead et al., 2007) are briefly discussed next.

- **Health Belief Model (HBM):**

Developed by Rosenstock et al. (1988) this model highlights the role of communicating information about the risks and benefits of a behaviour to change the knowledge, attitudes, and intentions of the target audience. Its main constructs are: perceived susceptibility, perceived severity, perceived benefits, perceived barriers and cues to action. It has been popular in social marketing as most of the interventions have mainly been applied in the public health context (Gordon, 2012).

- **Theory of Reasoned Action (TRA)/Theory of Planned Behaviour (TPB):**

The TRA was proposed by Ajzen and Fishbein (1980) based on the assumption that behaviour is the outcome of intentions, the stronger the intention, the more likely an individual is to engage in certain behaviour. In the TRA, intention is determined by attitudes and subjective norms associated with a behaviour. Later, Ajzen (1991) expanded TRA to TPB to include self-efficacy or the "perceived behavioural control" as another determinant of intention.

- **Social Cognitive Theory (SCT):**

Developed by Bandura (1982) SCT is based on the proposition that behaviour is influenced by an interaction between cognitive, interpersonal factors and environmental factors. One of its core concepts is "observational learning" in which individuals learn by watching actions and consequences of other people's behaviour.

- **Stages of Change/Trans-Theoretical Model of Change (TTM):**

Proposed by Prochaska et al. (1993) this theory/model suggests that individuals go through a series of stages to achieve behaviour change. There are six stages of change starting with "Pre-contemplation", in which the individual has no intention to change their behaviour in the near future, and ending with the "Termination" stage in which the individual is in full control of their behaviour and are unlikely to rebound to the past behaviour. Based on this theory Andreasen (2002) argued that interventions must be "tailored" to match the stage where the target audience is located.

- **Diffusion of Innovations:**

This theory was developed by Rogers (1976) who proposed that in adopting a new behaviour, people could be classified into 5 types: innovators, early adopters, early majority, late majority or laggards. Each group has different motivations for adopting a new behaviour.

Some drawbacks in these theories have been pointed out in previous research. For instance, Rundle-Thiele et al. (2019) noted that in most of the common theories used to guide social marketing practices, attention is mainly focused on the way people "think, feel, and act". They added that such theories usually examine "individual psychological predispositions" such as attitudes, perceptions and behavioural intentions. Moreover, Spotswood and Tapp (2013) indicated that such an "individualistic" perspective might cause theories to be "limited in scope" by over-emphasising the role of individuals' attitudes and cognitive decision making while ignoring the cultural factors that might influence behaviours. Therefore, there have been calls in the literature to broaden the scope of theories used in social marketing. For instance, Rundle-Thiele et al. (2019) argued that since theories used are "overlooking" the impact of external factors there is a need to expand to include social and environmental factors; that may hinder or support behaviour change. Few studies explored the applicability of context oriented theories such as Bourdieu's habitus theory (Bourdieu, 1990) and practice-theory (Shove et al., 2012). For instance, Bordieu's theory has been found to help acknowledge and explain the "cultural mechanisms" that lead to lack of physical activity (Spotswood and Tap, 2013). Similarly, it helps understand the "interplay between structures and agency and how change emerges through processes mediated by collaboration of multiple actors" in an anti-smoking intervention (Luca et al., 2019, p. 1389). Furthermore, a practice-based approach is emerging in recent social marketing studies. For instance, the potential of integrating a practice-oriented lens is advocated to promote physical activity in

schools (Spotswood et al., 2021) and physical activity of people with intellectual disabilities (Makris and Kapetanaki, 2022).

From the above arguments, it is noted that employing theories that incorporate the influence of external/contextual aspects has a great potential – yet are still insufficient, in the social marketing domain. As previously discussed, social influence has the potential to better understand water conservation (see section 2.1.3, p. 29) and its importance is emphasised in social marketing (see section 2.2.5, p. 49). Therefore, one of the aims of this study is to explore the social dimension of water conservation, especially social norm perceptions. Furthermore, in this study the potential role of internal motives that guide behaviour regardless of social norms is acknowledged, to account for the socially-invisible nature of household water consumption. The Norm Activation Theory (NAT) (Schwartz, 1977) and Issue-Contingent Model (Jones, 1991) are used to capture internal moral dimensions. These theories could help us to understand the mechanisms through which individuals assess/recognise the broader societal impact of their behaviour from a moral perspective. The moral perspective proposed in this study is discussed in more detail next (section 2.3).

2.3 A Moral Perspective

This section will introduce the moral perspective by providing an overview of the relevance of morality and ethics in the PEB context and to water conservation . Moreover, it will discuss theories of moral behaviour and illustrate their potential in explaining water conservation. Finally, the significance of social influence in moral decision making is explained.

2.3.1 Morality and PEB: A background

The notion that human-nature relationships should be governed by moral guidelines were first introduced in the 1970s when the concept of "environmental ethics" emerged as a sub-discipline of philosophy (Palmer et al., 2014). According to Shrader-Frechette (2005), its "root" could be traced back to when the "degradation" of the environment caused by human inventions (e.g. chemical pesticides, nuclear power) came to light. Consequently, he added, early scholars started expanding the "boundaries" of morality beyond humans to include other aspects such as soil, water, plants and animals. In addition to the consequences on the environment, a core concept in environmental ethics is the "intrinsic value" of the environment as an entity that "ought to be valued", "worthy of respect", and has "value in its own right" (Palmer et al., 2014). It is worth noting that the word ethical and moral are used interchangeably in this study, in line with previous literature (e.g.Treviño et al., 2006; Jones, 1991).

In the PEB literature, it is argued that sustainable behaviour is "morally embedded" and driven by moral considerations, as their impact goes beyond the individual/self-interest (Rex et al., 2015). In the same vein, Culiberg and Bajde (2013) argued that the decision to engage in PEBs such as recycling, buying eco-friendly products, or minimising the consumption of non-renewable resources can be considered as an "ethical dilemma". They added that "moral evaluations" occur in all of these cases because the impact of behaviour will not only affect the individual but also other people, and the environment as a whole.

Therefore, some studies examined aspects relevant to morality in PEB. For instance, Gatersleben et al. (2019) emphasised the significance of moral motives and indicated that a person's "moral identity"[9] is positively related to buying fair trade products. In addition, a study by Culiberg and Bajde (2013) concluded that recycling could be explained by the

[9] Moral identity in terms of self-identifying as "frugal" with "a deep desire to avoid waste" (Gatersleben et al., 2019, p. 43).

constructs of Jones's (1991) moral decision-making model. Furthermore, empirical findings indicate that PEB in general is "a function of moral considerations" (de Groot and Steg, 2009, p. 62). In the water conservation context, few studies examined "moral obligation"[10] and reported mixed findings. For instance, while it was found to positively impact water conservation behaviour (Han and Hyun, 2018; Dolnicar et al., 2012), it was not associated with water conservation intention (Lowe and Lowe, 2015). Despite these few studies including a moral construct to help explain water conservation, no previous studies acknowledged water conservation as a moral behaviour. In this study, one aim is to understand individuals' perceptions and the meanings they hold for water conservation to explore whether it is perceived only as a PEB, or also as a moral behaviour. This will be illustrated next (Section 2.3.2).

In the PEB literature, there is a lack of previous qualitative studies that have explored the meaning of morality from an individual's perspective. Nonetheless, in some studies that adopted a qualitative methodology to understand PEB a moral imperative is frequently uncovered. For instance, responding to climate change is found to be perceived as a "moral responsibility" (Miller, 2018), food waste is reported to have not only environmental but also "moral implications" (Bishop and Megicks, 2019), and sustained action to maintain biodiversity was prevalent in individuals who reported an "internalised moral standard" in favour of nature (Williams et al., 2021). This calls for a more in-depth understanding of these moral implications of PEB and this study contributes to this research gap.

2.3.2 Is water conservation a moral issue?

A behaviour is considered to be "morally relevant" when one's self-interest and the interest of others are in conflict (Kaiser et al., 2005) or if a person's actions, when freely performed, have consequences on others, either harm or benefit (Jones, 1991). This conceptualisation could apply to water as only three percent of the water on earth is freshwater, one percent is accessible and more than seven billion people worldwide need this one percent to survive (Clements, 2016). Therefore, water is considered to be a "public good" (Johnson and Handmer, 2002). Russell and Fielding (2010) argued that water is a "collective resource" which is negatively affected by individuals' overuse for their own personal purposes and self-interest. In addition, they argued that this could reflect a "tragedy of commons" case (Hardin, 1968) in which a "shared resource is depleted through motives of

[10] Moral obligation is a "personal internal standard" to act in a certain way (Han and Hyun 2018, p. 89).

self-interest" (Jorgensen et al., 2009, p. 229). Hence, when individuals "harvest" from a common pool (i.e. available water resources) to satisfy short-term personal needs, they ultimately cause depletion of such a resource and affect its long-term sustainability and availability (Russell and Fielding, 2010). Similarly, an early study by Lam (1999) indicated that water conservation can be perceived as a "social dilemma" because "using water liberally brings personal comfort and convenience, but is against public interests" (p. 1061).

These arguments suggest that water conservation could be addressed from a moral perspective, in terms of the potential harm/benefit that overconsumption/conservation could have on others. However, individuals' perceptions about the morality of water conservation and their perceptions about the impact of their consumption on others is lacking in the literature. As previously discussed (section 2.1.3, p. 26) beliefs are one of the main antecedents of water conservation (Russell and Fielding, 2010). While perceptions about the morality of water conservation could fit under beliefs, none of the previous studies that examined the influence of beliefs on water consumption included a moral construct. Examples of beliefs examined in previous studies are general environmental beliefs (e.g. humans are abusing the environment) or water-specific beliefs (e.g. water is a limited/unlimited resource that should be conserved/exploited by humans) (e.g. Corral-Verdugo et al., 2003) (see section 2.1.3, p. 26 for a review of antecedents of water conservation).

Therefore, to contribute to addressing this research gap, this study will aim to explore individuals' perceptions about morality in the context of water conservation. A theoretical framework that explains moral behaviour is therefore needed to guide the inquiry. Theories in PEB and ethical decision-making literature are discussed next.

2.3.3 Theories of Moral behaviour

One of the main benchmarks of social marketing highlights the significance of integrating theory to inform the design of interventions (see section 2.2.2, p. 40). In the PEB literature, it is stated that "environmental psychology" has a significant role in designing effective behavioural interventions (Steg and Vlek, 2009). According to Klöckner (2013), the most commonly used theories to explain PEBs in environmental psychology are: the Theory of Planned Behaviour (TPB) by Ajzen (1991), the Norm-Activation-Theory (NAT) by Schwartz (1977) and the Value-Belief-Norm Theory (VBN) by Stern et al. (1999). Each of these theories has different assumptions regarding the motivations for prosocial behaviour

(Turaga et al., 2010). For instance, the TPB assumes self-interest and rational choice, while NAT and VBN focus on values and moral norms (Kaiser et al., 2005).

Despite its popularity, TPB has some drawbacks. Firstly, one of its core assumptions is that attitudes are directly linked to intentions and eventually, intentions are translated into actual behaviour (Ajzen, 1991). However, in the PEB context attitudes and intentions are not always consistent with behaviour (Rettie et al., 2014) and an "attitude-behaviour gap" has been reported by previous studies (e.g. Barr and Gilg, 2006). In addition, an "intention-behaviour gap" is reported. For instance, a meta-analysis by Bamberg and Möser, (2007) of 57 studies examining various types of PEB indicated that intentions account for only 27% of the variance in self-reported pro-environmental behaviour. Similarly, it is stated that intentions were not correlated with neither actual reduction in energy consumption (Jackson, 2005), nor water conservation behaviour (Fielding et al., 2012). Second, TPB is argued to be weak in explaining consumer "ethical" intentions (Culiberg, 2014) because it neglects moral considerations (Kaiser et al., 2005). Therefore, it is not the focus in this study.

In this study, because a moral perspective is adopted the focus will be on the theories that examine the moral and normative dimensions of PEB. According to Jackson (2005) there are four theories that "explicitly" recognize the role of moral and normative aspects – 'ecological-value theory'(Dunlap and Van Liere, 1978), the Norm-Activation theory (NAT) (Schwartz and Howard, 1981), Value-Belief-Norm Theory (VBN) (Stern et al., 1999) and Focus Theory of Normative Conduct by Cialdini et al (1990). It should be noted that the VBN theory extended the NAT by linking it to the ecological-value theory. It is argued that NAT and VBN theories are the most coherent, well-accepted, and empirically supported theories of moral motivation (Turaga et al., 2010) thus, they are discussed next in more detail.

In a series of articles, Shalom Schwartz and his colleagues developed NAT as a model for moral decision making to explain individuals' altruistic helping behaviour. The basic assumption of their theory is that people help others if they "feel morally obliged" to do so, which they referred to as "activated personal norm" (e.g. Schwartz, 1977; Schwartz and Howard, 1981). Hence, personal norms are "feelings of moral obligation" that can directly influence behaviour (Godin and Sheeran, 2005). It should be noted that the concept of personal norms here is different from subjective norms in the TPB. Subjective norms reflect the individuals' perception about how their significant others expect them to behave or what they believe is appropriate in a given situation (Ajzen, 1991). On the other hand, personal

norms reflect the individuals' "internalised values…regardless of external reinforcements" (Schwartz, 1977, p. 226) and their personal perceptions of the "morality" or appropriateness of a specific behaviour (Jackson, 2005). Therefore, it is triggered by "an internal (personal) process rather than external (social) processes" (Han and Huyn, 2018, p. 89).

The fundamental proposition of the NAT is that an activated personal moral norm triggers prosocial behaviour. According to Schwartz (1977), two conditions are crucial for the activation of personal norms. First, the individual must be aware that their action has consequences for the welfare of others, referred to as "awareness of consequences" (AC). Second, the individual must feel a personal responsibility to undertake that action referred to as "ascription of responsibility" (AR). Stern et al. (1993), developed the VBN theory and extended NAT by arguing that in addition to altruistic values[11], "egoistic" values of self-interest and "biospheric" values toward other non-human species trigger pro- or anti-environmental action. Moreover, Stern (2000) added that personal norms are not only activated by ascribed responsibility and awareness of the consequences suggested by Schwartz, but also by "ecological worldview" which reflects an individual's environmental concern or orientation (Dunlap et al., 2000). According to the VBN framework, a person's ecological worldview determines their awareness of consequences (AC) and self-ascribed responsibility (AR) to act, which then leads to activating that person's sense of obligation to act (i.e. personal norms) (Kaiser et al., 2005). Therefore, it was argued by Turaga et al. (2010) that VBN theory is simply an extension of the norm activation theory because in addition to NAT's altruistic values, it incorporates egoistic and biospheric value orientations. Hence, they added that VBN acknowledged that the AC and AR beliefs are not only shaped by personal (i.e. altruistic or egoistic) values but also by general beliefs about human–environment interactions (i.e. biospheric) or "ecological worldview".

The altruistic basis in NAT is closely related to the moral perspective adopted in this study, because water conservation is addressed as a moral behaviour – not solely as a PEB. NAT's conceptualisation of altruistic acts as "intended to benefit others, regardless of material or social outcomes" (Schwarts and Howard, 1984, p. 229) matches how water conservation is addressed in this study. Therefore, NAT is used as a reference in this study to help in understanding water conservation and expand the application of NAT in the PEB

[11] Altruism is a "self-sacrificial act" motivated by a "concern for the well-fare of others" (Schwartz and Howard, 1984, p. 229).

literature. A discussion of NAT in PEB literature and how it would help explain water conservation is provided next.

Norm-Activation Theory in PEB

NAT was originally applied to explain altruistic behaviour but has been extended to pro-social behaviour in general, including PEB (Turaga et al., 2010). It is argued that NAT is the most influential model in the explanation of environmental behaviour (Culiberg and Bajde, 2013). Previous studies which have applied NAT to explain PEB have reached the conclusion that pro-environmental behaviour is influenced by its variables (Klöckner, 2013). Therefore, it is well-accepted and extensively applied to explain a variety of PEBs such as littering, household energy conservation and recycling (Turaga et al., 2010).

However, there is a lack of studies that employ NAT in the water conservation context. In this study it is suggested that NAT could provide a useful framework for exploring water conservation from a moral perspective. It also explores whether t NAT constructs would help understand the above mentioned "gap" between attitudes/intentions and actual behaviour as they take into consideration the role of an individual's sense of responsibility or "ascribed responsibility". One of the reasons proposed to explain such a gap is the notion of "consumer responsibility" which is under-researched in the marketing literature (Wells et al., 2011). It was noted by Luchs et al. (2015) that positive attitudes towards a behaviour would not be sufficient if the individual does not feel a "sense of responsibility" to change their consumption behaviour. They added that it provides valuable insights on how "collective social issues" could be transformed into a personal responsibility.

Furthermore, personal norms – the core construct of NAT, is found to be the most significant predictor of PEB in a recent meta-analysis (Helferich et al., 2023). It has been argued that intentions based on personal moral norms better predict behaviour than intentions based on attitudes (Godin et al., 2005) because personal norms are relatively stable over time – compared to attitudes, and hence, their effect on behaviour is stronger (Klöckner, 2013). The significant influence of personal norms is reported in various PEBs. For instance, a study by Kaiser et al. (2005) reported that personal norms accounted for 64% of people's general conservation behaviour and thus, argued that a person's sense of moral obligation is the ultimate predictor of PEB. Moreover, in green transportation, Bamberg and Schmidt (2003) indicate that there is a significant negative relationship between personal moral norms and car use behaviour.

Therefore, better understanding of NAT constructs in water conservation would provide implications for social marketing interventions to achieve more durable results. It is worth noting that NAT is insufficiently utilised in previous social marketing (see section 2.2.7 p. 52), especially in addressing PEBs. One study on waste sorting behaviour by Setiawan et al. (2020) integrated NAT with TPB and concluded that it provides a "more comprehensive perspective" for social marketers.

The above theories do not explain how individuals assess the morality of a behaviour or what factors are necessary for a behaviour to be identified as moral. In an attempt to better understand these aspects, a well-established theory in the moral-decision making literature is used as a reference in this study and discussed in the next section.

Moral decision-making theories

Ethical decision-making theories were originally developed to explain moral behaviour in business contexts. According to a review of the ethical decision-making literature in such domains (Craft, 2013; O'Fallon and Butterfield, 2005), the most supported and widely used theories are Rest's model (1986) and its extension by Jones (1991). Rest (1986) argues that in an ethical situation individuals go through four stages: moral recognition, moral judgement, moral intent and finally, moral behaviour. This model was criticised by Jones (1991) as it is individual-focused and ignores the characteristics of the moral issue, which implies that an individual will behave in the same ethical/unethical manner regardless of the severity of the ethical situation at hand (e.g. stealing office supplies or insulting a colleague). Thus, he extended Rest's model to be an "issue-contingent model" and proposed the "moral intensity" construct to reflect the significance of the moral issue in hand. Moral intensity reflects the "perceived moral significance" of a certain issue (Barnett, 2001) so it represents the characteristics of a moral issue (Culiberg, 2014). According to Jones (1991), moral intensity has six "possible" components or determinants that reflect the characteristics of the moral issue and are summarised as follows:

- Magnitude of Consequences is the sum of the harms (or benefits) done to victims (or beneficiaries) of the moral act in question.
- Probability of Effect is the probability that the act in question will actually take place and will actually cause the harm (benefit) predicted.
- Social Consensus is the degree of social agreement that a proposed act is evil (or good).

- Temporal Immediacy is the length of time between the moral act in question and its consequences (shorter length of time implies greater immediacy).
- Proximity is the feeling of nearness (social, cultural, psychological, or physical) that the moral agent has for victims (beneficiaries) of the evil (beneficial) act in question
- Concentration of Effect is the number of people affected by an act of given magnitude

The addition of moral intensity made Jones's (1991) framework "the most comprehensive model of ethical decision making" (Culiberg and Bajade, 2013). Moreover, there is strong evidence of the effectiveness of moral intensity in enhancing different ethical decision-making aspects (i.e. moral recognition, judgement, intent and eventually, moral behaviour) reported in the business context (Craft, 2013; O'Fallon and Butterfield, 2005). However, previous literature does not provide an in-depth understanding of the meanings of morality from individuals' perspectives nor how the different decision-making stages are shaped. This could be attributed to the fact that ethical decision-making literature is "dominated" by quantitative and positivistic approaches (see review by Procópio, 2022). The few studies that employed qualitative methods in an organisational context have uncovered useful insights to better understand underlying factors contributing to issues such as bullying in the workplace (e.g. Zedlacher and Salin, 2021) and leaders' moral judgement (Heyler et al., 2016). This indicates that capitalising on qualitative methods would provide a more in-depth understanding of morality from individuals' perspectives. This is in line with calls in ethical decision-making literature for more "qualitative investigation" of the "meaning" of ethical/unethical (Heyler et al., 2016). Moreover, Procópio (2022) calls for "methodological renovation" to gain a deeper understanding of the "reasons" behind (un)ethical decision-making.

Nevertheless, Jones's model has not been commonly used in consumer settings although it is argued that there is considerable "potential for applying well-grounded general ethics theories to study eco-friendly consumer practices" (Chan et al., 2008, p. 477). This is a research gap that requires further investigation. The potential to expand the scope of moral intensity beyond business ethics to explain moral behaviours in a consumer context is addressed in a few studies, discussed next.

In the consumer context, most previous studies that have examined moral intensity have addressed consumers' ethically questionable/ negative behaviour while there have been limited studies on ethically positive behaviour (Culiberg, 2014). For instance, studies on

unethical behaviours such as counterfeiting and internet piracy have found a negative correlation between moral intensity and consumer intention to perform such immoral behaviours (e.g. Chen et al., 2009; Chiou et al., 2005). Meaning that, as the perception of the moral significance of the unethical issue increases, the probability to engage in such behaviour will decrease. In the PEB context, ethical-decision making theories are not commonly utilised, as a very limited number of studies examine PEB from an ethical perspective (Hong and Kang, 2019). Hence, few studies have examined the influence of moral intensity on PEB. The following table summarises previous studies that have included moral intensity to explain different PEBs.

Table 2.7: Moral intensity in PEB literature

Author	Country	PEB	Main Findings
Hong and Kang (2019)	South Korea	Purchase of sustainable textiles	Moral intensity had a significant impact on sustainable consumer purchase behaviour.
Zou and Chin (2019)	Hong Kong USA	Recycling and using reusable shopping bags	Moral intensity strengthens ethical judgement of idealistic but not relativistic individuals.
Rex et al. (2015)	Australia	Sustainable behaviour and purchasing.	Moral intensity is positively related to sustainable behavioural intentions.
Culiberg (2014)	Slovenia	Recycling	There is a positive relationship between higher perceived moral intensity and favourable attitudes. The relationship between moral intensity and intentions is mediated through attitudes.
Culiberg and Bajde (2013)	Slovenia	Recycling	Moral intensity is a significant predictor of moral recognition and judgement which in turn positively influences recycling intentions.

Mäkiniemi and Vainio (2003)	Finland	Climate friendly food choices	Modified the determinants of moral intensity proposed by Jones (1991) into three rather than the six aspects: perceived seriousness of consequences, social consensus and proximity. Probable seriousness of consequences and proximity were significant predictors of intention.

Studies in the above table reported mixed findings regarding the relationship between moral intensity and PEB intentions. While some studies found a positive direct relationship (e.g. Hong and Kang, 2019; Rex et al., 2015), other studies found that the relationship is mediated through attitudes (Culiberg, 2014), or moral recognition and moral judgement (Culiberg and Bajde, 2013). Furthermore, it is noted that none of the previous studies examined moral intensity in the context of water conservation. By adopting a moral perspective, this study aims to contribute to this research gap by exploring and understanding the notion of morality to uncover the perceived moral intensity of water conservation.

This research explores whether Jones (1991) theory would help better understand NAT, as moral intensity could be an additional factor to activate personal norms. In other words, perceptions of moral significance of an issue (i.e. moral intensity items) could have a role in activating feelings of moral obligation (i.e. personal norm). This potential relevance between moral intensity and personal norm has not been explored before, although –as previously mentioned, moral intensity is essential for recognition of moral issues (Jones, 1991). Perceptions about the moral intensity and significance of an issue could contribute to understanding the "defensive denial" of need and/or responsibility to act that deactivate personal norms noted by Schwartz (1977). This proposition is supported by a study that indicated that consumers with higher perceptions of moral intensity eventually reported less "defence mechanisms" or neutralisation (Shah and Amjad, 2017). An early study on neutralisation by Sykes and Matza (1957) noted that individuals engage in denial "techniques" to rationalise violating a normative behaviour. It has been argued that such techniques originate from an underestimation or a "biased interpretation" of moral intensity components associated with a given situation (Chatzidakis et al., 2007).

Therefore, this study will explore moral intensity in the water conservation domain, how its variables help to better understand the perceived significance of water conservation, and associated personal norms. One aspect that is also relevant to the discussion about morality and personal norms is social norms, which is discussed in more detail next.

2.3.4 Social influence and morality

Similarly to the water and social marketing literature (see p. 29 and p. 49), the role of social aspects in moral-decision making is emphasised. Therefore, it is discussed in this section in more detail. According to reviews of ethical-decision making literature, there are three main antecedents to the moral decision-making process: individual, organisational and moral intensity aspects (Craft, 2013; O'Fallon and Butterfield, 2005).

In business ethics, organisational aspects account for context-related dimensions that could eventually shape moral behaviour. For instance, O'Fallon and Butterfield (2005) stated that "ethical climate/culture" which includes formal (e.g. policies) and informal (e.g. norms) systems have an impact on moral conduct. Furthermore, they stated that "unethical behaviour is passed from the reference group to the individual" (p. 401) and hence, called for future research to examine the effect of "peer influence" as a contextual variable on moral behaviour. In a later review of the literature by Craft (2013), it was argued that the impact of individual's "perceptions" about ethical culture and norms in an organisation are as influential as actual culture. For instance, it is stated that in some cases individual perceptions about the number of people who agree with their ethical choices could be inaccurate and their behaviour could be misguided by "false consensus bias" (Flynn and Wiltermuth, 2010). Thus, Craft (2013) stated that future research could explore how to enhance perceptions of ethical culture in organisations. Furthermore, Zou and Chan (2019) examined the influence of contextual aspects in terms of an "Attention to Social Comparison Information" (ATSCI) construct to measure how individuals use "situational cues of social appropriateness" (p. 117) to guide their behaviour. An interesting finding was reported when ATSCI was included, that individuals eventually "make favourable ethical judgements … to present a positive moral self-image and gain social approval" (Zou and Chan, 2019, p. 117).

Despite different contexts, these arguments call for exploring social norms perceptions associated with water conservation. In the PEB literature, although the effect of social norms is highly supported (see meta-analysis by Bergquist et al., 2019), there is a lack of studies that examine the impact of social norms on PEB from an ethical-decision making

perspective. Few conceptual papers addressing climate change as a moral issue have acknowledged the power of social norms in enhancing the morality of such issues. For instance, Markowitz and Shariff (2012) argued that highlighting the positive social norms (i.e. favourable behaviours that others are doing such as cycling or taking public transportation) in communication is one of the factors that could enhance the recognition of climate change as a moral issue. Furthermore, Täuber et al. (2015) called on future research to develop "moral convictions" towards an issue by communicating relevant social norms. They added that "socially-engineering moral convictions" (p. 461) could evoke "conformity" and "trigger" action in individuals who perceive PEB as a matter of "mere preference" and lack relevant moral values.

What if social norms are negative? would individuals comply with a negative social norm? According to Schwartz (1977), personal norms reflect "self-expectations" about how one should behave are usually derived from socially shared norms and eventually, "internalised". Similarly, Bamberg and Möser (2007) argued that "social norms directly contribute to the development of personal moral norms" (p. 16), as they act as a standard of appropriate behaviour in a specific context. Schultz et al. (2007) stated that norms provide a "standard" against which people measure the appropriateness of their behaviour. When an individual "internalises" these standards they could shape their personal norms (Bamberg and Möser, 2007). In this study, one of the aims of adopting a moral perspective is to better understand social influence in water conservation by exploring the role of personal norms and moral intensity in regulating behaviour in a situation where negative social norms are prevalent.

2.4 Summary and Research Questions

This review of literature indicated that previous studies have not reached a consensus on antecedents of water conservation behaviour, which shows that water conservation is indeed a complex behaviour (Salas-Zapata et al., 2023). However, many of the previously examined individual variables (e.g attitudes, socio-demographics:gender, age, income) do not capture this complexity and hence, reported limited effectiveness in predicting water conservation behaviour. This pattern suggests that further underlying variables are shaping water consumption behaviour and need to be uncovered. This research aims to gain a broader and in-depth understanding of water consumption and uncover any relevant "latent" determinants of water conservation that might have been overlooked in previous literature (Cominola et al., 2023). Building on the extant literature, the first research question is:

RQ1: How do households perceive water conservation?

RQ1.1: How do households consume water?

RQ1.2: How do they perceive their water consumption pattern?

RQ1.3: What are their water-specific beliefs and knowledge?

Better understanding of these questions would help interventions achieve sustained behavioural change rather than short-term results and a "rebound" effect reported in previous studies (e.g. Nemati et al., 2023; Jorgensen et al., 2009). Moreover, there is evidence on the limited short-term effectiveness of economic measures (e.g. García-Valiñas and Suárez-Fernández, 2022) which suggests a move beyond the typical cost-benefit perspective. Thus, this study explores water conservation from a moral perspective and not only as a PEB, in line with environmental ethics arguments (e.g. Palmer et al., 2014). Few previous studies argued that water is a "collective resource" (Russell and Fielding, 2010), shared among members of a society and hence, individual water consumption eventually impacts the water available for others. This suggests that water consumption could be perceived as a "social dilemma" (Lam, 1999) because as a "shared resource", it is "depleted through motives of self-interest" (Jorgensen et al., 2009, p. 229). However, literature review has shown that there is a lack of studies that address water conservation from a moral perspective, in terms of the potential impact of one's behaviour on others. To contribute to this gap, this study explores the morality of water conservation by using NAT (Shwartz, 1977) as well as the issue-contingent model (Jones, 1991) – a well-established theory in moral-decision making

literature employed for the first time in water conservation context, to guide the inquiry and help understand households' morality perceptions. Therefore, the second research question is:

RQ2: How can perceptions about morality (i.e. perceived moral intensity) of water conservation help in understanding water consumption behaviour?

RQ2.1: How could NAT constructs (personal norms, awareness of consequences and ascribed responsibility) help capture households' water consumption from a moral perspective?

Exploring these questions will help understand if the notion of morality is relevant to water conservation. The determinants of moral intensity construct – as a core construct of the issue-contingent model (Jones, 1991), was used to guide the inquiry and help understand the extent to which an internal moral compass guides behaviour, especially when external factors are unfavourable. The external influence of social context and social norms on behaviour is acknowledged in water conservation, social marketing and moral behaviour literature (see p. 29; p. 49; p. 66). The need for conformity and fear of social sanctions were among the main reasons that explain why social influence is significant (e.g. Rettie et al., 2012; Cialdinin et al., 1990; 2006). However, there is a lack of studies that provide understanding of the mechanism through which social norms are interpreted by individuals and especially, why/how it still works when the behaviour is performed in a private setting (i.e. not socially visible). This research aims to contribute to this gap and explore social norms perceptions and their relevance in understanding private behaviour like household water conservation. Therefore, the third research question is:

RQ3: How can social norms perceptions help in understanding water consumption behaviour?

Social influence is acknowledged and widely utilised in social marketing, especially, community-based social marketing interventions (e.g. McKenzie-Mohr, 2000). The literature review suggests that water conservation could benefit from social marketing as a more holistic approach to achieve more durable behaviour change. Social marketing has proved its effectiveness in the public health domain (see Gordon et al., 2006) and is expanding its potential to encourage PEB (e.g. Veríssimo, 2019; Green et al., 2018) as well as achieving sustainable development goals (e.g. Rodriguez-Sanchez, 2023). However, there is less focus on water conservation relative to other PEB such as energy consumption and recycling in the social marketing literature – the same pattern is noted in the PEB literature (Grilli and Curtis,

2021). To contribute to this gap, this study broadens the scope of inquiry to explore barriers/enablers of water conservation from participants' perspectives. This will help provide insights for social marketing on the appropriate level(s) (i.e. downstream, midstream, upstream) to target. Therefore, the fourth research question is:

RQ4: What are the barriers/enablers to engaging in water conservation?

Finally, the literature review confirms that research on water conservation is mostly focused on geographical locations more prone to drought and/or are experiencing water shortages (see reviews by Salas-Zapata et al., 2023 and Cominola et al., 2023). Studies exploring water conservation in the UK and Egypt are still insufficient. Since the two contexts have relatively different water situations (see section 2.1.1, p. 17), this research aims to explore how/what contextual variables are relevant to water consumption and the extent to which they differ across contexts. Therefore, the fifth research question is:

RQ5: How could context-related aspects (e.g. risk of drought in a country) help in understanding households' behaviour and perceptions?

To explore all the above questions a qualitative research methodology is adopted in this study. The research methodology is discussed in more detail next.

CHAPTER 3: METHODOLOGY

This chapter will discuss the research methodology employed in this study and the philosophical rationale for it. Furthermore, a discussion of the chosen method (i.e. in-depth interviews) and its appropriateness to this research relative to other qualitative methods is provided. In addition, sample type and recruitment process is explained. Finally, the quality measures undertaken in this study are presented.

3.1 Philosophical Assumptions and research paradigm

Prior to discussing the research methodology that was adopted in this study, it is important to acknowledge the underpinning philosophical assumptions. It is stated that determining the most appropriate methodology and methods for a research should be derived from two assumptions referred to as ontology and epistemology, respectively. Ontology is concerned with "the nature of reality" (Guba and Lincoln, 1994, p. 108). Ontological assumptions could range from realism to relativism (i.e. nominalism). Under realism, the reality is seen as "external" and "independent" (Ritchie et al., 2013) to the individual's interpretation and perception. On the other hand, under relativism reality is contingent on individuals' interpretations and perceptions. Hence, realism views reality as fixed and "out there" (Guba, 1990, p. 20), while in idealism it is argued that individuals' could perceive and interpret reality differently and hence, reality is a function of "multiple mental constructions" (Guba, 1990, p. 27). Thus, the notion of "multiple realities" is often used (e.g. Ritchie et al., 2013). Epistemology is concerned with the nature of knowledge and "the relationship between the knower … and what to be known" (Guba and Lincoln, 1994, p. 108). Epistemological assumptions could range from objective to subjective based on the ontological assumptions meaning that a more relativistic ontology would be more inclined to capture individuals' multiple perceptions and interpretations of reality by acquiring more subjective rather than objective knowledge and hence, having a more subjective epistemological stand. Therefore, assumptions about reality (i.e. ontology) will influence the assumptions about nature of knowledge that could be acquired (i.e. epistemology). Furthermore, such assumptions will eventually guide the approach to acquiring such knowledge (i.e. methodology) and the exact tools to be used (i.e. methods), as will be illustrated next.

According to Guba and Lincoln (1994), ontological, epistemological and methodological assumptions are the underlying factors used to determine the research paradigm. They state that a paradigm represents a "basic belief system" and "worldview" (p. 107) that guides the research process. They classified research paradigms into four categories: positivism, post-positivism, critical theory and constructivism. Discussing the difference between these paradigms is beyond the scope of this study. In general, a research that adopts a realistic view of reality (i.e. ontology) and seeks more objective knowledge (i.e. epistemology) is more oriented towards positivism. On the other hand, research that views reality as relative (i.e. ontology) to individuals' subjective interpretations (i.e. epistemology) would be more inclined towards the constructivism side and sometimes could be referred to as interpretivism or interpretive approach.

In social sciences both positivistic and interpretive approaches are employed. According to Neuman (2013) a positivist piece of social research would seek objective, precise and measurable data to verify and "test" causal relationships. Thus, quantitative methods such as surveys and experiments are often utilised. On the other hand, an interpretive piece of research aims to understand the "viewpoint" and interpretations of participants and to view the world "through their eyes" (Neuman, 2013). Thus, qualitative methods such as interviews and observations are more appropriate to capture the meanings individuals assign to the phenomenon under study. More details on qualitative methodology and the methods utilised in this study are discussed later in this chapter in more detail.

Similarly, water conservation can be studied from a positivist or interpretive perspective. Under a positivistic stand, water scarcity would be viewed as a scientific fact and a reality that is independent of individuals' perceptions. Thus, more objective information (e.g. rainfall rates, percentage of decrease in water supply or increase in demand) will provide useful insights and quantitative methods would be employed. On the other hand, an interpretive stance may acknowledge that individuals' perceptions about different subjective aspects associated with water (e.g. social norms, morality, severity/probability of water shortages) could drive their consumption behaviour and eventually, contribute to addressing water scarcity. In this case, more subjective knowledge is being sought. Hence, qualitative methods should be utilised to better understand individuals' interpretations and allow aspects relevant to their water consumption behaviour to emerge.

It is worth noting that in water conservation literature the majority of studies employed quantitative methods to examine a predetermined set of variables (see systematic review by Bhakta et al., 2022). Despite the breadth of coverage that quantitative methods offer, the depth of insights is compromised. This suggests that a qualitative approach is needed to provide a rich understanding and explore underlying determinants of water conservation behaviour that might have been overlooked in previous studies. Therefore, in this study water conservation will be studied in line with the interpretive approach. Having a more relative ontological and subjective epistemological stand, this study acknowledges the significance of acknowledging individuals' perspectives and multiple realities on water conservation. Hence, a qualitative methodology is employed to explore individuals' different perceptions regarding water conservation within and between contexts (i.e. Egypt and the UK). In addition to uncovering any relevant factors that could contribute to better understanding of their water consumption behaviour.

3.2 Qualitative methodology

In the social sciences, it is widely agreed that there are two main research methodologies: quantitative and qualitative. According to Mills and Birks (2014, p. 23), qualitative research aims to "generate knowledge" that reflects the "reality of individuals" and is concerned with "how and why" a phenomenon occurs or exists, while quantitative research aims to "validate knowledge" by searching for evidence that a phenomenon exists. Thus, a quantitative approach is usually used under a positivistic stand, where the focus is mainly on testing hypotheses and relationships between variables through statistical analysis (Cassell, 2015). On the other hand, qualitative research is closely associated with interpretivism because it stresses the significance of a "human interpretation of the social world" (Ritchie et al., 2013, p. 11) and provides "in-depth and interpreted understanding" (p. 23) of the participants' perspectives.

Based on the previously discussed interpretive approach adopted in this study, a qualitative methodology would be the most appropriate. In addition to the philosophical assumptions, the research objectives and the subject under investigation helps to determine whether a qualitative approach should be used (Ritchie et al., 2013). In this study, a qualitative methodology would fit the nature of the topic under study and better contribute to the research aims and questions. For instance, the moral intensity construct was originally developed in the ethical decision-making literature in a business context, but there is a lack of

studies that explores its influence in PEB context and water conservation specifically. Thus, one of the main objectives of this study is to *explore* perceptions of morality and how it might be relevant to water consumption behaviour. In addition, regarding the influence of social norms, although most previous studies provide evidence on the effectiveness of normative messages on water conservation, a quantitative experimental design was the dominant methodology (see Table 2.3, p. 32). This could be considered a limitation, because qualitative methods would contribute to more in-depth insights and reveal factors that could increase the effectiveness of interventions. Therefore, in this study a qualitative methodology is utilised to provide better understanding of how perceptions of social norms and morality associated with water consumption could shape individuals' behaviour, as well as to allow for any additional factors to unfold.

Qualitative methods are used to gain "rich knowledge" (Creswell and Maietta, 2002) on the issue under study. Qualitative data could be obtained through various methods such as observation, interviews and focus groups as well as the analysis of documents and/or audio-visual materials.

In this section observation, interview and focus groups are discussed in more detail. In addition, each method's strengths and limitations are summarised in the table below (Table 3.1). Regarding observation, although directly observing a phenomenon or activity could provide "first-hand experience" and insights, the researcher's presence could be regarded as "intrusive" (Creswell, 2003). Moreover, observation might not be suitable if the behaviour under study is of a private nature. Household water consumption is largely a private behaviour and relatively less-observable. Thus, using observation as a stand-alone data collection tool would be unsuitable. Similarly, observation is such a central method in ethnography that the two terms are sometimes used interchangeably (Ritchie et al., 2013). Since ethnography is based on observation of a "social setting" (Silverman, 2013, p. 49), an ethnographic approach cannot be used in this study.

As for focus groups, unlike interviews they involve discussions with a group of participants rather than one-to-one. Ritchie et al. (2013) indicated that although the interaction between different participants could provide useful insights, it also offers less depth and richness relative to individual interviews. Moreover, they noted that "group dynamic may inhibit or distort the responses" (p. 57) and negatively impact the research outcomes. One possible reason could be related to social desirability bias, as a group "exert a

pressure on its participants to conform to a socially acceptable viewpoint" (Ritchie et al. 2013, p. 229). This study aims to explore social norms perceptions associated with water consumption and capture individuals' perceptions and behavioural patterns. Thus, focus groups might not be appropriate as they could hinder individuals from openly expressing their views. Although social desirability bias could also exist in one-to-one interviews, its effect in focus groups will be more significant. In addition, one interest of this study is to explore and identify the social reference groups that shape individuals' social norms perceptions. Nevertheless, having different people in the focus group may be confused as a reference group by participants and could lead to inaccurate responses. Thus, individual in-depth interviews would be more appropriate and will be utilised in this study. In-depth interviews are discussed in more detail next.

Table 3.1: Qualitative methods strengths and limitations

Method	Strength	Limitation
Observation	Direct and "first-hand" experience with participants (Creswell, 2003).	The researcher may be seen as intrusive (Creswell, 2003). Not suitable for behaviours of private nature.
Focus group	Group interaction could generate insights that "illuminate" research issues (Ritchie et al. 2013).	Groups exert a pressure on its participants to conform to a socially acceptable viewpoint (Ritchie et al., 2013). Less chance to gain in-depth understanding of individual views.
Interview	Detailed and in-depth understanding of individuals' perspectives (Ritchie et al., 2013).	Individuals are subject to forgetfulness and may recall details inaccurately (Roulston and Choi, 2018). Social desirability bias. Findings cannot be generalised (Brinkmann and Kvale, 2018).

3.3 In-depth Interviews:

It is argued that interviews provide "privileged access to authentic experience, private worlds, and true selves" (Sandelowski, 2010, p. 105). Thus, interviews can provide in-depth insights to better understand individuals' water consumption behaviour in "their own perspective and in their own words" (Brinkmann and Kyale, 2018, p. 14). Therefore, interviews would not only fit the relatively less-observable nature of water consumption behaviour, but also allow for relevant aspects to emerge from the participants' perspective. Interviews are one of the most used methods in the social sciences (Brinkmann and Kyale, 2018). Generally, interviews could be classified based on the degree of structure employed into: structured, unstructured and semi-structured interviews. According to Cassell (2015), in structured interviews all participants are asked a set of questions pre-determined by the interviewer in the same sequence to ensure "consistency" across interviews. On the other hand, she stated that in unstructured interviews there are none or few pre-determined questions and the interviewee is the one who directs the flow of the talk. In semi-structured interviews, a set of questions and "prompts" are utilised but, there is a chance for the interviewer to "follow-up on interesting issues" (p. 12) that emerge during the interview and have not been accounted for previously. Hence, semi-structured interviews are one of the most widely used as they give more "balance" and "freedom" for the interviewer to raise or dismiss questions based on their relevance to a specific participant (Sullivan et al., 2012).

As previously discussed, this study aims to explore and understand the water consumption behaviour in two different contexts (i.e. Egypt and the UK). Semi-structured interviews were conducted for two main reasons. Firstly, they provided an opportunity to raise common questions upon which to base the comparison between the two contexts. Second, they were flexible enough to allow for further insights and unanticipated aspects within or between contexts to emerge beyond the interview questions.

Despite the various advantages that interviews offer, there are some issues that should be accounted for. One of the main issues is social desirability bias. Sandelowski (2010) states that "people use interviews strategically to present … and even justify themselves and their actions" (p. 106). Similarly, Rapley (2010) notes that interviews pose "moral demands" on participants and they often seek to "produce themselves" in a "morally adequate light" (p. 307). For instance – in the scope of this study, people might provide inaccurate information about their water consumption behaviour and claim to engage in conservation activities.

However, this study will seek to capture participants' views and encourage them to freely express their perceptions, equipped with carefully crafted interview questions to assure quality of inquiry. More on quality measures in this study are discussed later in this section (Section 3.5, p. 91). Another issue could arise when using interviews to ask about "facts" and/or past events because people tend to forget and "may recall details inaccurately" (Roulston and Choi, 2018, p. 243). Such inaccurate responses could affect the research outcomes. Thus, this study did not inquire about historical events or figures. The main interest was individuals' typical daily water consumption behaviour and their views, experiences and meanings associated with water.

Before conducting interviews, an interview guide was developed. The interview guide used in this study is presented next in Table 3.2 (p. 78). According to Brinkmann and Kyale (2018), an interview guide in semi-structured interviews should identify the topics to be addressed as well as a set of "suggested questions" (p. 63) that could be used. Cassell (2015) argued that theory could have a role in guiding the design of interview questions. She stated that questions in a semi-structured interview could be "thematically organised around exploring different theoretical aspects" (p. 16) that have been identified in the literature of the topic under study. One of the techniques to develop interview questions is proposed by Brinkmann and Kyale (2018) who argued that a good interview question should take into consideration "thematic" as well as "dynamic" dimensions. Meaning that, it should not only contribute to producing relevant knowledge (i.e. thematic) but also should maintain the "flow" of the interview and encourage the participants to talk (i.e. dynamic). Thus, they recommended that the interview questions should be "easy to understand, short and devoid of academic language" (p. 64). In addition, they note that each research question could be translated into more than one interview question to approach the same topic from different perspectives. Therefore, in this study the research questions will be used to guide the development of interview questions, see Table 3.2 below. The interviews were held through an online platform (i.e. zoom) as it was during the COVID pandemic and social distancing restrictions did not allow for face-to-face interviews. Online interviews offer advantages over traditional interviews in terms of convenience, accessibility and facilitating long-distance communication (Gray et al., 2020) – which was useful in this study to help reach participants in two geographically remote countries and dispersed areas within both countries. Moreover, interviews on zoom are usually rated as a "highly satisfactory" experience and ranked above alternative methods such as face-to-face and telephone interviews (Archibald et al., 2019).

3.6 Interview Guide

In developing interview questions, the research questions were used as a reference to guide the interview process and assure main research questions are addressed. Each interview question,or set of questions, is followed by a brief explanation of the rationale/purpose of the question and support from previous literature, if relevant.

Table 3.2: Interview guide (interview questions)

Research questions	Interview questions	Purpose
1. How do households perceive water conservation? 1.1 How do households consume water?	**Q1: On a typical day, how do you use water around the house?** - Could you provide example of activities (e.g. brush teeth, shower) - Describe how (e.g. tap on/off, short/long). **Vignette no. 1 "Leaking tap"** **Q2: "Imagine you found a tap leaking in your house. What would you do?"**	Initial opening question. In addition, this question will help understand water consumption habits of participants as previous studies indicated its significance (e.g. Russell and Knoeri, 2020; Gregory and Leo, 2003). Exploring that would provide insights to determine the scope of social marketing interventions; whether to target breaking bad habits (i.e. wasting water) or to enhance good ones (i.e. saving water). In addition to habitual behaviour, that is likely to be reported in the first question, it would be important to consider more "cognitive" behaviours such as actively engaging in fixing domestic leaks (Perren and Yang 2015). Hence, this vignette will be used.

	– Would you fix it or not? – Why?	
1.2 How do they perceive their water consumption pattern?	**Q3: What do you think of the quantity of water you use?** – Are you ever concerned about the amount of water you use during any of the activities mentioned above? Yes or No, – Why?	Asking if they ever think about the amount of water they use will help explore how they perceive their water consumption behaviour. In addition, Schultz et al. (2016) stated that being "mindful" of the quantity of water could reflect personal norms towards water conservation.
1.3 What are their ecological and water-specific beliefs and knowledge? (How do they value water as a resource?)	**Q4: On a personal level, are you concerned about any ecological issues?** – Do you engage in any green/eco-friendly behaviour? – Why? **Q5: Generally, what do you think of water as a natural resource?**	Previous literature argue that general environmental beliefs and behaviours could predict water conservation (e.g. Dolnicar et al. 2012; Corral-Verdugo et al., 2003). Hence, Q4 will seek to understand participants' environmental concerns and behaviour. In addition, to gain deeper insight on "why" they engage (or not) in PEB and to reveal and understand the potential drivers, the next question aims to explore participants' water-specific beliefs. Q5 will explore water-specific beliefs which are found to be strong predictors of water conservation. For instance,

	− Is it limited or unlimited? − More of a common/shared resource among people or owned personal asset? − How do you think it should be used? − Are you aware of any water issues or conflicts? (Global or local-level) (Moral recognition /Tragedy of the commons) **Q6: How do you think your individual water consumption might affect available water resources?** − Positive/ negative or no effect?	Corral-Verdugo et al. (2003) found that "utilitarian" beliefs that water is unlimited and should be freely used by humans led to higher water consumption. On the other hand, the belief that water is "scarce" led to more water conservation (Jorgensen et al., 2009). Hence, Q5 could help understand participants' water-specific beliefs and how they value water. Q6 aims to capture if participants are aware of any broader impact of their water consumption behaviour. It complements the above question about whether they believe water is a common/shared resource and will provide further insights to better understand the notion of "tragedy of commons" (Hardin, 1968) in water conservation context. In addition, this question will help understand whether participants recognise the moral-side of water conservation. According to the issue-contingent model (Jones, 1991), moral recognition is the

		first step to activate ethical decision making. Meaning that recognising the impact of one's behaviour on others is essential for recognising the morality of a situation. The next questions will seek more in-depth understanding of the specific perceived consequences of participants' water consumption from their own perspective.
2. **Could perceptions about morality (i.e. perceived moral intensity) of water conservation help in understanding water consumption behaviour?** 2.1 How could NAT constructs help capture households' water consumption from a moral perspective?	(Awareness of consequences and Moral intensity perceptions) **Q7: Do you think there are any consequences of your consumption pattern as a household?** If Yes, − What are the consequences? − How serious/significant are they? − who/what will it impact? − when? If No, − What makes you think that? (Ascribed Responsibility)	In order to gain a deeper understanding of the participants' perspective on the impact of their behaviour, Q7 will directly address specific consequences that they think their behaviour might have. In addition, by using the determinants of moral intensity from the issue-contingent model (Jones, 1991) as a guide, the follow-up questions will address different determinants to help unfold the participants' perceptions about the perceived significance of water conservation. For instance, the question about how serious the consequences are perceived will help explore the magnitude of consequences – a core determinant of moral intensity perceptions. Moreover, asking about who will be impacted and when these consequences are perceived to occur will reveal perceptions about proximity and temporal immediacy/probability of effect, respectively.

	Q8:Do you think you have a role /part to contribute to addressing water issues? − Who do you think is responsible for saving water? − Individuals or governments? (Personal norms) **Q9: How do you feel about saving water?** − Sense of obligation/pressure/urge? Not concerned? − How do you feel if you think you might be wasting or using too much water?	Q7, 8 and 9 aims to cover NAT's key constructs: Awareness of consequences, ascribed responsibility, and personal norms, respectively (Schwartz, 1977).
3. Could social norms perceptions help in understanding water consumption behaviour?	(Social norms perceptions "injunctive and descriptive") **Q10: In your opinion, how do others think water should be used?** **"Injunctive"** − Water should be used wisely or is it okay to waste?	The above questions will aim to cover social norms perceptions associated with water conservation. Injunctive and descriptive norms will be addressed in Q10 and 11, respectively. Then, Q12 will aim to understand how participants internalise such norms and to what extent it could help shape their behaviour. For instance, Corral-Verdugo et al. (2002) found that the perception that others are wasting water

	− Others: family members, friends, neighbours, co-workers **Q11: How do you think others are actually using water? "descriptive"** − Do you think their consumption is efficient or inefficient? − What makes you think that? − Any specific incidents/examples in mind? **Q12: How would it make you feel if you know that "others" are engaging in water saving practices?** **Vignette no. 2 "Social Comparison"** Imagine that, in your water bill you received information about the average water consumption of households in your	decreased conservation motives and resulted in increased water consumption. In previous literature, there is evidence that normative messages do influence people's behaviour (e.g. Schultz et al., 2016) despite this influence being less deliberate or conscious (e.g. Nolan et al., 2018). Exploring injunctive norms perceptions will also help explore an important determinant of moral intensity in the issue-contingent model (Jones, 1991): perceived social consensus. Q12 and Vignette no. 2 seek to gain a deeper understanding of the rationale behind the impact of normative messages and how it is perceived by participants. For instance, what feelings these messages might evoke and reasons why they might

	area. You noticed that your consumption is much higher (or lower?) than the average". − What is the first thing that comes to your mind? − How would that make you feel? − Would that make you consider reducing your water consumption? o Yes or no, Why?	adjust their behaviour to comply with the normative "standard".
4. What are the barriers/enablers to engaging in water conservation?	(Knowledge) **Q13: How do you think you can save water around the house?** (Do you think there are any ways you can save water around the house?) If yes, − How? Could you please give some examples? (Self-efficacy) **Q14: Do you think you are capable of doing any of these water saving activities?**	It is argued that before trying to change a behaviour it is important to first understand the different barriers that could be hindering this behaviour (e.g. Kotler and Lee, 2011; Andreasen, 2006). Thus, the first set of questions will seek to understand internal barriers of water conservation by addressing aspects such as lack of knowledge, self-efficacy and motivation in Q13, 14 and 15, respectively.

	If yes, − Are there any specific things that you already do save water in your house? − Describe one activity − Why? (What makes you do this?) “motivation” − Save money? Ecological concerns? Doing the right thing? (Do you think it is the right thing to do?) − Sense of obligation to do or guilt if not? (personal norm) − How do you feel when you are saving water? − Happy? Proud? “Positive feelings?” If no, − Why not? (Motivation)	

	Q15: What would encourage you to start saving water in your house? − Do you have enough info or need more info about how to save water? If not, do you ever search for info on ways to save water around the house? − Incentives? Or higher water cost − Imposing water restrictions? − Knowing that others are saving water too?	Q15 will seek to gain deeper insights on motivation and to understand what could encourage participants to start saving water. Hence, key tools from previous literature are covered (information/ educational campaigns, rewards and incentives, pricing and water restrictions).
	Q16: What makes it difficult for you to save water? − Personal and external factors.	Then, Q16 aims to allow participants to reflect on factors that could make saving water difficult for them. This could help capture barriers from their own perspective and explore whether these barriers are internal or external.
	Q17: Can you think of anything that would make it easier for you to start saving water? (or to save more water – if they are already saving)	In addition to barriers, Q17 will explore enablers and factors which are usually used to promote water conservation or to make it more convenient. First, the researcher will cover water conservation messages as information is claimed to be the

	▪ Water saving campaigns. − Have you seen or received any water saving messages recently? − Platform? (digital (e.g. youtube ads), in newspaper, from water company) − What do you recall about those messages? − What did you like/dislike? − Did they make you save water? − Yes or No, Why?	most commonly used tool to promote PEB (e.g. Steg and Vlek, 2009). So, it will be interesting to explore how participants perceive those messages and what message frames have been used. This could provide insights when designing social marketing interventions to promote water conservation.
	▪ Gadgets such as : shower timer, water efficient taps and flushing systems. − Have you heard about any of those? − What do you think about them? − Would you consider getting something like that for your house? − Yes or No, Why?	Then, the researcher will ask about water efficient devices to explore if participants would find it easier to have these devices rather than to change their behaviour. Addressing such relatively structural aspects as well as price and water restrictions could provide insights on the potential of an upstream approach to social marketing that considers changing the system not just the behaviour.

5. How could context-related aspects help in understanding households' behaviour and perceptions?	**Q18: Could you describe the nature of the water situation in the place where you currently live.** − Abundance or experience water shortages − How do you think living in a place with such characteristics might have affected the way you use water? − Have you ever lived in another place with a different water situation? If yes, has living in this place changed the way you use water?	In this set of questions, I am interested to explore whether participants are aware of the water situation in the context where they live. If yes, to what extent the nature of the context could shape participants' water consumption habits and the way they perceive water.

3.4 Sampling

3.4.1 Population and Sample units

This study aims to explore individuals' perceptions associated with water conservation in two different contexts – Egypt and the UK. Interviewing individuals from both countries helped to provide better understanding of water consumption patterns and any relevant aspects that would emerge in such contrasting contexts. Thus, providing insights and implications for social marketing to design effective water conservation interventions.

The target population is households in Egypt and the UK. Based on the literature, household water usage accounts for more than 60% in the UK and is ranking second after agriculture in Egypt (see section 2.1.1, p. 17) A purposive sampling strategy is employed to select the sample units. Purposive sampling is a well-established approach in qualitative research as it ensures that the sample is "diverse" and that "key groups" are represented in the sample (Ritchie et al. 2013, p. 143). Although alternative sampling types such as convenience or snowball sample are more "easy" and practical" to use in qualitative research, purposive sample allows for selecting participants who are "most beneficial" to the research topic (Gill, 2020).

Aspects that are taken into consideration in this study to include in the purposive sample are discussed next. One of the aspects that should be accounted for is whether a water metre installed. Many houses in the UK do not have water metres installed and it is common among households to pay fixed periodic water charges regardless of their actual consumption. Thus, a purposive sample ensured households from both groups (i.e. water metre vs fixed charges) were represented and could provide insights to how they might perceive water conservation differently. Moreover, the status of the household was also considered. For instance, it was interesting to explore if being the one in charge of paying the bills (e.g. head of the household) and being aware of the cost of water consumption made financial/economic motives emerge rather than moral or social aspects. Thus, the sample ensured different members of the household were represented. Furthermore, geographical aspects were also taken into consideration. For instance, perceptions of households in drier areas which are more prone to droughts (e.g. south of England) might differ from households in other areas where rainfall is higher. Finally, socio-demographic variables such as age and gender were considered to ensure a range of age groups and different genders were represented in the

sample and explore whether different perceptions or usage patterns are reported across groups.

3.4.2 Sample size

Sample size is one of the greatest concerns in qualitative interviews (Cassell, 2015). One of the concepts that could help determine the appropriate sample size is the notion of "theoretical saturation" introduced by Glaser and Strauss (1967). The main idea is that saturation is reached when no new data or themes are produced from additional interviews – which could be achieved typically after 20-30 interviews (Creswell and Maietta, 2002). Therefore, this study aimed to conduct a total of 20-30 interviews with participants from both contexts (i.e. UK and Egypt) until saturation was achieved. However, there is no "one-size-fits-all" for data saturation, a general principle is when "no new data, no new themes, no new coding" is attained (Fusch and Ness, 2015, p. 1409) which could be by –as little as – 6 interviews (see Guest et al., 2006).

A total of 35 participants were contacted/invited to participate – 33 participants filled in the expression of interest form and 30 were selected to participate – 16 from the UK and 14 from Egypt. Data saturation was noted after 13 and 12 interviews, respectively. A few more interviews were conducted in both contexts to confirm saturation was achieved. All interviews were online via zoom, over a 12 months period – between June 2021 and July 2022, before the droughts were announced in the UK in August 2022 .

3.4.3 Recruitment process

At the initial stage, an invitation to participate in interviews (see Appendix 2) was sent through email and social media platforms to colleagues, friends, and family members who represented a diverse range of the purposive sample criteria (e.g. geographical location, age, gender). This invitation briefly introduced the key purpose of the study and shared the information sheet (see Appendix 3) including all details about the interview process. Then, recipients were asked to complete an "expression of interest form", if they wished to participate (see Appendix 4). In the expression of interest form, they were asked to provide further details relevant to the other screening criteria mentioned previously (e.g. metre installed, responsible for paying the bills). A snowball strategy (Atkinson and Flint, 2001) was also used. At the end of the interview, participants were thanked for their time and were asked to provide references to others who they thought might be interested in participating. For confidentiality reasons, they were asked if they agreed to mention their name when

contacting those references. If yes, prospects were sent the same invitation including the information sheet and a note stating that they have been referred by <participant's name>. Recipients who submitted an expression of interest form were reviewed to ensure diversity in terms of the purposive sample criteria, and only those who are not/less represented in the sample are contacted to schedule an interview.

It should be noted that participation was completely voluntary and no incentives were offered to participants. These recruitment procedures and interview questions were reviewed and approved by the ethical committee at the University of York (see Appendix 1).

3.5 Quality assurance in qualitative research

According to Silverman (2013), seeking better "quality" qualitative research involves addressing issues relevant to representativeness, validity, reliability. The notion of representativeness better fits the nature of qualitative research, and in-depth interviews specifically, unlike the concept of generalisation. Brinkmann and Kvale (2018) stated that social knowledge is contextual rather than universal. Hence, they argued that the concern should not be whether interview data could be "generalised globally" but if such knowledge could be "transferred to other relevant situations" (p. 146). Moreover, Ritchie et al. (2013) noted that in qualitative research the interest in "in-depth coverage" and hence, when making decisions about sample size, depth rather than "breadth" is emphasised. As for validity and reliability, Golafshani (2003) indicated that "positivists" used these terms to reflect the accuracy of the measurements used and the "replicability of results", respectively (p. 295). She added that terms such as "credibility", "trustworthiness" and "rigour" are used in qualitative research to better reflect the nature of qualitative inquiry and data analysis.

In this study, quality and rigour is a core aim throughout the research process. Starting with sampling, Silverman (2013) indicated that "representativeness" is a "quality issue" in qualitative research and argued that selecting a purposive sample based on "logical grounds" is a "straightforward way to achieve representativeness" (p. 280). Therefore, to assure quality in this study, a purposive sample is used and to ensure diversity of participants. Furthermore, the interview questions – previously presented (see p. 78), are designed to be simple and clear. Additionally, pilot interviews were conducted and the wording of some questions was refined to respond to participants' comments. During the interviews, building trust and assuring confidentiality was a priority, and a secure internet connection and online platform was used. In addition, a recommendation by Rapley (2010) for interviewers is

adopted in study, to "encourage talk in a non-leading way", act "passive" as well as to be "facilitative and neutral" (p. 310). This has been considered during conducting interviews, by creating a non-judgmental and friendly attitude most of the participants reported feeling comfortable/relaxed during the interview. Thus, many of them were honest about their water consumption patterns and admitted that their behaviour could be more efficient. After the interviews, all recordings were kept in a password protected device accessed only by the researcher and the authorised transcriber – verified and approved by the University of York. As for the analysis stage, to achieve a "rigorous analysis" it is crucial to employ an approach that "displays ordering" (Ritchie et al., 2013, p. 291). Therefore, in this study the thematic analysis approach is adopted and follows the systematic steps proposed by Clarke and Braun (2021), as will be explained in chapter four in detail (section 4.2, p. 97). Moreover, to enhance credibility of results, one way is for different investigators to examine the data set and see if they assign the scripts to the same categories, which Silverman (2013) referred to as "inter-coding". This was done in this study (see Appendix 5) and a lecturer in a UK university verified the extent to which the identified themes matched relevant quotes, as well as, reviewed the english translation of Arabic quotes from interviews in Egypt.

Finally, reflexivity was considered throughout all stages. This was achieved by acknowledging/limiting the potential influence of researcher's personal perspectives by seeking "neutrality" as well as striving "to avoid obvious, conscious, and systematic bias and be as neutral as possible in the collection, interpretation and presentation of the data" (Clarke and Braun, 2021, p. 22). In designing the interview questions, conducting the interviews and analysing the interview data, the researcher was aware of their personal perspective regarding the importance and the morality of water conservation. Extra caution was taken to assure a neutral position and avoid any verbal/non-verbal expressions that reflected the researcher's personal views. In framing the questions and engaging with participants an open-minded/ non-judgemental approach was adopted to encourage participants to express their opinions. Moreover, the researcher used the determinants of moral intensity proposed by Jones (1991) to develop the interview questions. This allowed for exploring the concept of morality implicitly without asking participants direct questions about whether or not they perceive water conservation as moral. Thus, the researcher maintained an unbiased position and ensured the questions were non-leading.

3.6 Summary

This chapter discussed the interpretive philosophical paradigm and the qualitative methodology adopted in this study. Semi-structured interviews were chosen as the data collection method as they allow for flexible yet in-depth inquiry. A purposive sampling strategy was followed to recruit and select participants in both contexts under study – the UK and Egypt. Quality and reflexivity tactics employed throughout the process of designing, conducting and analysing interviews are discussed.

CHAPTER 4: DATA ANALYSIS AND FINDINGS

This chapter will present the data analysis process and discuss the main research findings/themes. An overview of the selected sample units and participants' characteristics from both contexts (i.e. UK and Egypt) is presented. Moreover, the thematic analysis approach adopted in this study, preparing data for analysis, transcription process and theme development stages are explained. A conceptual framework is developed to visualise the potential links between the six identified themes. Each theme is discussed thoroughly in a separate section.

4.1 Sample and participants characteristics

A total of 30 interviews were conducted – 16 from the UK and 14 from Egypt.

As mentioned in the previous chapter, in selecting participants, diversity of the predetermined purposive sampling criteria was taken into consideration (see Section 3.4.3, p. 90). Participants were a mix of individuals who are responsible for paying the bills and who are not responsible for paying the bills (e.g. living with parents). As for having a metre installed, participants in both contexts usually answered "yes" in the expression of interest form. However, during the interview the majority of UK participants were not able to confirm if they actually had one installed, they usually later changed their answer to "no" because the bills they paid were fixed rates regardless of consumption. In Egypt, in the interviews several participants reported having one shared metre installed for the whole building rather than a separate metre for their flat/apartment. As for the geographical location, participants were selected to cover different locations, living across 8 and 9 different cities in the UK and Egypt, respectively. To further enhance sample diversity, selected participants were males and females, whose age groups vary from 20 to over 60 years old.

A summary of the sample units main characteristics is provided in the Tables 4.1 and 4.2 below. Pseudonyms were assigned to participants to protect their identity.

Table 4.1: UK sample characteristics

	Responsible for paying the bills	Do you have a water metre?	City	Gender	Age group
1.Georgia	Yes, but water bill included in the rent	None of the participants reported knowledge of having a water metre	York	F	Less than 20
2.Bob			York	M	30 - 39
3.Maria			York	F	40 - 49
4.Elizabeth	No		York	F	20 - 29
5.Alex	No		London	M	20 -29
6.Mario	Yes (fixed rate)		York	M	50+
7.Sherly	Yes (but never paid a water bill)		Newcastle	F	20 - 29
8.Daniel	Yes, Water bill is a fixed rate paid quarterly or annually		Carlisle	M	50+
9.Mary			York	F	50+
10.Rasheed			London	M	30 - 39
11.Karen			York	F	40 - 49
12.Pamela			York	F	40 - 49
13.Tasha			Bath	F	30 - 39
14.Maya	Yes (included in council tax)		Glasgow	F	30 - 39
15.Liam	Yes (fixed rate)		Newcastle	M	30- 39
16.Angie	No		London	F	50+

Table 4.2: Egypt sample characteristics

	Responsible for paying the bills	Do you have a water metre?	City	Gender	Age group
1.Doaa	No	Yes	Cairo	F	30 - 39
2.Esraa	No	No	Giza	F	30 - 39
3.Ahmed	Yes	Yes	Zayed	M	30 - 39
4.Aya	No	No	Giza	F	30 - 39
5.Marline	No	No	Giza	F	20 - 29
6.Adel	Yes	Yes	Cairo	M	30 - 39
7.Noha	No	No	Alexandria	F	30 - 39
8.Mahmoud	No	No	Cairo	M	20 - 29
9.Marwa	Yes	Yes	Gharbeya	F	40 - 49
10.Amal	No	Yes	Assut	F	30 - 39
11.Amina	No	Yes (prepaid)*	Suez	F	30 - 39
12.Ali	Yes	Yes (prepaid)*	Zagazig	M	40 - 49
13.Emad	Yes	Yes (prepaid)*	Mansoura	M	30 - 39
14.Nadia	Yes	Yes	Cairo	F	50+

*Most participants in Egypt reported having one water metre for the whole building; shared among all flats. The few participants who reported having a (prepaid) metre installed, were the only ones who had a separate metre for their apartments. Those participants usually lived in new buildings subject to new metering policy regulations.

4.2 Thematic analysis approach

Data analysis and data collection was carried out simultaneously as recommended by Glaser and Strauss (1967) and Charmaz (2008). Data analysis proceeded after the end of data collection – in July 2022, until May 2023.

Transcription of interview audio recordings into text was the first essential step of analysis. Interviews with participants in the UK were conducted in English and were initially transcribed using the auto-transcript option on zoom, then were reviewed for errors and edited to match the audio recording. Interviews with participants in Egypt were conducted in Arabic, a language that is not recognised by zoom auto-transcript. Therefore, an external transcription service – verified and authorised by the University of York ethical approval committee, located in Egypt was hired to transcribe the Arabic interviews.

A thematic analysis approach was adopted and followed the six steps recommended by Clarke and Braun (2021): familiarisation, coding, constructing themes, reviewing themes, defining themes and writing up. Coding was done by the researcher manually without using data management software (e.g. Nvivo). Arabic interviews were kept in their original language and were not translated during the coding stage to maintain participants' views and meanings in their own words. Assigned codes were in English, in both the UK and Egypt interviews to avoid confusion and facilitate contrast of how the same code emerged in each context.

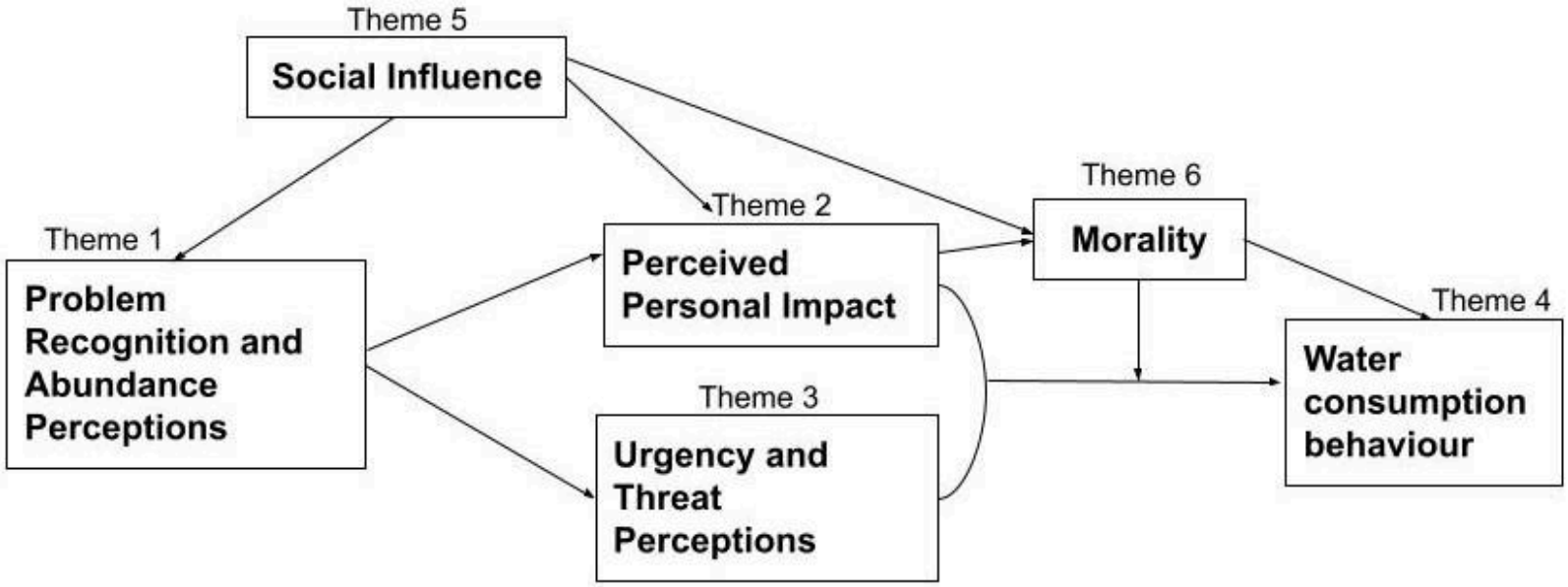
To guide the process of transforming codes into themes, a step between the coding and constructing themes stage was done following Saldaña (2013) "categorising" – in which "similarly coded data" were grouped into categories "because they share some characteristics – the beginning of a pattern" (p. 9). According to Saldaña, the initial coding process, in which labels are assigned to data is the "first-cycle", refining and categorising the codes is the "second-cycle". Initial codes (i.e. first-cycle) used were mainly derived from participants' quotes using their own words, while sub-themes (i.e. second-cycle) were the researchers' interpretation/categorisation of emergent patterns. Therefore, following this coding procedure, data analysis is classified into three main stages: coding, categorising codes into sub-themes, and finally, developing a theme. Table 4.3 below illustrates the codes used in this study, the categories and the final themes. The conceptual framework of the identified themes and suggested links between them based on data analysis is presented in Figure 4.1. These will be discussed next.

Table 4.3: Stages of coding and theme development

Stage 1 Initial Coding "First cycle"	Stage 2 Clustering codes into sub-themes "Second cycle"	Stage 3 Developing Themes
No problem; not an issue; frequent rain; infinite resource; taken for granted; no evidence; no current/previous droughts; will last forever- bright future; future problem/not now	Physical Cues	Theme 1: (Lack of) Problem recognition and (high) abundance perceptions
Less attention to water (water vs electricity; water vs climate change); no media exposure; no social conversations/observations; "free" resource; usage unrestricted; no metre; cheap bill	Non-physical Cues	
Not wasteful; "normal" usage; assumptions (think; guess; feel); lack of feedback - no metre; lack of feedback - bills fixed/included in rent	Perceived efficiency	Theme 2: (Trivialising) Perceived personal impact
Fixed rates; no incentive- cheap; affordability	Monetary Impact	
High abundance; don't know impact- admit lack of awareness; assume no impact- makes no difference; potential societal impact (others; other people; society)	Environmental and social impact	
Not serious; not urgent; not important; extravagated; lack of concern; not worried	Perceived problem significance	Theme 3: (Underestimating) Urgency and threat perceptions
Shortages- highly unlikely; far future- temporal distance; somewhere else not here- geographical distance; not personally threatened	Perceived proximity	

Difficult; sacrifice; hardship Convenience (easy; quick; comfort; enjoy); necessity (human basic need; well-being)	Efficiency is hard (water usage) Perceived as essential	Theme 4: Water consumption behaviour (Prioritising convenience)
Big companies, other people waste more; makes no difference; responsibility- not my; Collective effort (all people; majority; all of us), big collective impact; personal contribution- efficiency Vignette reactions - surprise; embarrassed; confused); benchmark - right or wrong; self-efficacy; competitiveness; learn from others- advice	Relativity Collectivity Social comparison	Theme 5: Social Influence
No social impact; don't know impact; who?- will benefit/be harmed; enough for all; common/shared resource; help others; guilt- negative impact on others; unfair for others Explicit morality- Right/wrong thing to do; explicit morality- moral/ethical; feels good to save; guilt- feels bad to waste; personal conviction (principle; embedded; personality); family influence- habits; appreciation; blessing; religious reasons (Egypt); potential scarcity; less-fortunate; responsibility	Consequences/ impact on others Intrinsic value of water	Theme 6: Morality

Figure 4.1: Conceptual Framework



4.3 Identified Themes

In both contexts, data analysis suggests that water is taken for granted and water conservation is not a priority. Water consumption is a means to an end, performed without much regard to the quantity of water used in the process. A common theme in reported water consumption behaviour across both contexts was the tendency to prioritise convenience over efficiency. The most frequently reported water conservation practices were the ones which do not involve a sacrifice of convenience/comfort (e.g. turn off the tap while brushing teeth). On the other hand, practices that were relatively less convenient (e.g. giving up a daily bath for a short shower) were less frequently reported, and were even justified. Analysis indicates that these patterns are rooted in underlying (mis)perceptions about water, its availability and how it should be used. Analysis has identified six themes which provide in-depth understanding of household water consumption behaviour in the UK and Egypt. This section will discuss each of the identified themes, starting with theme 1: problem recognition and abundance perceptions, as analysis suggests it is the core (mis)perception and the basis for all subsequent themes. First, an overview of the six themes is presented:

Theme 1: (Lack of) problem recognition and abundance perceptions reflect the extent to which participants acknowledge a present/future problem with water availability, as well as, their perceptions about present/future water abundance.

Theme 2: (Trivialising) perceived personal impact reflects perceptions about the impact (i.e. monetary, environmental or social) of their personal water consumption.

Theme 3: (Underestimating) urgency and threat perceptions reflect perceptions about the proximity of water shortages – in terms of time when and place where it might occur.

Theme 4: Water consumption behaviour (prioritising) convenience reflects the reported water consumption practices.

Theme 5: Social influence reflects participants' perceptions about how others in their social group are using water and the extent to which it contributes to one's behaviour.

Theme 6: Morality reflects perceptions about consequences of personal usage on others, as well as perceptions about the intrinsic value of water as a resource that is worth saving – regardless of consequences.

In discussing the identified themes, words such as few, some, and several are used to reflect the prevalence/ frequency of a pattern in findings. Using terms to reflect quantity is common in qualitative research and is sometimes referred to as "semi-quantification" (Neale et al., 2014), or "verbal counting" (Sandelowski, 2001). Each of these words is assigned a "range" (i.e. lower and upper range) to reflect the numbers of participants relative to the total sample size (Chang et al., 2009). For instance, in the UK and Egypt, the sample size is 16 and 14, respectively. Hence, the range for terms used was as follows: "few" means 2-3 participants; "some" means 4-6 participants; "several" means more than 7-12 participants; "almost all" means more than 12 participants.

Furthermore, the suggested links between themes (see conceptual framework Figure 4.1) are based on insights from data analysis and theme associations that were identified within and across interviews. The researcher kept track of the occurrence and frequency of each theme in the data set as well as the association between two (or more) themes, whenever they were reported/ identified simultaneously. The associations that are identified in one interview are compared to other interviews and the more an association is repeated the more support this offers to augment the suggested links. For instance, in interviews where the lack of problem recognition and high abundance perceptions theme is identified, an underestimation of the urgency of water issues relative to other environmental issues is also reported. This pattern which indicates that these two themes are usually associated with one another was noted/repeated across interviews, in both the UK and Egypt. Hence, suggesting a potential link between these two themes.

Theme 1: (Lack of) Problem Recognition and Abundance Perceptions

Overview

Participants in both contexts – UK and Egypt, enjoy uninterrupted access to water which makes it hard for many of them to recognise a current, or potential, problem with water supply. From several participants' perspectives, in the absence of an obvious disruption with current water supply (e.g. shortages or droughts), a "favourable" water situation is assumed and water is perceived as highly abundant. Hence, water does not qualify as an "issue" or a "problem". Lack of problem recognition is one of the main themes identified and this theme and its underlying factors are explored in more detail in this section.

Across the UK interviews, the significance of water conservation is underrated. Saving water is perceived as an unnecessary solution to a problem that, in their opinion, does not exist. In several interviews, lack of problem recognition is identified where participants explicitly state that water availability is not a "problem" or an "issue". For instance:

> "I've never thought about it [water] as a **problem**" – Bob

> "To be very honest, I think water is not an **issue** here in the UK" – Rasheed

> "That's **never been a problem** that we have here, that might be a problem that people have elsewhere, not really a UK thing" – Alex

> "It is different if we were living now in Abu Dhabi or Cairo, where I guess water is a key **issue** … But I don't think that is the case in York" – Mario

This pattern was associated with less-concern given to water relative to other environmental issues. The data suggests that when water is not perceived as a problem, water conservation becomes irrelevant. Hence, other environmental issues /behaviours capture more attention, while water is pushed further back in people's minds. For example, in several UK interviews, water usually comes second after electricity, gas and even food waste:

> "It does all worry me a little bit, but **not as much as electricity** usage, I'm always **more preoccupied with carbon dioxide** emissions, compared to water usage. I'm

less worried about it and more worried about other environmental issues. it's not really a thing that I think about as much compared to other other issues" – Georgia

"It [water usage] is not something that I've thought through in any great detail, necessarily, you know, honestly, **not in the same way as say the electricity** … I don't think about it really, at the moment" – Karen

"**food wastage** is on the **top of my list** … perhaps it [water] is not something I think about as easily or as much as food" – Bob

On the other hand, across interviews in Egypt a higher degree of problem recognition is identified. Several participants acknowledge water availability as a "problem" and even a "crisis". In almost all statements participants refer to the dam being built in an up-stream country on the river nile:

"The **problem** that we have in Egypt with the water supply, it makes me more interested in **not wasting** water… We have a **problem** with the water **now**, or a **potential problem**" – Emad

"There is a **problem** with the Nile River and Ethiopia's Renaissance Dam, of course, we must all control [our water usage] and **preserve** [water] because we are under risk now" – Marwa

"We do have a **problem** in Egypt now, the renaissance Dam, a similar **crisis** exists now with water supply worldwide, not just in Egypt" – Adel

"Already, we are in a **crisis** because of the Dam, and Egypt is very affected by it" – Esraa

This pattern shows that despite the dam not having a current actual impact on Egypt's water availability, it has positioned water as a "problem" in participants' minds.

Further analysis was conducted to better understand why different levels of problem recognition were identified across contexts. It was indicated that a core aspect is perceptions about water abundance. These perceptions are the basis on which other water relevant beliefs and behaviours are shaped. As will be explored in following sections in more detail, many of the themes that were identified could be traced back to an abundance perception (see Figure 4.1, p. 100). The data suggests that the higher the perceptions about current water abundance,

the less significant water resources are perceived. For instance, in the UK following-up with Georgia to elaborate on why she is less "worried" about water relative to energy usage, her statement shows a high abundance perception (e.g. accessible, available):

> "It's quite hard to think about the importance of it [water], when you're lucky enough to live in the UK and generally, **water is accessible all the time!** we're quite privileged in the fact that we don't, **we don't need to think about water usage that much** … we're quite lucky, water is generally **taken for granted**, it's **easily available** – Georgia

The same pattern was noted in several UK interviews, water abundance is "taken for granted" to an extent that it is sometimes perceived as an infinite resource. These perceptions help explain the lack of problem recognition and why water is a secondary issue. For example, when asked to describe their perceptions of the water situation in the UK, Karen and other participants stated that:

> "I would say, it [water] **doesn't seem** to be a particular **finite resource** .. Well I mean if you compare it to like electricity or fossil fuels or something like that, then that's again like a really clear kind of **finite resource"** – Karen

> "In this country [UK], people are fortunate enough to have what **seems** like an **unlimited supply** of resources to an extent where **things typically don't run out**… I know yeah it [water] is not an **unlimited resource**, but that's not the **impression** that the general public have" – Alex

> "I **feel** like we are quite a **way off when it comes to having a shortage**. But, yeah, that's just complete **assumptions** based on what I've seen and heard**"** – Tasha

On the other hand, the higher problem recognition identified in Egypt was usually associated with lower abundance perceptions. Unlike the UK, several participants in Egypt acknowledge water as a "limited" and a "finite" resource:

> "Water, of course, is **finite**, and it **could run out**, and there will come a time when the water will run out" – Adel

> "Water is **limited**. I mean, we can't keep dealing with it like this, taking it for granted. I think there are many **indicators** around us that are showing this" – Doaa

In the above examples, words used by UK participants such as “seems”, “impression”, “feel”, “assumptions" indicate that their perceptions about water abundance are based on subjective interpretations of their surrounding environment. Similarly, in Egypt, Doaa for instance, mentions “indicators” to support her perceptions about “limited” abundance. This pattern suggests that participants tend to scan the surrounding environment for cues to help them shape their abundance perceptions and eventually, assess the significance of the water situation. When the available cues are not signalling a current problem with water abundance, participants fail to recognise a problem with water availability and underrate the significance of water conservation. Further analysis was conducted to explore types of cues and how they differ across the UK and Egypt. Two types of cues were identified – physical and non-physical cues, and will be discussed next in more detail.

Physical (explicit) cues

The first type of cues which participants refer to are explicit/visual cues and physically involve water. In several UK interviews, the lack of an actual water shortage, frequent rainfall as well as easy uninterrupted access to water are perceived as the ultimate evidence that water is not an issue. These perceptions not only contribute to a lack of problem recognition, but also misleads them to assume that water is highly abundant. For instance, Daniel used “rain” and “green” grass as a physical cue to support his perceptions about the “favourable” water situation, similarly, Tasha refers to “too much rain”:

> “The water situation in the UK is **favourable**. To the best of my knowledge, there is **no water shortage** in the UK, the **grass** in the park is lovely and **green**, because **it rains every day.** I believe that **there is enough water here**, in this country, to go around.” – Daniel

> “**There's probably too much water** from the amount of rain, there's **too much rain** in this country! (laughs)…that's only what I perceive on the media, and what I read, **I've never seen headlines** that say we have a shortage of water or it's just something I've grown up thinking it's a given, if you're in the UK, you will have **access** to water quite easily” – Tasha

Notice how Tasha reported a lack of exposure to news or “headlines" about shortages to support her water abundance perceptions. A similar pattern is identified across several other interviews in the UK and Egypt. In the absence of non-physical cues that challenge their

assumptions, several participants will rely on the physical cues to shape/augment their water abundance perceptions. The non-physical cues will be explored in more detail later in this section.

In Egypt, physical cues were relatively less prevalent across interviews. Nonetheless, despite several participants acknowledging a problem with water availability, in some interviews the problem significance was underrated because of absence of physical cues. The data suggest that lack of physical "evidence" – in terms of an actual disruptions to water access or shortages, was associated with high abundance perceptions in some interviews. Hence, they fail to realise the severity of the water situation even if a problem is acknowledged. For instance, Amina justifies her perceptions about the water availability with the absence of "a tangible proof" of a water problem:

> "I don't see anything, a **tangible proof**, that water will run out if I am being honest" – Amina

Similarly, despite acknowledging a "problem" earlier and perceiving water as a "limited" resource, Adel and Doaa's statements indicate that physical cues of water availability/access, shapes their perceptions about current abundance and problem significance:

> "We are taking it [water] for granted, I mean the fact that I get up and **water is there**, when will I start to feel the issue? **when I can't find this water**" – Adel

> "Currently, **there is abundance**, but we are approaching a shortage… my benchmark is as long as **I have water at home** it means there is abundance" – Doaa

This pattern suggests that relying on physical signs of water availability as the sole and accurate representation of reality (i.e. water situation) is a core contributor to shaping inaccurate perceptions about water situation and abundance. Analysis indicates that the validity of these perceptions are not questioned by participants, as long as there are no contradictory signs challenging these initial "impressions", or implying they may not be necessarily true. Hence, in the absence of physical signs of water issues (e.g. supply disruptions, shortages or droughts) participants assume their perceptions about the water situation are accurate. Nevertheless, the data suggests that more implicit cues also play a significant role in shaping these perceptions. These implicit/non-physical cues go beyond actual water access/availability and have a potential to offset the impact of physical cues on

abundance perceptions and problem recognition. These non-physical cues help understand the different problem recognition identified across the UK and Egypt, despite similar physical cues. Three main non-physical cues were identified and are explored in more detail next.

Non-physical (implicit) cues

In several interviews in the UK and Egypt, participants refer to cues that do not physically include water to support their perceptions about abundance and problem significance. In the UK, several participants refer to the absence of these cues as to justify their abundance perceptions. For instance, Daniel explains his rationale behind his high abundance perceptions by stating that there is an "absence" of "contrary" signs:

> "There is a total absence of positive signs…It's not that you actually **see** something that gives you that **impression**, it is the total **absence of anything to the contrary**. So, I think people take water for granted, **they don't talk about it**, the **bills are not that high**. You know the gas bill is much higher than the water bill for most people. So, I think it is on that **basis**." – Daniel

Similarly, Mary, reflecting on reasons why she thinks many people assume water "isn't a problem", stated that "absence" of behaviours and signals that "remind" people that water is "valuable" are main reasons:

> "It's the **absence** of certain kinds of behaviours, really. There's **very little that reminds us** that water might be valuable in some way or to be appreciated. So we think **"it is just there"** we are just very accustomed to having good access to clean water, most of the time that **isn't a problem**" – Mary

In the same vein, Tasha stated that she based her "assumptions" on the amount of rainfall, because she was never exposed to anything about water availability in the UK:

> "Based on how much **rainfall** we have, this is just based on **complete assumptions** here … I've **never seen headlines** that say we have a shortage of water, there's never anything really pushing water conservation just to see adverts, to see things in the media, to see **people talking about it**, I don't see any of that!" – Tasha

These statements are examples of how this type of cues go beyond physical exposure to water and involve more implicit signs in the participants' surrounding social context. Furthermore, it indicates that it is not only the existence of these cues that matters, it is also their absence. For example, in the UK the data suggests that the *existence* of physical cues such rainfall and continuous access leads to misinterpretation of the water situation; in terms of lack of problem recognition and/or assuming high abundance. Those perceptions were supported, rather than contradicted, by the *absence* of other more implicit cues.

This pattern is identified in several interviews across the UK and Egypt where participants refer to implicit signs to justify their perceptions about the water situation. However, as will be explained next, the absence of some of these signs does not signal a problem with water and thus, implicitly confirming rather than challenging the participants' perceptions. Analysis indicates that non-physical cues can be classified into three main types: media, social and policy cues, discussed next.

Media cues

The data suggests that exposure to information about water is a crucial cue that shapes participants' abundance perceptions and triggers their problem recognition. In UK interviews, several participants reported lack of exposure to any information relevant to water. This further contributes to the lack of problem recognition, the perceived insignificance of water relative to other issues and assuming abundance perceptions. For instance, in the interview with Tasha, she states that unlike climate change, information relevant to water never comes to her "radar". This supports the notion mentioned previously that individuals scan the surroundings for cues to help them assess the significance of the water situation:

> "It's just **not something that ever comes into my radar.** It's **not something I ever see in the media** or things I **read,** things I **watch.** I do know about **climate change**, but specifically water conservation is **not something I see on a daily basis"** – Tasha

Similarly, Pamela and Karen reported a lack of exposure to informations or "news" about water:

> "there is a concern here [in the UK] you have organisations worrying about **bees**, worrying about **environmental problems**, but water, **I haven't seen anything** yet" – Pamela

> "It's **not really talked about, water** shortages. Quite**, not very common to hear** about water shortages on the **news** and **common conversation**" – Karen

Karen raised an interesting point that suggests that it is not only exposure to official information through media platforms that shapes perceptions, but also the informal "conversations" with others. Hence, social interactions have a role in shaping participants' perceptions about the water situation. In several interviews, social cues were the second type of non-physical cues identified and will be discussed in detail later in this section.

In the Egyptian interviews a different pattern is identified. Several participants reported being exposed to constant official information in the media about the water situation, especially the various threats posed by the dam being built in an upstream neighbouring country (e.g. affecting Egypt's share of water). Such exposure to water relevant communication from formal sources and national media highlights the importance of water, as well as, signals a potential problem with water availability:

> "The issue of this Renaissance Dam is the **talk of the hour.** If it's built it will **negatively** affect Egypt and the annual share of water" – Ahmed

> "On the **media** it's all about the issue of the dam and the problem that water will be reduced, the media has been **focusing on this topic** for a long time, maybe a year or two" – Nadia

Exposure to media cues helps better understand why higher problem recognition is identified in Egypt, despite the similarity of physical abundance cues with the UK. It suggests that media cues helped them capture a broader picture of the water situation beyond their current abundance perceptions.

Social cues

The second type of cue identified is social cues. Across several UK and Egypt interviews, these cues act as a relatively less-formal source of information that helps participants shape their perceptions about the water situation. Social cues identified are

conversations with others about water as well as observation of others water usage behaviour. In the UK, several participants reported that topics ranging from water conversation or metering to availability and/or shortages are rarely discussed within social groups' "conversations". This lack of social conversations, in addition to lack of exposure to media cues, helps explain the prevalent lack of problem recognition and the perceived insignificance of water issues relative to other issues in the UK. For instance, Elizabeth mentioned that she always talks with her friends about environmental issues. However, when asked to elaborate, water was not mentioned:

> "There is a lot of conversation about what we're doing, about things like **fast fashion**, I'm kind of **aware** of, and there's often a **conversation with friends** about **climate change**" – Elizabeth

Similarly, Pamela and others stated that with her friends water is "not on the table" and that they talk about other things:

> "**we never had that sort of conversation**, if it's not on the table. Wow, I realise this now. Maybe because **we have water for granted**, we are more drive into talking about **other things**" – Pamela

> "**no one's really ever brought it up in conversation**, like in terms of like you know we should watch our water usage … even when people are moving into a new place for instance, questions are always about like, what's the gas bill like what's the electricity, but like, **no one ever says "how's the water bill?"** – Rasheed

Regarding the point raised by Rasheed, further analysis reveals one aspect that could help understand why conversations about water bills are not common. In almost all UK interviews, participants reported that their water is unmetered, and water bill is a fixed rate – regardless of consumption, and that it is relatively cheap compared to other utilities. This suggests that when policy measures related to water metering and cost are insufficient, the significance of water relative to other utilities will be underrated. Policy measures as cues for problem recognition are the third implicit cue and will be explored later in this section.

Insights from the UK interviews in regards to "conversations" suggest that when an issue is important participants expect to hear about it in social discussions. In Egypt a similar pattern

was noticed. However, an additional layer of the social cues was identified. It is not only "conversations" about water that were lacking but also observation of other people actively engaging in water efficient behaviours. On the contrary, in almost all Egypt interviews, participants reported observing socially visible water wasteful practices (e.g. washing cars with a hosepipe). They were usually associated with criticism and/or with expressing disapproval. For instance, Adel perceives this as "caresslness", Marline adds "irresponsible" and Mahmoud thinks it is a "waste". It is important to note that these negative attitudes towards wasteful practices indicate that socially common behaviour is not necessarily socially acceptable:

> "Guys who are holding the hosepipe and keeps spraying cars with it, or spraying the ground this is **carelessness at its best**, for such an important resource [water]" – Adel

> "Those people who spray water in the streets, they are not even using it for anything, it's very **careless** and **irresponsible**" – Marline

> "People in Egypt waste lots of water, the simplest example is who spray water on the streets, this is **pure waste** of water" – Mahmoud

In addition, this shows that social cues are not consistent with media cues. Hence, a gap exists between the information received and the practices observed. For instance, Doaa stated that people's behaviour in the streets does not reflect what she sees on "social media". Similarly, Noha thinks that information about the potential threats of the dam in Egypt has increased awareness but has not changed "usage":

> "It's **only on social media**. I mean, still, while you are walking in the street, you find people washing the cars and leaving the water running from the hosepipe" – Doaa

> "As in **usage, no**. It's in the thinking about the importance of water, maybe the **awareness increased** a little bit, because of the problem with dam" – Noha

This pattern suggests that exposure to media cues solely is insufficient to signal a significant water problem. Hence, a water problem and its significance will be underrated as long as social cues are not conforming to media cues – through water efficient practices and/or conversations. Some participants in Egypt refer to one aspect that could be an effective tool

which could help bridge this gap, namely policy measures. For instance, Esraa stated that "laws" that impose "fines" on excessive consumption would trigger practical practices that align with the water problem announced in the media. The importance of policy measures was identified in several other interviews across the UK and Egypt, as will be discussed next.

Policy cues

The third type of cues identified and the most subtle of all is policy cues. In the UK, as previously mentioned, several participants reported that water is unmetered and bills are fixed monthly/annual rates that do not necessarily reflect actual consumption. Moreover, several participants reported that the water bill is "cheaper" than other utilities. For instance:

> "We only have smart metre for energy but **we don't have any for water**" – Maria

> "In gas and electric [companies] there's a big push to have everything installed on a metre. But the water company I'm using, **they've never said anything about a metre**" – Bob

Consequently, this has positioned water as relatively less significant and helps explain why other utilities are gaining more attention. These policy measures further support the lack of problem recognition and disregard given to water relative to other resources. In addition, as mentioned by Rasheed earlier, lack of policy measures are relevant to the lack of social cues. For instance, Pamela reflecting on why her friends do not have "conversations" about water, she stated that it is mainly because water is "cheap" and hence, not perceived as an "issue":

> "Maybe they [friends] are **more aware of plastic and other environmental issues** but not water. And I think most of the people are not aware or more ignorant about the topic because **water is cheap, it's not expensive as gas or heating.** You **don't seem to care,** daily, you know what I mean, it's because we're not being charged with big amounts of money for water**, it's not like an issue."** – Pamela

In addition to contributing to the lack of problem recognition, the existing measures are further supporting participants' high abundance perceptions. In a few UK interviews where water is perceived as infinite, keeping track of usage was perceived as unnecessary. For instance, Mario and Daniel think that installing a water metre does not "make sense" or has "no benefit" in a UK context where water is abundant:

> "It **wouldn't make any sense** to have this very smart metering system in York because **they have plenty of water** there, so why? that wouldn't make any sense to have a very sophisticated watering system" – Mario

> "I would regard it as an **unnecessary expense** for marginal or **no benefit**" – Daniel

Further analysis indicates that non-mandatory metering and paying fixed rates not only reinforces high abundance perceptions, but also implies lack of accountability and governance. Thus, augmenting the lack of problem recognition and/or the low significance perceptions. If a resource is scarce, participants expect its usage to be governed and restricted. However, the existing insufficient policy measures are signalling a dangerous message that water can be used "freely", with no limits/restrictions on usage. Insights show that in the absence of legal/policy restrictions, the water is perceived as ungoverned and hence, can be used freely. For instance, Bob perceives the lack of "legal" measures as the cue that implies "freedom", and that's why he would never comment on his neighbour's wasteful behaviour (i.e. washing the car with the hosepipe):

> "There's **nothing legal** to say anyone has to use only so much water. So, I think more technically they [their neighbour] have the **freedom**, technically, legally in the UK, **anyone can use as much water as they want**. If you don't restrict something people will use it to the maximum you know" – Bob

Moreover, some participants got used to this "freedom" that any kind of restriction is negatively perceived. For instance, in the interview with Maria, a hypothetical increase in cost is met with "disappointment" because it means she will have to give up some of this freedom:

> "My initial reaction would be **disappointment** and being **upset** … probably because it is this resource that we know that **has always been there** and we are able to use it **freely**" – Maria

Similarly, the notion of restrictions on usage is perceived by Alex as "unfair" and a violation of "human rights":

> "**impeding on people's rights** to certain things, you know… like food, water, **basic needs**, **human rights**. Who decides how much one household should have? It might be **unfair**" – Alex

While access to water is a human right, free unlimited usage is not. These insights indicate that sufficient solid governance tools and policy measures are needed to counter the impact of such perceived freedom. Furthermore, these measures are an important cue that help participants assess the significance of the water situation. Hence, stricter measures could signal a current or potential problem with water abundance and better reflect the significance of the situation.

In Egypt, similar to the UK, governance and accountability were lacking. In several interviews, it was clear that policy measures in place did not align with media cues. Additionally, a link between social and policy cues was identified in several interviews where participants blamed the socially visible wasteful practices on absence of policy measures. They called for more strict law enforcement and sanctions on anyone misusing this perceived "freedom" of consumption. For instance, Esraa stated some of the reasons that she thinks are causing people's wasteful behaviour:

> "There is **no control**, there is **no punishment**, no one will hold me **accountable. So,** people think that this **water is an acquired right**, I will use it as I want, I will waste it, there is **no governance** and no one will hold me accountable for anything, I am **free** to do what I want" – Esraa

Similarly, Marwa mentioned that "punishment" and "threat" would be an effective tool to change these behaviours:

> "To feel that you are under **control**, and that you are under **surveillance…** the mere threat that you will be **punished**, this will make a lot of difference. All the people in the streets washing cars should be **fined**" – Marwa

Regarding metering, a similar pattern to the UK was identified in Egypt. Several participants reported not having a separate water metre for their household, but sharing a metre with the whole building. This was criticised by many participants mainly because they were not able to track and pay for personal usage, which was perceived as "unfair". For instance, when asking Aya and Noha if they prefer having a shared metre, they both replied in favour of a separate metre:

> "Of course, [I prefer] a separate metre for our apartment, even if it would be more expensive, it is **more fair**"– Aya

> "The metre will be **fair**, because each household would be able to **track their consumption accurately**" – Noha

However, an interesting policy shift is noted with few participants who live in newly built accommodations. They stated that all new buildings now have a separate water metre for each apartment that is also prepaid. This was usually associated with more concern about usage rates and intentions for reductions. For instance:

> "When they started changing the metres to a prepaid amount every month, the story changed completely. If you don't use the water efficiently, the metre will cut off your water supply" – Emad

This new metering system indicates that policy measures are taking steps to better match the potential threats on Egypt's water availability, hence, aligning more with the media cues.

Overall, the data suggest that these cues need to be consistent and should complement each other. Moreover, they have a great potential to trigger problem recognition as well as enhance the significance of water conversation, even in the absence of physical cues signalling water issues.

A side effect of the absence of these cues and no physical evidence of water issues is that the perceived state of abundance is assumed to last forever. The data suggested that these cues not only shape perceptions of current abundance but also future abundance, discussed next.

Future Abundance perceptions

This was evident across several UK interviews where a potential change in the assumed state of abundance and potential shortages were perceived as a "highly unlikely" event and even "a joke". For instance, asking participants about their perceptions of the likelihood of water shortages in the UK:

> "That's [water shortages] **never** been a kind of problem that we have here … [probability of water shortages] very low, **very low**. Like, you know if it was likely unlikely and so on, I'd say **highly unlikely**" – Alex

> "It [water shortages] is **not something I've ever imagined**" – Sherly

> "It's just a **joke** to expect water to run out in a **very wet country**" – Karen

> "I can't see that [water shortages] happening **in my lifetime** in this country. I feel that we have a **plentiful supply** of water in this country." – Daniel

The analysis above shows that these perceptions are not only supported by the existence of physical cues of abundance but also the absence of conflicting non-physical cues, especially media. In several UK interviews, the role of information was identified as a main contributor to shaping perceptions about future abundance. This supports the previously mentioned notion that media cues help offset the influence of physical abundance cues. For instance, a hypothetical potential shortage in the UK was met with "surprise" by Rasheed and Tasha, because they lacked exposure to relevant information and had to rely on physical cues of abundance to shape their "assumptions":

> "It's [a water shortage] **unlikely** because of the fact that **we're surrounded by water**. So, on that basis, I would think it's unlikely. Plus, we get a lot of **rain** (laughs)... To my knowledge, **I don't know** about any issue with water supply. If you're telling me it [a water shortage] is likely, then I'd be **surprised** for sure! then I think **we should know about that** as well to drive behavioural changes"– Rasheed

> "I would be **very surprised**, let's put it that way … we're not experiencing climate change, **we have so much rainfall** in this country where we're famous for it! So, it [a water shortage] is highly unlikely. I think a water shortage would be **quite far into the future**, again based on how much rainfall we have. I'm not into geography or anything this is just based on **complete assumptions** here" – Tasha

Similarly, Karen justifies her perceptions about "unlikely" water shortages, with the absence of physical cues signalling a problem with current abundance as well as lack of information that says otherwise:

> "because we've never really had a situation where, being without water. I **don't know.** Yeah, I don't feel I've got enough information, really. I think, **not feeling very informed** on it, I think it [water shortages] might be that something will happen, but not in the near future" – Karen

On the other hand, higher perceptions about the likelihood of shortages was identified in few interviews where participants reported some degree of personal awareness about environmental issues. This was usually associated with acknowledging potential changes to

the current state of abundance and reporting higher uncertainty about the future. For instance, Pamela and Mary recognise the possibility of shortages due to awareness of climate change:

> "I think that the **future doesn't look very bright.** Natural resources, they're not going to be there forever. I am **reading** and I'm **watching documentaries** about it. So, I think at some point we're not going to be that lucky. We're not going to have water, as we want, freely, as we are used to now." – Pamela

> "Weather patterns are so **unstable**, **although we get a lot of rain**, we are hotter than it used to be, and we get periods, long periods with no rain. I mean, we had two months without rain this year, which is a long time! So, (silence) I think it's very unpredictable, it could happen next summer, could be next spring, it could happen anytime. And definitely in the longer term it's a bigger **risk**, unless we begin to do something about the climate" – Mary

In the same vein, further support to the relevance of information in shaping future abundance perceptions was identified in Egypt. Higher exposure to media cues previously identified was usually associated with higher perceptions of future water shortages. Several participants reported negative perceptions about future abundance based on exposure to relevant information, especially about the potential threats of the dam in Egypt. For instance, when asked to explain their perceptions of the future water situation, negative scenarios were proposed:

> "The future is **terrifying**, and sometimes I am in denial, and I try not to think about it. When the dam is built, there might be a war, there might be a **drought**, it could all be bad" – Aya

> "Why waste? We should think about the coming days, no one knows what will happen with water. The issue of the dam and water will be reduced, consumption should be rationalised, water could **dry out**. All these talks made me **scared**" – Nadia

> "The water available in Egypt **will not remain at the same quantity** as it is now. Let us assume that, the water in Egypt will **decrease** by 50%, surely this means 50% will be cut off everyone's share of water" – Mahmoud

> "It [dam] will cause the amount [of water] that reach Egypt to **decrease** one day, and water available will **not be enough for everyone**" – Ahmed

In the few interviews where problem significance in Egypt was trivialised, lack of information was identified. For instance, Noha's assumptions about unlikely future shortages was based on her "personal opinion" because of lacking "awareness":

> "My personal opinion, I don't think that the probability of this [water shortage] happening is large…I **don't know**, I also do not have enough degree of **awareness** about the implications of the issue [dam]" – Noha

In summary, these insights indicate that perceptions about future abundance are usually consistent with the degree of problem recognition. Problem recognition is identified differently in the UK and Egypt. In the UK, several participants show a lack of problem recognition. On the other hand, in Egypt most participants acknowledge an existing problem with water availability. Exposure to information in Egypt creates a climate of uncertainty that is associated in most cases with concerns about future abundance – despite not having any actual physical cues of scarcity at the present time. Thus, participants became aware that absence of these cues does not guarantee future abundance and hence, a problem with water is recognised. Unlike in the UK, where nono-physical cues (i.e. media, social and policy) are absent, changes to the current state of perceived abundance is hard to imagine and hence, assumed to last forever. These perceptions are found to be the basis for other perceptions/themes identified. When no problem is recognised and/or abundance is assumed, two main perceptions are also identified. First, several participants trivialise the broader impact of their usage and think "it won't make a difference". Second, they tend to underestimate the urgency of the issue and need for action. These two patterns are discussed next, in theme 2 and theme 3, respectively.

Theme 2: (Trivialising) Perceived Personal Impact

Overview

Absence of policy cues (see Theme 1, p. 108) such as metering and regular billing means there is a lack of feedback on usage rate. This was associated in several interviews with participants underestimating their usage rate and hence, perceiving no need to adjust their behaviour. The data suggests that when usage is underrated, its impact is trivialised. Participants' perceptions about their water usage and its impact is explored in this section.

In several interviews across the UK and Egypt, the absence of policy measures such as water metering and/or regular billing (see Theme 1, p. 108) is associated with an underestimation of water usage rates. Participants' perceptions about their water usage are very positive. They tend to perceive themselves as highly efficient and hence, perceive no need to adjust their water consumption. For instance, reflecting on their level of consumption, several participants in the UK stated that:

> "I think I'm a little bit **below average**. That's a complete **assumption**, I think **I'm quite satisfied** with water consumption" – Tasha

> "I consider that I use water in properly **good sense**" – Daniel

> **"I think I don't waste much water anyway**, I probably do, but I don't consider myself as wasteful" – Bob

> "**We don't have big water consumption,** we are using as much as we need. That's my **feeling** anyway, **I have no numbers to back this up** because **I don't even know how much we use**" – Mario

These results were similar in Egypt, when participants were asked if they are satisfied with their level of water usage:

> "Generally, we are **not wasteful**, I am **satisfied**, my consumption is very **reasonable**, not wasteful at all" – Marwa

> "I feel that my consumption is the **normal** consumption for anyone ... I do not **feel** that I am wasting" – Esraa

"I don't **feel** like I'm using too much unnecessarily, my usage is **moderate**" – Doaa

"I don't perceive it [her water usage] as high... I mean I am **satisfied**" – Marline

It is noted that several participants use the words such as "think" and "feel" which suggests that their water usage perceptions are based on "assumptions" rather than solid numbers/knowledge. This reveals an additional side effect of insufficient policy measures relevant to lack of feedback. In the absence of feedback, there is nothing to help participants gauge their usage. Accordingly, several participants tend to make speculation about their water consumption. In some cases, this was associated with inaccurate assumptions about their water efficiency in terms of underestimation of their usage rate. For instance, Alex admits he does not "know" his usage and underestimates his daily usage to "10 litres", despite reporting always leaving the water running while washing up:

"[daily water usage] Something like 15 or 20, **maybe 10 [litres per day]. I don't know,** because, you don't know!" – Alex

Similarly, in Egypt when asked to estimate her daily water usage, Marline assumed it is "40 litres ", despite reporting earlier that she spends a minimum of 45 minutes in the shower. On the other hand, receiving feedback on their water usage helps bring their actual consumption into their realisation and challenges their efficiency perceptions. For instance:

"I've never had a water metre before so **perhaps, I've always used a lot of water and haven't realised it**." – Karen

Furthermore, there is a pattern showing that feedback can also trigger behaviour change. In several interviews, participants reported that having a water metre and/or regular numeric feedback would help them "reduce" or "bring down" their consumption. For instance:

"To **see** it [water usage] in **number form** just like my electric and gas. I think, having the **monthly bills instead of my annual bill**, I think it would have some kind of impact on me trying to **reduce** my water consumption, so hitting home harder (laughs), you can actually see in **numbers,** how much it is" – Tasha

"When you **realise** like one person or two people uses that much, that many litres , it's just like "wow, that sounds wild", it just sounds very very exaggerated, but it's just a **real figure.** Just **knowing** that you use **100 litres** sounds so much for household of

three people, just hearing that, just seeing that sounds like "you know what guys, **let's try and bring this down**" – Alex

Similarly, in Egypt, explaining the perceived benefits of a separate metre is usually associated with intentions to reduce water use:

> "If I have a separate metre and the usage is very high, then I know that – even if I think it is low, but the metre shows it is high, then it needs **conservation**, I mean, I need to **reduce** my water usage a bit" – Marline

> "We can **track** or we can see how much water we consume every month I think we will **reduce** it, if we see that it is a lot more than previous month, then we can **reduce** it" – Mahmoud

These statements call for further analysis to better understand the reasons behind their intentions to reduce. The data suggests that there is a deeper implication to having a water metre and/or receiving a water bill that goes beyond feedback provision. The mere knowledge of usage rates is not sufficient to trigger these behaviour change intentions, but the perceptions about the impact which this usage rate entails, as will be illustrated next.

In the first instance, it may appear that participants' intentions to reduce their water consumption are driven by self-benefit and economic motives to cut the cost of their water bill. However, further analysis revealed that the monetary impact of water consumption is not always an effective motive for behaviour change. Interestingly, a pattern across the UK and Egypt indicated that participants' motives to conserve water include the broader impact of their usage on environmental and social aspects that go beyond themselves. These two aspects (i.e monetary and environmental/social) are discussed in more detail next.

Monetary impact

Typically, water usage rate is translated into a financial cost that has a monetary impact on individuals. In some interviews, participants perceive their water usage rate in terms of the cost it involves. This suggests that cost gives their usage rate a meaning. For instance, Maria perceives metre readings as "random numbers" that do not have any meaning until it is presented in a "monetary" form:

> "Whenever you see a [water] metre, you see **random numbers**, but the moment you see it in a **monetary image** you **understand** exactly what each penny and each pound

mean. So, that puts a value in something that we are using, in a **monetary reference** you have it **clear**" "– Maria

Similarly, Rasheed – whose water bill is included in the rent, is curious to know his water usage but refers to it in monetary terms rather than in litres:

> "It would be interesting to see how much water we actually consume, to see if I consume **40 pounds of water a month or more or less"** – Rasheed

Nonetheless, analysis indicates that monetary impact was not associated with behaviour change. One aspect that is highly relevant is the notion of affordability. In several UK and Egypt interviews, individuals' perceived significance of the monetary impact of their water usage, in terms of the cost incurred, depends on their perceptions about affordability. Hence, cost will not encourage behaviour change and water savings, as long as they can afford it. For instance, Daniel will only consider giving up his daily bath if he can no longer "afford" the bills. Similarly, when the water bill is perceived as not "expensive", Mario thinks there is no "incentive" to save:

> "I would continue to have a bath, even if I had a water metre …I know **I can afford my present consumption**. ***If*** my i**ncome dropped** and I could no longer **afford** the bills to pay the bills. Then something would have to go" – Daniel

> "It's [water] not very expensive. So again, there is **not much incentive for water savings**" – Mario

Similarly, in Egypt, Nadia reported that only if she can not afford the water bill, she might change her behaviour:

> "if the bill is **expensive**, and it is **too high for me**, I will close it [the tap], and I will not use a lot of water" – Nadia

On the other hand, monetary impact was perceived as a more significant driver of water savings when perceptions about affordability are low. For the few participants who reported that cost would be an incentive to save water, it was noted that relatively lower affordability was implied. For instance, Georgia, as an undergraduate student, thinks paying the water bill would be an "incentive" for her to save water and hence, she criticises that all bills are included in her rent. Similarly, Tasha referred to the cost of living and her "salary" not increasing:

> "absolutely everything included in the rent. I guess it is probably **quite a bad** thing because it means that **there's no incentive to cut down** the amount of water, [and] electricity we use" – Georgia

> "**The cost of living** has gone up, all our bills are going up, **my salary is not going up as quickly**. So, I think it's only natural to say, I **would cut down my water consumption**, because of the **cost** and how much **money**" – Tasha

Overall, this pattern indicates that the monetary impact of usage is trivialised when affordability perceptions are high. In the absence of the financial motive, an additional aspect was identified as a motive for water conservation; the environmental/ social impact.

Environmental and social impact

Several participants in the UK and Egypt reported that the broader environmental impact of their water usage would motivate them to save water more than the cost or monetary impact. For instance, Karen started with assuming "less cost" would be her main motive for saving water, then she stated that knowing a "wider environmental impact" would be "stronger":

> "You know, **cost** me less. But **I don't think that would motivate me**. Information about **environmental impact would be stronger.** My individual impact understanding that a bit more about the **wider environmental impact"** – Karen

Similarly, Sherly states that knowing more about her impact "on other people" would come first.

> "I think knowing if it [personal usage] is having an impact on **other people** would be the kind of information that would influence me. If it's **negatively impacting** other people would be first [reason to save], and then probably cost would be second" – Sherly

The social impact of water usage, in terms of affecting other people, was less prevalent in UK interviews. This will be explored in more detail under morality (Theme 6, p. 153).

The lack of problem recognition and assumptions of high abundance in the UK explained in the previous section (see Theme 1, p. 103) was associated in some interviews with not realising about or trivialising the environmental impact. Some participants believe that their water usage – either efficient or inefficient, does not make a difference and will not have a broader "impact" because of perceived abundance. For instance, Alex thinks cost is the highest motive for people to save water because – in his opinion, there is no environmental benefit. In the same vein, Elizabeth and Rasheed, trivialise and fail to realise the impact of water usage because of frequent rainfall and lack of a water issue in the UK, respectively:

> "There is never in the UK, there's not really the commonality or the norm of having **water shortages**. So, we're not reducing our water usage to prevent that or reduce that occurrence. So it's always going to be the **cost**, not the underlying **environmental benefits**"– Alex

> "the rate of our water consumption, **wouldn't really change much**, us being supposedly a **wet country** [UK]" – Elizabeth

> "I don't think there is any issue with the water supply … it [his water consumption] **doesn't impact anything in the UK**, I'm privileged that **I'm able to waste water and it doesn't impact anything**" – Rasheed

As discussed in the previous section, lack of exposure to information contributed to inaccurate perceptions about abundance and the water situation. In the same vein, further analysis indicates that information is relevant to shaping perceptions about behavioural consequences as well. A follow-up with some of the participants who reported low environmental impact perceptions revealed that they also lack awareness about the consequences of their behaviour. For instance:

> "consequences [of excessive usage] have **never come to light** … There's nothing, there's **no consequences**. People can be as excessive or as restrictive as they like, and **there's no difference"** – Alex

> "I am a bit **ignorant about the impact**. I think that would have a bigger impact on my consumption, rather than energy saving or water saving tips, to actually see the damage that excess consumption does" – Bob

> "I think there's definitely an impact or consequence, it's just that **I don't know** what that is**, "ignorance is bliss"**. If you don't know then basically, **there is no consequence**, because you **don't know** the consequence!" – Rasheed

In Egypt, a similar pattern showing that cost comes second was noted, but environmental/ social impact was relatively more prevalent. This suggests that higher levels of problem recognition and lower abundance perceptions could have a role in enhancing the realisation and/or countering the trivialisation of environmental/ social impact of behaviour. Several participants reported environmental/social reasons for saving water, regardless of whether or not they are responsible for paying the bill. For instance, reflecting on their motives for water conservation:

> "I'm not the one paying bills and I don't know how much it is [the water bill], so maybe it [cost] is **not the priority**, rather just that I am preserving the **environment** and the **resources**" – Doaa

> "To feel that I am doing something **impactful**, something **useful**, it [water saving] will be something I do for **society** or for the **environment**, because as I told you, I don't know how much is the bill we get" – Mahmoud

> "Cost is never the thing which makes me do or not do something, I mean, the cost of electricity now is high, my consumption does not change…It is more about the **society**, there are **people** who cannot find this water, whether we here in our country or in another country" – Adel

The impact on "people" reveals a social aspect to water conservation beyond the generic impact on the environment. It suggests that realising the potential impact of behaviour on someone else beyond themselves could motivate behaviour change. This notion has moral implications and will be discussed in more detail under the morality theme.

In summary, findings indicate that self-interest in terms of monetary impact (i.e. cost) is not the sole motive to save water. Environmental/social aspects could also motivate behaviour change. It is worth noting that, in some interviews the environmental/social impact was trivialised because of perceptions relevant to the collective behaviour. This will be explored in more detail under social influence (Theme 5, p. 140).

Despite the higher level of problem recognition and acknowledgment of the environmental/social impact of water usage in Egypt, participants did not report engaging in any further water saving than in the UK. Further analysis reveals that urgency/threat perceptions could help better understand this phenomenon. Similar to the UK, the significance of the problem and their potential impact was still trivialised by some participants in Egypt because the urgency of water issues was underrated. This was usually associated with several participants – in both contexts, prioritising convenience over efficiency. Perceptions about urgency and threat are explored next (Theme 3) and prioritising convenience is discussed in Theme 4 (p. 134).

Theme 3: (Underestimating) Urgency and Threat Perceptions

Overview

Previously discussed themes have shown how lack of problem recognition is associated with high abundance perceptions and trivialising personal impact (see themes 1 and 2). Additionally, the perceived probability of water shortages and the mere idea of potential problems with supply are perceived as distant, in terms of the time when and the place where it could happen. Consequently, the urgency of water issues are underestimated. Urgency perceptions and underlying aspects that shape them are discussed next.

A lack of problem recognition and high abundance perceptions identified in the UK interviews aligned with a prevalent perceived lack of urgency. In the UK interviews, several participants explicitly stated that water is not "serious", "urgent" or a "priority". For instance:

> "It's just isn't **serious** enough for people to be listening to it… **the urgency isn't there**" – Elizabeth

> "It's not like a **priority** to worry about. Electricity generation and carbon dioxide emissions are **more urgent at the moment** than water usage, in this part of the world. It's [water] not something people tend to **panic** about as much, at least in this country" – Georgia

> "In the long term, let's say *if* climate is going to change and water supply, even in this country, is going to become a much more **serious** issue." – Daniel

In Egypt, urgency/threat perceptions were more implicit. Despite acknowledging that an "issue" and a "problem" with water exists, some participants stated that the water situation does not need "exaggeration" and does not call for "panic" or "concern" – implying a perceived lack of urgency. For instance:

> "I do not feel that the **issue** needs **exaggeration**, it is an existing problem yes, an actual **existing problem**, but not to the degree that causes **panic**, I mean, **not yet**" – Noha

> "This is why the **issue** is not a cause of concern … it **will not be in the current period**" – Adel

Further analysis to better understand how urgency is shaped revealed that urgency is relevant to threat perceptions, in terms of the extent to which they feel personally threatened by a problem. Participants assess the degree of threat based on their perceptions about distance/closeness in time as well as place where a water shortage would occur. When an event is perceived as more likely to happen in a close geographical place, urgency perceptions tend to be higher. For instance, in a follow-up with Georgia to explain why she thinks carbon emissions are more urgent she stated that it is more "UK centric" and its effect will be felt more "locally". Similarly, Elizabeth further explains what would make water more "serious" is that a water shortage happens "somewhere closer" and thus, affects people "personally":

> "It's kind of so **UK centric**, climate change and just general warming at the planet, it will probably **affect us more locally**" – Georgia

> "I feel like it has to be something that **affects people personally** … if it's going to be affecting **somewhere that's geographically closer**, that would mean that people are starting to get scared about it, about **what happens to themselves**" – Elizabeth

Furthermore, perceptions about temporal proximity contribute to shaping personal threat perceptions. Several participants refer to a time element such as "not yet", not "in the current period" and "at the moment". From the participants' perspective, the further in the future a shortage is perceived to occur, the less likely they will be personally affected. For instance, Sherly explains sarcastically that if a drought is distant in time, "fifty" years, she will not "panic" because she will probably be "dead by then", impling lack of direct/personal threat:

> "I mean, if you said in the next **five years** [a water shortage will occur] I'll definitely start to **panic**, but even the next like, you know, fifty [years] it seems like a **long way away**…maybe I can slightly write it off a little bit, by that point **I'll probably be dead by then**, so **why does it matter** (sarcastically, laughs)" – Sherly

Similarly, Marline from Egypt explains that if a water shortage would happen in Egypt within "10 years", it means she is still not "affected". Hence, it is not perceived as a "near enough threat" to trigger "strong action" and reduce her water consumption. Nevertheless, she would start to change her behaviour if she knew it would happen sooner, within "two years":

> "I know that the **issue** [potential shortage] is not far away, but I **am still not affected by it.** I expect if this **problem** persists, maybe in 10 years [a shortage might occur]... I mean, as long as I or any person **does not feel a great or near danger**, it [water usage] will not be reduced to the extent that makes me take real, quick and **strong action against myself.** But, if it is still going to happen **within two years** or something, one can **start to change** a bit" – Marline

In this quote a hypothetical change in temporal proximity has triggered an intention to change behaviour. A similar pattern was identified across several other interviews across the UK and Egypt. The role of urgency/threat perceptions in helping understand water consumption behaviour is explored in more detail next.

Further analysis indicates that water issues are perceived as less "urgent" and "serious", because some participants do not feel personally threatened by a water shortage. When a water shortage is perceived as a personal direct threat – happening sometime soon, in a place where they currently live or close by, a higher degree of personal/direct threat is implied. Ultimately, the sense of urgency increases. When urgency perceptions increase, water issues become more of a reality and more worthy of attention and instant action. The data shows that the closer/more urgent the problem is perceived the more likely it will trigger need for action and behaviour change. Thus, higher urgency perceptions were usually associated with reported intentions to adjust behaviour. Conversely, the less urgent water issues are perceived, the less attention it is given and the less the motive to change. This pattern was identified across both UK and Egypt interviews. For instance, Daniel who stated earlier that the water situation was not "serious" enough, later explains that water is one of the issues that does not need "to be solved by tomorrow", impling a lack of urgency associated with inaction. Similarly, Elizabeth's low urgency perceptions have pushed water conservation "out" of her mind:

> "But these are **not things that need to be solved by tomorrow** type of thing, and therefore, people **don't want to think about them**, and **other issues get in the way** of them anyway. That's just my belief, water is one of these issues" – Daniel

> "we can put practices **out of our minds** because we're not really dealing with it **immediately**" – Elizabeth

Similarly, Alex explains how messages about the impact of global warming on "polar ice caps" does not make him change his consumption because it does not personally affect him in London. Hence, there is a lack of threat and urgency to act:

> "That's like you telling me that the polar ice caps are melting and the water levels are rising. **That still doesn't affect me in London.** It's **good to know** and I appreciate the information (laughs). If I'm going to be really brutally honest, **that doesn't impact me** … that piece of information **isn't going to change consumption**, **it has to be personal** to change." – Alex

Relevant to exposure to information, messages about water shortages occurring in the UK and in the near future "10 years" implied higher threat/urgency and was perceived by Mario as an "incentive" to "start thinking" about his water usage. This is despite his earlier lack of problem recognition and trivialising impact of personal water usage in the UK:

> "I don't know if it is true or not. I read that, it is projected that in **10 years** or something like that, in London, they may face **water shortages**…Yeah, I think that will be an **incentive**, really **to start** thinking about what to do" – Mario

Exploring water consumption behaviour across Egypt and the UK interviews has shown that water usage behaviours were – surprisingly, quite similar. Urgency/threat perceptions revealed an additional layer relevant to problem recognition, namely perceived problem significance. Despite different levels of problem recognition across the UK and Egypt, water issues in both contexts are not perceived as close/urgent and thus, not serious/significant enough to trigger behaviour change.

This helps understand the problem recognition - action gap identified across Egyptian interviews. In addition, it is one reason why they are not engaging in extra water efficient practices relative to the UK participants. For instance, despite acknowledging the potential risks posed by the dam, Adel reports that such "impacts" will not happen "overnight" and will occur "after a long time". Hence, he is not "concerned", implying perceiving the problem as insignificant and not worthy of concern:

> "Its impact will appear **later**, which is **after a long period**, not now. It **won't happen overnight.** Maybe that's why I, and people, are **not concerned** about the **topic**" – Adel

On the other hand, further analysis revealed that the few participants who showed higher urgency perceptions reported higher problem significance and ultimately, engaged in more water efficiency behaviours. For instance, Esraa refers to water as a "very close" "crisis" that makes her "scared". Notice how the words used reflect a higher problem significance and urgency compared to Adel for instance who used "later", "topic" and "not concerned", respectively. Esraa's perceptions of higher urgency and significance was associated with more water efficiency practices on her side and even encouraging others to do the same:

> "**Very close**. I am **scared** that in two or three years, if not closer than this… maximum of two or three years, [so] water consumption must be reduced. The issue is **getting closer**. A **crisis** and a **disaster** may happen because the country does not have water. So, I keep doing this [saving water] more and I keep telling people more." – Esraa

However, underestimating urgency and significance of water issues was a more frequent pattern across interviews. The data suggest that water is not perceived as a significant enough problem to call for significant behaviour change, in terms of reduced water consumption by most respondents. An actual water shortage is perceived as the most urgent and significant threat, hence, the biggest force inducing water efficiency. For instance, Maria explains that her water usage in the UK is not as efficient as in Mexico, because she lacks exposure to a significant "closer" threat, in terms of water shortages, to change her habits:

> "When you see it **closer**, or you hear **closer** cases in a **neighbouring country**, you're aware that this is **not a joke**. It's something that kind of hits you … a constant reminder that **makes you change**. I think**, people act** whenever they **see it** or when they **face** the lack of resources and that's whenever they might **change that habit**" – Maria

In Egypt, when asked what would be a reason for her to change her water usage, Marline further confirms her low urgency and problem significance perceptions by stating that an "actual" "crisis" would force her to take "action". However, simply "hearing" about a potential problem that does not feel "close" will not make her change. This shows how problem recognition does not necessarily mean the problem is perceived as significant enough to act. Notice how words used shifted from "not close" and "problem" to "near" and "crisis". This implies an increase in problem significance as the perceived urgency increases. Consequently, triggering action:

> "When you keep **hearing** about a **problem**, but it is **not close to you**, then you **do not take action**, unless you feel that **danger is getting near**. Something **actual** has to happen, what would **make me take action** other than something, a **crisis** happening at the regional level" – Marline

Similarly, Doaa stated that her usage could be much less if they were actually "living" in water scarcity. This suggests that changing water usage is within their capability, however, they do not perceive it as necessary:

> "If we are now **living in scarcity** of resources, for example, consumption would be completely different. I mean, consumption can be so much less than that" – Doaa

In the same vein, when Amina is asked what would encourage her to save more water she stated that to "see" an actual "tangible" problem in Egypt would make her change:

> "To save water more? **to see** in front of me, I mean something **tangible,** a **problem happening**, so I would change my personal perceptions" – Amina

In the UK, Tasha states that she does not "think about" water because there is no current "major" water shortage in the UK– implying perceived problem insignificance. She added that this "lack of urgency" is a "barrier" to change her water usage:

> "It's something I don't think about on a daily basis. I think if there is **no pressure to change**, I think the lack of pressure is making it harder to start. The UK is not experiencing a major shortage **already**. So, I think that **lack of urgency** or pressure is probably like the **biggest barrier**" – Tasha

In summary, the data suggests that as long as there is no actual water issue that is personally threatening, urgency and problem significance will be underestimated. Ultimately, convenience will be prioritised over water efficiency, a theme that will be discussed in detail next (theme 4).

Theme 4: Water conservation behaviour (Prioritising Convenience)

Overview

In the previous sections, abundance perceptions were discussed (see Theme 1, p. 103) and it was indicated that high abundance perceptions are usually associated with low urgency perceptions (see Theme 3, p. 128). In this section, the impact of these perceptions are further explored. It is noted in some interviews, that participants' perceptions about low urgency are linked to a tendency to prioritise convenience over saving water in their daily practices. The underlying reasons that help understand this tendency will be discussed in this section.

The analysis suggests that as long as there is presumably no urgent need to change – because water is perceived as highly abundant, saving water is seen as an act of courtesy rather than an obligation. This was noted in several UK and Egyptian interviews and could be traced back to perceptions about abundance, discussed previously (see theme 1). When abundance perceptions are high, participants perceive the urgency of the water issues as low and hence, not "yet" worthy of changing their behaviour. For instance, in the UK, Maria lists some of the water efficient practices she could do. However, when asked if she is actually doing any of them, she admitted that she does not "go that far "yet":

> "Those are the things [water saving acts] that **I could do** that **I know that are possible,** but being completely honest, I don't go that **far** yet … I have this level of **awareness** that things are happening. But, I probably haven't reached the limit yet" – Maria

Similarly, in Egypt Doaa thinks it is unnecessary to be "extra mindful" and use the "minimum" amount of water possible because she is not experiencing scarcity.:

> "My usage is moderate, but it **will not go beyond this unless there is a real scarcity** or a shortage in the water that we get. As long as water is there, I am **not living in a scarcity** at the present time to be extra mindful, so still I will not be using the minimum" – Doaa

Further analysis indicates that personal interest is prioritised when they do not see water saving as a serious enough reason to adjust their behaviour. If everything is – seemingly, just fine, water is perceived as abundant/not scarce "yet", water efficiency is perceived as an

unnecessary sacrifice of "comfort". A follow-up with Maria reveals that water conservation is performed as long as it is not compromising personal comfort/ convenience.

> "I am doing the best that I can from my **comfort level …** this comfort place that I'll do it to the point **it does not hurt me** or it does not **take me out of my comfort zone**, I'll do the best that I can **up to a certain level"** – Maria

The notion of suffering implied in her choice of words such as "hurt" and "take me out of my comfort zone" was noted in several other interviews. This pattern of associating water efficiency with negative perceptions helps understand why several participants prioritise comfort and convenience over efficiency, and why water efficiency is perceived as a painful and a "hard" thing to do. For instance, asking Tasha if she thinks she is able to cut down her shower time, she reported perceptions about how "hard" it is to adjust behaviour because of "comfort":

> "Absolutely **I could if I wanted to**. There's no reason why I couldn't, is there? if I'm being really honest, there's like a **big comfort factor** here, you know, I'm very used to this level of water consumption and to have to cut down would be **hard** to incorporate. I think it's a lot easier said than done, **very hard** to do in practice, it takes a lot of dedication to do that continuously." – Tasha

Notice how Maria and Tasha stated they "could" be more water efficient. This indicates that there is no lack of personal ability/efficacy hindering the behaviour. However, it is simply putting personal interest – in terms of convenience/comfort, as a priority. This identifies convenience perceptions as one of the personal barriers hindering water conservation behaviour. In a few interviews a similar pattern of prioritising convenience was noted with behaviours beyond water that have eco implications. For example, in the interview with Elizabeth "convenience" was a "priority" when she was explaining the rationale behind choosing high energy consuming gadgets (e.g. electric cooker, underfloor heating and a boiling water tap) for their new kitchen. Noice how being eco-friendly was perceived as a "forfeit" of this convenience:

> "It's sort of, like you know, "what's **convenient**?**"** Maybe it is **quicker** thing, it's **easier** to use, those thoughts have definitely been the **priority** rather than "Oh, let's try and make our kitchen a little bit more eco friendly!" (sarcastically, laughing), but

it's true. I want my house to be warm. I'm not really that prepared to **forfeit** nice things in order to protect the world" – Elizabeth

Pursuing convenience has stopped some participants from acting on the knowledge they have about how to save water. In some interviews, participants reported knowing "alternative ways" to be more water efficient, however, their behaviour did not align with their knowledge. For instance, when asking Bob if he thinks some water tips would help him be more water efficient, perceptions about comfort and ease –rather than lack of knowledge, were identified. Similarly, Rasheed does not use a bucket to wash the car – despite knowing that it is a more water efficient than a hosepipe simply because it's more "convenient":

> "I feel like **I already know** them [water saving tips] …it's not like I know them and then I choose purposely not to do them, you get **comfortable** in your own usage. You, kind of, you decide what's necessary for your for your life, you become **comfortable** with that, and you form the habit from that and breaking that **isn't so easy**" – Bob

> "There are **alternative ways** to do it [to wash the car]. But that was really, umm, it would be **more convenient**, let's say, if I just had a home where I can just spray the car with [hosepipe], as opposed to keep going back into the house to get buckets of water" – Rasheed

Similarly, Adel in Egypt knows that he "should" turn the tap off during washing up but it is simply "easier" to leave it running:

> "What **should** happen, is to turn the tap on and then turn it off, on and off, but to make it **easier for myself** I just leave the water running until I am done" – Adel

This indicates that knowledge is not enough to drive behaviour change as respondents are not acting on the knowledge they already have. Perceptions about convenience/comfort associated with water efficient practices are relevant to understanding this knowledge - action gap. A pattern emerges from the data that saving water is associated with hardship. In the participants' perception, to give up such convenience and comfort, that they seem to not only prioritise but cherish, will cause them to suffer.

Further analysis was conducted to better understand why saving water is perceived as such a difficult thing to do. One aspect that is identified to contribute to these perceptions is the fact that water is essential in many daily activities. In some cases, participants link cutting down

their water consumption to not only inconvenience, but also to affecting their "fundamental" "basic human need" for water and even their "quality of life". They are willing to give up practices that they perceive as relatively less essential in order to maintain their level of water usage. For example, in explaining why it is easier for her to give up fast fashion shopping , while it is "harder" with water, Elizabeth states that:

> "it's **harder to do with water** because we think of water as being, like, a such a **vital thing** like **fundamental to our lives** and yeah and drinking and, as in having water to drink, having water to wash with all those things feel **quite fundamental** so maybe **it's quite hard to change** because it doesn't feel like an **added thing**, maybe something like fast fashion is **easier** to change … it's **quite hard** to **take away** something that's quite **fundamental**, I **need** water to drink. I **need** water to wash with. If I cut down that's going to be, that's going to **cause me to suffer,** maybe feel like it would be a **hardship**, more than it would be to go without, you know, another pair of shoes or something" – Elizabeth

Again, words that show inconvenience and struggle are noted here when she said "quite hard" "suffer" and "hardship". Similarly, inconvenience is identified in how Alex links cutting down his water usage to reducing his "quality of life":

> "I don't like to **reduce my quality of life** or my standard of living for costs, especially if I can afford it … even if it does sound excessive I'll just adjust other things outside of that, so I won't buy the expensive shoes, or, you know, go on this trip, but I will maintain the same water usage or the same electricity that I've always used, if that makes sense, so I'll adjust other things outside of my **basic needs**" — Alex

Similarly, in Egypt Nadia is open to adjusting her water usage as long as it will not impact her "basic needs":

> "If there is something I can do, I will do it, why not? I mean, as long as it doesn't affect my day. It will be **very difficult** to not cook or drink. I mean, these are the **basic needs**" – Nadia

Looking more into the words used by participants, the word "need" is used to imply *absolute* necessity. While drinking, cooking and maintaining personal hygiene are obviously non-negotiable needs, the amount of water used during these practices could be adjusted. However, in some interviews, it appears that the amount of water used is associated with an

added value or benefit which has become a need in itself. Further analysis indicates that a behaviour is sometimes perceived as necessary – even if it is unessential for satisfying a "basic human need", because of the extra value it offers. This extra value/benefit makes the behaviour simply indispensable and hence, difficult to adjust. For example, Daniel stated that having a bath is a "wonderful luxury", which implies that he knows it is not an essential need. However, throughout the interview he showed reluctance to giving up his daily bath. One of the reasons he used to justify his behaviour is the perceived benefits a bath has for his "skin" and his "well-being", a higher value to him than the basic personal hygiene goal:

> "it [bathing] has a very **nice feeling** that's very actually very **good for the skin**…I'm trying to explain to you that it has a very distinct **positive effects on my well being**, frankly…Yeah…does **good for my psychological well being**" – Daniel

The "nice feeling" and the psychological benefits that a bath offers makes it difficult to give-up. Similarly, Ahmed and Aya in Egypt report they sometimes take long showers and justify this by stating that it feels "nice" and helps "clear your mind", respectively. For instance:

> "the **feeling** of standing under the water, and the water is running down the body, it is **nice**, I can't close the water **easily** (laughs)" – Ahmed

This indicates that water practices that satisfy a hedonic need are sometimes perceived as equally important and essential as basic human needs. Hence, it is harder to give them up than water practices that are perceived as less-essential. This could be one reason to help understand why almost all participants reported easily turning off the tap while brushing their teeth. Unlike showering, leaving the tap on while brushing their teeth does not offer any extra hedonic, or even functional, benefit.

It is worth noting that many of the participants who reported convenience or enjoyment in water practices were not necessarily "indulging" nor completely unmindful about their water usage. In several cases, a sense of "guilt" was reported when water is used excessively. For instance, Elizabeth explains how much she enjoys a long hot shower, yet she feels "guilty". This implies that hedonic motives are controlled by an internal force that constrains behaviour by triggering this sense of guilt:

> "It's quite nice to just **enjoy the water**. So it's kind of a cycle of like, **enjoying** the fact that, **we have hot water and taps just available to us**. I like enjoying that, **I like that**, but at the same time **feeling guilty** when I'm doing these things" – Elizabeth

Despite the perceived water abundance and the associated lack of urgency it entails, an inner sense to save water exists and helps to rationalise water usage. This pattern was noted across several other interviews and is explored to better understand where it is stemming from. The sense of guilt and the morality perceptions about water conservation will be discussed in detail in Theme 6 (p. 153).

In the next theme, the role of social influence in encouraging participants to change behaviour and shaping their perceptions about the impact of their behaviour is explored.

Theme 5: Social influence

Overview

The role of social cues in shaping problem recognition has been discussed earlier (see Theme 1, p. 103). Further analysis indicates that direct conversations with and/or observations of other members of a social group are only one aspect of how social influence was identified in the data set. Several other aspects such as relativity, collectivity and social comparison help to better understand participants' water consumption behaviour. These aspects are explored in this section. Moreover, a link to the trivialising personal impact theme was identified and will also be discussed.

As previously explained (see Theme 2, p. 120), a pattern of trivialising the environmental/social impact of personal water usage because of abundance perceptions was identified. An additional aspect that helps participants assess the impact of their water usage was identified: relative usage. Several participants assessed their usage relative to the usage of other parties in their social group/context. This notion of relativity was manifested in UK and Egypt interviews differently. For instance, in the UK interviews, several participants compared their water usage to higher non-household water users (e.g. agriculture or industrial) contributing to trivialising personal impact perceptions. Hence, relative to the industrial or agriculture sectors water consumption individuals' water usage, and ultimately, its impact is perceived as trivial:

> "**80% of the water consumption** was from the **farming** community. So, what actually can **make the difference** is by convincing the **farmers** to use less water… only 8% is coming from the water companies, so basically households could contribute potentially to this 8%, and I'm from that 8%. Brushing teeth will be like **0.02% or even less, the impact you can have"** – Mario

> "**90% or 80% of the wastage** is coming from **companies**, as opposed to individual households, **they should be doing stuff to stop their wastage first,** as opposed to us [households] because of pure maths" – Rasheed

These statements imply that perceived responsibility to change behaviour is relevant to perceptions about relative impact. Trivialising personal water usage and its impact relative to higher water users is associated with a perceived lack of responsibility to adjust behaviour.

This suggests that the lower the perceived usage impact the lower the perceived sense of responsibility, and vice versa. Responsibility was mentioned explicitly in a few interviews. For instance, Elizabeth thinks it is the "responsibility" of "big corporations" to save water because of their higher perceived relative impact:

> "Ultimately, it is the **big corporations** who are the ones **using up most of the fossil fuels and water**. And **they are the ones** who are **contributing the most** to climate change … I think that bigger **corporations should be prioritised**, you know, **it is mostly their responsibility**" – Elizabeth

Similarly, Sherly stated that "big corporations" should take "more responsibility" because their water reductions could make a more "meaningful change", which implies higher perceived impact relative to individuals:

> "We've been sold the idea that it's up to us as **individuals** to fix this problem, actually you need **big corporations** and the **government** to **change their behaviour.** I think for there to be **meaningful change,** it's probably like the other things as climate, it's big corporations and **big companies** that need to take more **responsibility**" – Sherly

Further analysis identifies one aspect that leverages the perceptions about personal impact and counters trivialising the impact of individual actions relative to big companies, namely collectivity perceptions. The data suggests that perceptions about the collective impact of individuals in a social group could enhance/reinforce rather than trivialise personal impact. For instance, in a follow-up with Elizabeth, she explained that "if every individual did something" things "add up". Similarly, Pamela elaborates how her behaviour might not have an impact on its own but when you "add" other people the perceived impact increases:

> "the onus should be on the bigger corporations that doesn't negate any benefit of us doing it. I do feel like **if every individual did something, it would have an impact**. It's **still important for us** to be doing things in our day to day, just **little** behaviours that do **add up"** – Elizabeth

> "Industry consumption is more damaging, **me** taking care of water **may not have an impact** but if you **add** my friend, and another friend, and another friend and we are **10**

> **people then hundred, a thousand people, and so on** and so forth, maybe that could have an impact" – Pamela

In Egypt, although comparing personal usage and its impact relative to non-household sectors did not emerge, relativity was identified in a pattern relevant to collectivity. Unlike the UK, participants in Egypt assess their personal usage impact relative to the impact of other "people" rather than "companies" in the social context. In several interviews, the impact of individual action and water efficiency is trivialised because of assumptions that "millions" of other people are not doing the same. The data suggests that the perceived behaviour of the collective or majority acts as an indicator for assessing the net potential impact. Thus, when the majority are perceived as water inefficient, the impact of personal water savings will continue to be trivialised relative to the collective. For instance, explaining her perceptions about the impact of personal water usage, Doaa stated that the impact has to be measured on the "group" level as she "individually" can not impact the environment "positively" or "negatively":

> "We can measure it on a **group-level**, I mean, **not me individually**, who can impact **positively or negatively**. If only **one person is conscious** [of their water usage] and **a million people aren't**, his **impact will not do anything**, it is something related to **all people**" – Doaa

Similarly, in the interview with Noha and Amina – reflecting on the impact of their water savings, they think individual action will not have an impact unless "everyone" or "majority" were collectively water efficient:

> "It could have an impact, it might, **only if everyone behaves similarly**, but for example, **just me among 101 million** or 105 million [people] it **won't make a difference**, no" – Noha

> "As a person, as an individual, no, of course it **will not have any impact, at all**. We need, I mean, the **majority of people** to be aware of this [water efficiency] for change to occur" – Amina

This shows that collective action usually encourages the trivialization of personal impact. The same pattern was frequently noted across the interviews in the UK and Egypt. For instance, Alex stated that he feels "powerless" and Georgia thinks her water saving will not make a "difference", nonetheless, the perceived impact becomes higher when collectivity is assumed:

> "You'd be **powerless** [to make a difference]. Because if I made a concerted effort to reduce my water consumption, **it would only work if we all did it.** I could use 500 millilitres a day of water (laughing) in my effort to cut down water and save the environment, but **that doesn't really mean much if other people are not making an effort to reduce it as well**" – Alex

> "I try [to save water] although**,** it's not going to make that much difference. I suppose **if everybody did it, it will make a bit of a difference"** – Georgia

In the same vein, several participants in Egypt refer to the higher perceived impact of collective relative to individual action. For instance:

> "**If all people** began to use water in a way that rationalises consumption, I think if it would be measured, there will be a **great difference**, I am sure" – Emad

> "It is **cumulative**, I mean, **me in addition to others**, and others, we will **add up**. A person with another person, definitely it will **make a difference**" – Marwa

These statements imply a higher sense of efficacy associated with collectivity. Further analysis to better understand how and why collectivity perceptions seem to reinforce their sense of efficacy was conducted. In some interviews across the UK and Egypt, when participants assume that other members of a social group are engaging in a certain behaviour, they then perceive their own individual action as a form of participation in and a contribution to a collective/social movement. For instance, when asked about the impact of her personal usage, Maria used words that imply collective action such as "team" "bulk" "collaborative". Moreover, she adds that her behaviour is a "small contribution" to the "community":

> "You have to have a **team** of, to have **more people in bulk to make it work.** You're able to make a **small contribution as an individual**, and it can be **multiplied** by

more people. That's all you need. It is about the individuals. But I think, in this case, it has to be something, umm, **collaborative contribution** and consciousness within a **community**" – Maria

Similarly, in the interview with Liam, speaking of aspects that would encourage him to use water more efficiently, he stated that in addition to information and incentives he needs to "be part of something bigger". In Egypt, Doaa thinks water efficiency should be a "social responsibility":

"Information, incentives, like a **community**, **if you're part of something bigger** as well, so it's **not just me as an individual**, like you as Liverpool**, you can do it if you work together**" – Liam

"It should be a **social responsibility,** all people should be involved**"** – Doaa

This sense of participation and contribution to "something bigger" was not only identified at a community level, but also on a smaller scale. In a few interviews, the reference social group is at a narrower level such as tenants in the same building or even in the same household. For instance, reflecting on factors that could "motivate" her to save more water, Marline in Egypt referred to "group" action of all the other "apartments" in the building. Notice how collectivity perceptions help her overcome the trivialised personal impact which is clear in her stating "me alone will not fix the universe":

"Perhaps what will **motivate** me [to save water] is when I feel that **I am not doing this alone**, you know, **me alone will not fix the universe**. If I am joined by more people [in the building], for example, if we and **other apartments**, and **we all decided to do this**, I will be more motivated, with the **groups** I mean" – Marline

Furthermore, in the UK, Georgia stated that "group effort" as a "house" is one of the factors that would help her perform the water efficiency tips that she already knows but is not actually doing.

> "I'm not doing any of those things, even though I should … if we managed to sort of as a **group effort,** as a house, do those things. If we can **work together as a house** that would probably **make things work better**" – Georgia

This pattern raises a question of why collectivity is associated with intentions to take action and hence, calls for further exploration of collectivity from participants' perspective. The data suggests that in addition to the sense of efficacy triggered by collectivity perceptions, the knowledge of how other people are using water helps participants assess the appropriateness of their own water usage. In other words, comparing their water usage relative to the collective social group puts their usage into perspective and acts as a benchmark to help them make sense of their usage rate. For instance, Bob argued that he needs "statistics and relativity" about the "average consumption" to help him evaluate his water usage efficiency:

> "If my water metre said you've used, I don't know, 10 litres today. **I wouldn't know if that was a lot, or not** … there needs to be some sort of **statistics and relativity,** you know, **relative information** to the rest of the **country** or the rest of **the world** even…**I don't have any idea** what the **average consumption** is" – Bob

Similarly, in reflecting on his water bill, Rasheed stated that he cannot decide if what he is paying for the water bill is "normal amount" or "cheaper" than others. He added that he is "curious" to know if his usage is "typical":

> **"**I don't know if it's a **normal amount** [his water bill] or if it's expensive it's cheaper, but after this I will **ask people** to understand how much they're paying as well. **I have no idea what a typical water usage is,** you know, it has made me **curious**, what is my usage compared to the **typical UK amount**" – Rasheed

Moreover, asking Georgia if she perceives her water usage as efficient, she explained that she cannot tell because she lacks the relativity of her usage to the "national average". Similarly, Liam stated he needed "context" to assess his usage:

> "it's hard to tell [how efficient her usage is] because **I don't have anything to compare it to**, the **national average** that would help, umm, I genuinely don't know, how I am doing compared to **other people in the UK**" – Georgia

> "Nobody knows how much water they use without **context**, so I could tell you I use 10 litres a day, that is meaningless unless I know that **next door** uses 20 or it uses 50" – Liam

This suggests that relativity to the collective behaviour which is implied in the "average" and/or "typical" usage rates helps participants better understand their water usage rate and assess their own water efficiency. Nonetheless, it is clear in the data that participants lack access to this relative information and "statistics". What if they have access to this information, how would it be perceived? Analysis of participants' reactions to a social comparison vignette in which their personal usage was *hypothetically* compared to the neighbourhood average was conducted to further explore the notion of relativity. Moreover, it helps expand the understanding of how any deviance from the collective "average" is interpreted from participants' perspectives.

Participants in the UK and Egypt were presented with a scenario in which they are asked to imagine they have received a water bill which stated that their usage was higher than the "neighbourhood average". In some UK interviews, the first reaction was usually surprise, which suggests that this information conflicts with their perceptions as they assume their consumption is within or below average. In other words, they assume a social consensus on the way they consume water. For instance, Rasheed's and Bob's initial reaction was "surprise" because of the relative gap from the collective pattern:

> "I'd be **surprised**, probably, for sure. Because, of course, I think **my usage** of water is **pretty normal**, **pretty typical**" – Rasheed

> "I'd be **very surprised** and I'd have to very quickly try and figure out what it is I'm doing that other people aren't" – Bob

In some other UK interviews, surprise was reported more implicitly as verbal or even facial expressions. For instance:

> "I have to look in the mirror and say "**what am I doing!**" – Alex

> "that would make me think "**what the hell am I doing** that's wasting this much water!" – Sherly

> "I'd go [shocked facial expression] **How come!** I would be **shocked**" – Mary

These reactions to the vignette did not emerge in Egyptian interviews. Nevertheless, similar to several other UK interviews, expressing negative emotions was very common. Emotions such as upset, unsatisfied, embarrassed, guilty and shame were reported by several participants across both the UK and Egypt. These emotions will be explored in this section as well as in more detail in the morality section (see theme 6) – because of the moral implications that they involve. In several interviews, negative emotions were usually associated with a reported intention to adjust behaviour to match the average. For instance in the UK:

> "I think I would feel **embarrassed** and **really bad** and yeah, **I need to bring my consumption down**" – Tasha

> "initially just **feel very, very very guilty**…I'll start tallying up all the ways that we used water and **how we cut down** each one individually, get rid of or massively **reduce the biggest water consumer** in our household" – Georgia

> "Firstly, would make me **feel guilty** that I would, I feel like, okay, that's **a benchmark to aim for**" – Elizabeth

Similarly, in Egypt:

> I will be **very upset**, I will **rethink everything**, in everything I use [water in], I will be **more mindful**, more than the before" – Amal

> "I will **feel guilty** about wasting water, and I will try to **review myself** and see what unusual thing I am doing that causes me to consume more water and will **regulate my water consumption**" – Esraa

Further analysis identified one aspect that could help explore the roots for these negative emotions and why they triggered the need to adjust behaviour. The data suggest that participants interpret information about the average as social norms and guidance for appropriate behaviour or what ought to be done. Thus, deviation from collective patterns and social consensus implied in this vignette is interpreted as not only breaking social norms, but also deviation from the correct course of action. This is clear in several interviews where participants explicitly use the "wrong" to describe their deviation from average. For instance, in the UK:

> "I would try to find out why, I mean, **what are we doing wrong**, I will be concerned that **we're doing something wrong**" – Mario

> "Probably I will think about **what I'm doing wrong** and why I'm not in the average" – Pamela

Similarly, in Egypt:

> "Consuming more than other people, then there **must be something wrong.** One should go back to see what **wrong** he is doing" – Ahmed

> "I'm wasteful... I'm definitely, I'm **doing something wrong**" – Aya

> "I mean, how? What is the **wrong thing that I did** that has led me to this? I will be very upset" – Amal

These examples suggest that participants perceive the average usage as the correct behaviour, hence, being higher than average is interpreted as "wrong". Accordingly, the associated negative emotions and the triggered behaviour change intentions becomes a mechanism to comply with the social norms by reducing the deviation from average. Interestingly, when the hypothetical scenario is reversed – they were told that their consumption was below average, almost all participants reported maintaining their level of consumption. Several also reported that it is an indicator that they are on the "right" track and doing the "right thing" despite lacking the social consensus. This was associated with positive emotions such as "satisfied" "content" "happy" and even "smug" and "proud". This indicates that there is an additional

aspect that guides their water usage rate. An aspect that would make them maintain and commit to their lower than average usage regardless of social influence. Data suggests that the appropriateness of the behaviour is not only guided by social consensus but moral perceptions are also relevant. Morality of water conservations will be discussed in more detail in the next theme (Theme 6, p. 153).

Despite the desire to comply with the social norms and the collective average being the most prevalent, it is not the only factor. Additional aspects that could help explain how normative messages are interpreted by participants were identified. In some interviews, the social comparison vignette triggered a sense of competitiveness. For instance, Liam's initial reaction to the vignette was to "reduce" his usage. The reasons he elaborates to justify his reaction were all relevant to competitiveness:

> "You would want to reduce it [water usage]. **Nobody wants to be the biggest waster** in any group, you want to be the person that wastes the least. If there's if there's a leaderboard there's a **competitive thing** that **you want to be the Nice person,** you want to be the **good neighbour** and also you want to win you want to **win the League ”** – Liam

A similar reaction was triggered even when the opposite scenario – being less than the neighbourhood average, was presented. For instance, being less than average is perceived by Sherly as a competitive position that she wants to maintain:

> "**Pure competitiveness** and the knowledge that **I'm the lowest one** like, just the knowledge that I had the lowest water consumption and because I like to **get a streak**. So if I've got one week, I want to go to the next week or one month, I want to get it next month" – Sherly

In Egypt, a similar pattern relevant to competitiveness, but less explicit, was identified. From the participants' perspective, the higher than average scenario meant that other people are gaining more monetary savings and their bills are less. Consequently, this encourages them to adjust their behaviour to reap the same cost benefits:

> "They succeeded in saving it, so **why not be as successful as they are**, so I try to review myself to **reach what they have reached**" – Ahmed

> "Two things, my consumption is high so why am I using more water, and the second thing is, it's a bill, so **why pay more** too" – Doaa

Furthermore, in a few other UK interviews, a sense of self- efficacy was triggered. For instance:

> "Clearly, **it's possible**, and they survive, they are, you know, hygienic and clean and **if they can** maintain the same standards with less, **maybe I can do that**" – Alex

> "Other people are doing more to save water, so **it is possible for me as well**, like if they are spending less **maybe I can as well**" – Elizabeth

Additionally, in some interviews across the UK and Egypt the vignette triggered intentions to start a conversation with neighbours and ask for advice. This indicates a potential for social learning to help individuals adjust their behaviour. For instance:

> "If I spoke to them, my **neighbours** and I asked them, are you doing anything? I will be "what was yours like? **Are you doing anything in particular**?" – Sherly

> "I will ask if I'm seeing someone that is using the resource very effectively, yeah, **I'll ask** because **I would like to know how they do it**. **How they manage.** Maybe they invest in a new system or they're being more clever in the way they use water, so that's a **good example**, always open to just **see and replicate**." – Pamela

Similarly, in Egypt some participants reported they will "ask" their neighbours for advice:

> "I can **ask people what they are doing**, maybe they have other **techniques** and they are doing something in specific, but I will see what people are doing, so maybe I will try to learn" – Emad

> "I can **ask my neighbours**, for example, how much water do you consume? how was your bill like? **Ask the people** around us what they do, can they give me a little **impression of how I am doing**. Or perhaps someone would give me **advice** that they have a [water efficiency] device installed" – Aya

Notice how Aya stated that knowing what others are doing will give her an "impression" of her own usage. This confirms the previous identified pattern that relativity to the collective helps participants assess their own usage and puts it into perspective.

It is worth noting that, the eagerness to learn from the experience of others, especially "neighbours" could help explain why some participants reported they need "suggestions" or "tips" on how to save water to be attached with the bill:

> "It might need a **few suggestions**, as well, **how to reduce it**. Yeah. "Would you like to use less water, would you like your bill to go down? Here are **some ideas**" – Mary

> "I would have a **top three, top five suggestions** of how people can reduce it" – Liam

Additionally, the data suggests that these messages could be more effective if they were framed as advice from neighbours rather than from the water company:

> "Oh, you would not know **what other people did** but you know the average? I think it would probably be a good way, maybe as a **community** that could be kind of a **community led, sharing of ideas or practices** or **communal ways** in which to kind of encourage them" – Elizabeth

In summary, relativity to other parties in the social context – either households or non-households, helps to better understand how participants assess their own water usage and its relative impact. This contributes to understanding the previously identified theme of trivialising personal impact (see Theme 2, p. 120). Furthermore, collectivity has shown a strong pattern of being associated with behaviour change intentions. The data suggests several reasons for this pattern. For instance, collectively enhancing the perceived impact of water savings gives a sense of collective-efficacy. In addition, it is perceived as a standard for behaviour and triggers participants' desire to comply and join a social movement. Moreover,

in some cases it triggered competitiveness, self-efficacy and social learning. Furthermore, a pattern of maintaining a level of usage was identified when the hypothetical scenario was reversed to being lower than average. This indicates that internal factors are guiding water usage behaviour and acknowledges excessive usage as "not right", despite the social consensus. This notion of morality and its underlying factors is explored more in the next theme (theme 6).

Theme 6: Morality

Overview

Morality was identified in the data set from two perspectives. First, realising the consequences of behaviour on other people (i.e. potential social impact) was reported as a motive for behaviour change. Second, the embedded morality of water conservation was identified in several interviews where participants acknowledged water as a valuable resource that is worth saving, regardless of the consequences. These two sub-themes are discussed next.

Realising the potential impact on others

In UK and Egyptian interviews, acknowledging the potential social impact of personal water usage on other people was identified as a motive for behaviour change. Nevertheless, several participants in the UK stated that they lack awareness of the social consequences of their water usage. Moreover, they reported that such information would motivate them to change their behaviour. For instance, when explaining factors that could encourage them to save more water they usually refer to impact on "others" or other "people":

> "I think knowing if it [her personal usage] is having an **impact on other people** would be the kind of information that would **influence me**, you know, if it's **negatively impacting other people** that would influence me to sort of have that in the back of my head if I am running the tap for a bit too long, or keep me having really quick showers" – Sherly

While Sherly refers to negative consequences, other UK participants reported a need for awareness of the positive impact or "benefit" of their water savings on others. It is worth noting that in several interviews, these statements were associated with expressing a desire to "help" others, impling the relevance of altruistic motives in water conversation. For instance:

> "I just think it's a good idea not to waste water, maybe we would need to be convinced that it had a **benefit**, so it has to be linked to some benefit. And that benefit might not be directly for me personally … something like that might affect people if they thought there was at least a **community benefit**" – Mary

> "the **benefits** of saving water, that would really kickstart me…Anything that I can do to **help others** in terms of accessing water, even if it's not so much of an impact here in Bath and England, if it's **helping somebody else,** then I think that would be my **greatest motivation"**– Tasha

> "We need to know **who we are doing it for**. The **language has to be positive** as well, it can't be telling people off, it would have to be something like "you are a water hero" or something for saving water. It's kind of **helping out your fellow person"** – Liam

Interestingly, the altruistic motive for water conservation was identified in an interview with one of the least water efficient participants. In the interview with Alex, referring to some people in Africa who do not have access to clean water, he states "helping" them would be an "incentive" for him to start saving water:

> "If we use less water, we can send it to those people, that's an **incentive** that I can get behind. You're **helping** loads of people **benefit**, even if it's like one family. So, if I use 10 litres less, that can be magically transferred (laughing) to the other side of the world, this kind of **incentive**, and you can **feel better** about your decisions rather than doing something with this kind of indifference, you can feel like there's a kind of **motivating factor** behind why you're doing what you're doing" – Alex

Exploring who are the perceived beneficiaries from participants perspective, it was noticed that participants do not restrict their help to a specific category of people. Following-up with some of the participants to better understand who they mean when saying "other people" revealed that it could be anyone who they perceive as in need of their help such as "less-fortunate", "society" or "future" generations. For instance:

> "People that don't have access to water, if it's people who don't have access to clean and safe water, or it's just people! just the general, I don't know, like, just **society**" – Sherly

> "People who can't heat their homes or who can't eat, who can't afford things, I want my act to be an **act of generosity** that would help somebody else **less fortunate**" – Liam

> "Sounds very cliche, but I really believe this, for **future generations** that's my concern, I don't want them to suffer…I think about the future, I want to my daughter and my daughter's friend, their generation have more friendly world to live in"– Pamela

In the Egyptian interviews, awareness of potential social impact of water usage was relatively more prevalent. One aspect that helps explain this difference is the notion of commonality. The data suggests that realising the commonality of water resources is an essential first step to realise the potential impact of personal usage on others. Several participants in Egypt acknowledge that the available water supply is a shared/common resource and some explicitly refer to it as "one" or "same source", perhaps because the Nile River is the main source of water across the country. Thus, the potential impact of their water usage on others, as well as others' usage on them, is acknowledged. It is worth noting that, unlike in the UK, acknowledging commonality was usually associated with referring to the negative impact/ harm of overconsumption on others, rather than the positive impact/ benefit of water savings. For instance:

> "If we keep on using [water] in this way, we will all **regret** it, because everything that is done will **affect everyone** in the end. We consume from the same country, the **same source** and the same resource." – Amal

> "What I am using may prevent someone else from reaching the water. I always have this in mind, that your excessive water usage can **affect other people**. Your usage, from **one source**, so whoever increases [their water usage] will **reduce the chances** of other people reaching that water." – Emad

Nonetheless, further analysis revealed that acknowledging commonality is insufficient for realising and accepting the potential impact on others. The second relevant aspect is abundance perceptions (see Theme 1, p. 103). Thus, despite acknowledging commonality, the impact on others remains hypothetical as long as water abundance is assumed. For instance, Aya and Adel explain how social impact is not actualised because in the meantime there is "a running source of water" and that it might occur "in the future" when water becomes more scarce:

> "If I consume a lot of water, this may **affect another human being in another place**, not getting enough water. I mean, we are taking from the **same source**, if we all consumed it in an absurd way and did not think about the implication of our consumption, maybe **someone else** taking from the same source **would be affected**… Of course right now, thank God **we can't see this** because it's a running source of natural water" – Aya

> "In the end, we all live together, I mean in a society with each other, eachone's own consumption eventually pours into public consumption, it will affect the total that is available to us. **We all affect each other**, I mean, **we may not feel this now**, but who knows in the future what will happen" – Adel

A similar pattern relevant to present abundance perceptions and recognising social impact was identified in the UK. This helps explain why the notion of commonality was identified in only a few UK interviews. For instance, reflecting on the impact of their water usage Tasha and Sherly acknowledge commonality and the associated potential social impact – implicitly and explicitly, respectively. Tasha states that someone else "benefits" when she uses less water. More explicitly, Sherly states that there is "one water supply" and refers to the available water supply as a "pot" that goes around:

> "If me using less water benefits somebody else, in my mind the less I can use the better. It means, hopefully, **somebody else could use that water**, if that makes sense, someone who needs it more than I do" – Tasha

> "See in my head, I feel like it would mean there was technically **more water reserve available**, if I use less it means there's **more in the pot to go around** that is how I perceive it…I mean technically you know we're all on the world. We have one world, and the world only has **one water supply**" – Sherly

However, high abundance perceptions across UK interviews means the "pot" of water available is perceived as big enough for everyone to satisfy their need without impacting others. Thus, high abundance perceptions block any realisation of social impact, even if commonality is acknowledged. This helps explain why awareness of social impact on others

was less frequent in UK interviews. For instance, Daniel and Rasheed explain how their water usage does not impact "anyone":

> "I believe that **there is enough water** here in this country **to go around**. So, **I don't feel that I'm depriving anybody**" – Daniel

> "It [water wastage] doesn't impact anything in the UK, I'm able to waste water, and it doesn't impact anything. There's **no direct link between me wasting water and someone else not getting water"** – Rasheed

These findings suggest that the social impact is realised only when water scarcity is assumed. This interpretation is supported in some interviews where a hypothetical shortage scenario brought commonality into consciousness and amplified the potential impact on others, especially negative impact. For instance, in Egypt, Marwa acknowledged the potential impact her water usage might have on others "only if" the situation got worse in terms of water scarcity:

> "If we assume that the [water] situation got really bad, for example, if I consume more than my average, I will definitely harm someone else. In the long term, if the situation really gets worse" – Marwa

Similarly, a follow-up with Daniel and Rasheed revealed that the impact of their water usage on others is realised only when a hypothetical water shortage is assumed, or an actual shortage is experienced in the home country, respectively:

> "it would only be in those times of **extreme, critical water shortage**, then I would **feel guilty** about having the bath, it would be **unfair**. In normal times, I don't feel guilty about it because of where we live. If there's a water shortage, then the **fixed amount of water has to be around more people**. So therefore, we should all use less" – Daniel

> "I come from Pakistan and over there are water shortages, there I would **feel guilty** if I was to waste water, whereas here – not that I waste water on purpose, but I would **feel less guilty** about it just because **there's no water shortage here**. The situation

there [in Pakistan] is completely different so, water wastage there has a **very direct impact on people** getting water elsewhere in the country" – Rasheed

It is worth mentioning that negative emotions, especially guilt, usually emerge when a negative impact on others is assumed. Nonetheless, analysis reveals an additional aspect that triggers these emotions beyond social impact. In several interviews across the UK and Egypt, it is noted that wasting/saving water is associated with negative/positive emotions regardless of the level of perceived social impact. This will be explored in more detail in the embedded/inherent morality section below (p. 152).

An additional aspect relevant to abundance was identified. Some interviews showed that when water abundance perceptions are high, not only the impact of water usage on others is hard to realise, but also, the impact of others' usage on them. This was indicated when water scarcity is assumed on a smaller scale and hence, potential impact becomes easier to comprehend. For instance, Alex explained why he never commented on his sister's long showers:

"**it's not scarcity, so her usage doesn't affect my usage**… I don't need to say "hey, save some water for me!" because it's still there." – Alex

Similarly, Liam cannot understand how neighbours' excessive water usage would impact him. However, it becomes easier to grasp and more relevant when he assumes a hypothetical scenario where the water supply available is visibility limited – as in a water "tank":

"Maybe if the street just had **one tank** and somebody else's waste in the water and you'd say hey **that's my water too** that's all that's all of our water, we have to be responsible." – Liam

Noha in Egypt stated in her parents house they had a water tank that is re-filled daily. This made her very mindful of her impact on other family members to the extent that she used to postpone her shower:

"We started relying on a water tank and there were four of us in the house. It [her water usage] may **affect the rest of the family members** for the rest of the day. I

> postpone, according to the importance of the activity, for example, if I want to take a shower for fun, no, the priority is for my mother, not for me" – Noha

This pattern indicates that participants are more mindful of their water usage when social impact is realised, because commonality and limited abundance are acknowledged. Relying solely on this interpretation would mean that in the absence of perceived social impact, water efficiency will not occur. Nonetheless, some participants have reported being mindful about their water usage regardless of the perceived consequences. This will be explained in more detail next.

Embedded/inherent morality of water conservation (value-in water conservation and intrinsic value of water)

The second aspect of morality that was identified goes beyond social impact and acknowledging the consequences of personal usage on others. In several interviews across the UK and Egypt, the embedded morality of water conservation is acknowledged and water efficiency is perceived as the "moral" or "right" thing to do, regardless of the consequences. For instance, in the UK:

> "I don't know the exact impact. But, I can't be careless about water. I think it mostly makes me **feel better.** I think I **feel more troubled** by doing things that **don't feel right**. Water is life, and we need to look after it. So, to use it unthinkingly is just **morally wrong**" – Mary

> "So even though I'm in the UK, I still just think wasting water is not a **morally correct** thing to do. I think wasting anything is **not right**. So, yeah, for me it's just the **moral thing**" – Rasheed

Similarly, in Egypt, Emad thinks wasting water is not "ethical":

> "All the bills are included [in rent]. I still get really **annoyed** when I see lots of lights on or I see water [wasted]. Regardless, I will pay water or not pay water, it is an **ethical motive**, I mean it is an **ethical thing**"- Emad

These perceptions about righteousness of water conservation were usually associated with expressing negative feelings when wasting. Similar to Mary and Emad who expressed feeling "troubled" and "annoyed", the same pattern is identified in several other interviews across the data set. For instance, Pamela in the UK and Adel in Egypt reported negative feelings of discomfort and being "upset" because wasting water is "not right" or is "wrong":

> "That's a psychological thing I feel with water, like using water non-stop, it doesn't make you feel **comfortable**, this is not good, this is **not right**" – Pamela

> "The **right thing**, or what should not happen is that one does not waste water. This is the **right thing**. It [wasting water] is like when **doing something wrong**, you will feel a **upset**, and a little bit you **blame yourself**" – Adel

Thus, perceptions of embedded morality of water conservation could explain why negative/positive emotions are still provoked when wasting/saving water, regardless of perceived impact. For instance, despite reporting not knowing the exact impact of their water usage, Sherly in the UK states wasting water makes her "feel bad" and Mahmoud in Egypt reported that he feels "comfortable" and "satisfied" when saving water:

> "I **don't know what it is** [impact] I'm worried about when it comes to water, I just know **you're not meant to waste it**…you just **feel bad** because you know you're wasting water, but I just realised I don't actually know why" – Sherly

> **"Even if it has no impact**, at least it will make me feel comfortable. Even if it has no impact or will not benefit anyone, between me and myself, I will be **comfortable** and **satisfied** to feel that I've saved water, for its own sake" – Mahmoud

In the same vein, a personal conviction against waste was common across some interviews where embedded morality is identified. Some participants across the UK and Egypt reported a sense of internal obligation against wasting water. This sense of obligation was not necessarily linked to consequences; rather it seems to operate on a deeper level. It was clear in the way they explained water efficiency as an "embedded principle" and a part of their "personality" or "ideal self". For instance, despite not having a "logical reason" and not

paying water bills, Rasheed in the UK and Emad in Egypt stated that it is a matter of "principle":

> "I don't have a logical reason for that [saving water] it's just doing **something out of principle** not because there's any rational reason for" – Rasheed

> "Water itself shouldn't be wasted. This is **my principle**, even before the bills. This is my principle, it is an **internal thing**" – Emad

More implicitly, Esraa in Egypt referred to an internal "urge" when reflecting on her motives behind water efficiency:

> "I feel like I have an **urge** to turn off the tap, I can't leave the water running like that, I just can't!" – Esraa

This pattern adds an additional perspective to understanding the reason behind the commonly expressed guilt. In some interviews, it was indicated that wasting water is perceived as breaking those internal value perceptions and moral principles. For instance, when water usage behaviour conflicts with personal convictions, Sherly and Maya in the UK reported negative emotions such as being "disappointed" and feeling "guilty". Similarly, Doaa in Egypt stated she is "uncomfortable":

> "You just feel **disappointed in yourself** when you kind of don't do things which you want your **ideal self** to do. I want my ideal self to be someone who is really conscious of the environment, when you don't, you're not doing that in day to day life it **feels disappointing** because I feel like **I'm breaking those values** I have" – Elizabeth

> "It is **against the concept that I want to do**, so you feel **uncomfortable**. I feel like it is something **embedded** inside of me" – Doaa

> "I shouldn't waste, that makes me feel like **guilty**, because my type of **personality**" – Maya

Looking into the roots of these feelings of personal obligations, it is noted that they are usually derived from ingrained perceptions relevant to the intrinsic value of water. The data suggest that these value perceptions are shaped by four main contributors: family influence, concern about potential scarcity, acknowledging water as a "privilege" relative to those who are less-fortunate and finally, religious beliefs. These aspects are discussed next in more detail. It is worth noting that participants who reported water efficient behaviours and/or feelings of guilt when being excessive – regardless of the consequences, have shown at least one of these aspects.

Family influence

Analysis indicates that water efficiency is a learned behaviour that could be traced back to childhood. Hence, family plays a role in shaping perceptions about the intrinsic value of water and ultimately, how it should be used. Participants who realised the embedded morality of water in the UK and Egypt usually reported that water efficiency was taught to them at a very young age. For instance, reflecting on aspects that shaped their internal motives for water efficiency Pamela and Maya in the UK, and Emad in Egypt referred to their family influence:

> "I feel much better [when saving water] and I feel more connected with nature. Maybe because **I was raised in that way.** We are from Chile in South America. I think it's **part of us**…. It's something that we have it in our **family culture"** – Pamela

> "**I was also raised** with my mom, my dad, my grandmother, and my grandfather. My grandmother was really good at reusing water. For example, wash potatoes, use that to water the garden. I think that was really good, something **I learned from my mom**. I have like really **good water education** from my mom and grandma (laughs)" – Maya

> "I remember **my mother** used to always say to me, when I was young I took a lot of showers, she always told me "all this water is a waste!" but she didn't mention why, maybe that's the reason [why he saves water] **it stayed in my mind**" – Emad

Even in some interviews where a personal conviction was not explicitly expressed but water efficiency behaviour is reported, it would usually be traced back to family influence. For

instance, reflecting on their rationale behind turning off the tap while brushing their teeth, Noha in Egypt and Liam in the UK state that it is simply, the way they were "raised":

> "We are used to it, our parents **raised us** to conserve water" – Noha

> "That was always a thing when we were **growing up**, so **my mom** would say "keep the tap off do your teeth, count two minutes", yeah so we were definitely **raised**, the tap thing with brushing teeth, is **something we were told** when we were growing up as kids" – Liam

Furthermore, a few interviews showed that learning was not necessarily explicit/verbal, but as young children they also learned by observation from family members. For instance, Bob explaining why he uses a bowl when washing up the dishes rather than leave the tap running stated that:

> "It's just always the way I've known it to be done. I guess **I observed my mother doing it**, when I was younger" – Bob

Similarly, Amal in Egypt stated that she turns off the tap while brushing because her mother used to do it when they were kids, despite not explicitly saying why:

> "From the days when my mother used to brush my teeth for me, for example, I used to **notice** that we close the water until we are finished. These were small things, but they **caught my eye** and I understood them, without her explaining to me, she used to do it **as a behaviour** without explaining why" – Amal

Potential shortages

Some participants expressed concerns about future water shortages. In a few cases, this was associated with explicit statements showing an enhanced value perception such as referring to water as "precious" and needs to be taken "care" of. For instance, asking to state their core reason behind water efficiency, Mary, Tasha and Pamela show uncertainty about the future water availability:

> "I'm thinking **water is precious**, the climate is changing, and it's very unstable and we never know really what's going to happen next. So, I have a very **strong motivation** not to waste the resources that we have" – Mary

> "I do believe in climate change, some people deny it, but I do think it's happening and it will hit us… water really is a **precious commodity**" – Tasha

> "I think **we're running out of water**, we're not going to have this universal tap of water forever endlessly. So, we need to **take care** of that [resource]" – Pamela

Similarly, in Egypt some participants who acknowledged potential scarcity in the future stated that water "deserves" to be "appreciated", implying high value perceptions. For instance, explaining their main reason for water efficiency Emad refers to the "value" of water. Amal reported being upset when someone is wasting water and perceives it as "lack of appreciation":

> "**Appreciation** of its **value**. Scarcity of resources or water and its impact on people in the future, and that it might run out, this is the basic driver [for water efficiency]" – Emad

> "I get annoyed of course, this is a **lack of appreciation** of something that is available now, who knows after a while what we will happen, this cup of water that you are throwing away, this water you will wish you have…I **appreciate** natural resources, I feel that natural resources are something that **deserves to be preserved**" – Amal

On the other hand, participants who were relatively less water efficient have shown low water value perceptions because they lack concern about potential shortages and are assuming high abundance. For instance, Liam thinks water is "inexpensive", while Alex thinks washing a car with a hosepipe is not "wasteful":

> "we see water all the time in the UK **there's lots of rain**, so **it doesn't seem expensive**" – Liam

> "I'd wash my car with the hosepipe but I don't see that as wasteful, because **I don't see this resource as scarce**… people don't have to really be that responsible, in their mind there is **reassurance** you can leave the tap on all day and it will run at the same pressure all day without cutting off" – Alex

Other people who are less-fortunate

In some interviews, participants acknowledged the less-fortunate who do not have access to water. This mere acknowledgement helps them realise the intrinsic value of water and the moral side of water efficiency. For instance, Bob explains his perceptions about food and water water waste:

> "Why throw food away when there may be **people who aren't eating at all**, it's perhaps, it's a very **simple moral question**. it's really the same principle [for water]." – Bob

In the same vein, several participants who have shown a concern about the less-fortunate perceived water as a "privilege" and reported water efficiency. For instance, Rasheed and Georgia in the UK reported a reduction in their water usage, despite not having an actual "rational link" or "impact" on the less-fortunate. This was associated with a strong sense of "obligation" and "responsibility", which are relevant to personal convictions:

> "Not everyone has access to water in an easy accessible way. And so as a result, I think everyone that does have access to that water, I think has an **obligation** to if not fix the issue, then at least recognize the privilege that they have. And the way in which you could **recognize our privilege** is by reducing the waste where possible. Even though there's probably **no rational link** between me turning off the tap water and someone else in Africa getting the water that they need" – Rasheed

> "There are people in the world, just a little drop of that water would make a difference for them and the fact you're just pouring it down the drain is, it's really, it just **feels bad**…it feels like an **insult** to people who live in places where water is scarce. I guess it's **our responsibility** to be aware… it's the **responsible thing** to do to **reduce** our water consumption in response to that, even if we're **not directly making an impact**" – Georgia

Similarly, in Egypt, when Aya explained why she is keen on water conservation a sense of "social responsibility" emerged as her core motive. Later, she even mentioned when giving charity she always chooses organisations that specialise in building water wells in poor villages:

"There are people who are starving and cannot find water, and they walk from one village to another to get water. This issue has always been on my mind. I always feel sorry for them and wish I could do something. I have a **social responsibility**, I always think about the less-fortunate, I believe we have a **responsibility** towards them" – Aya

Religious beliefs

Finally, religion was reported by most participants in Egypt either explicitly or implicitly as a core contributor to their water value perceptions. However, it was not identified in any of the UK interviews. Several participants in Egypt refer to water as a "blessing" from God and state religious reasons for their water efficiency, while others have frequently used a word such as "forbidden" to describe water waste. For instance:

"**God will hold us accountable** for water waste. I mean, it [water] is supposed to be a **blessing**. God gave it to us, we should preserve it. I mean, the issue has nothing to do with money, extravagance is **forbidden**" – Adel

"The first thing is that it is **Sunnah** [practices of the prophet Muhammad] that one should conserve water, and the second thing is it is being thankful for this **blessing**, when one **thanks God for the blessing** he has, God preserves it" – Ahmed

"I started to feel that it [excessive water usage] is wrong and **forbidden**, a **religious motive.** Our religion urges us, **the prophet** peace be upon him, said "do not waste water even if you are on a running river" – Emad

In summary, data suggest that the notion of morality is relevant to water conversation. Several participants showed altruistic intentions by reporting their willingness to reduce their water usage if someone else will "benefit". Moreover, several participants reported being mindful of their water usage and/or feeling guilty when water is used excessively, regardless of the consequences. This was associated with perceptions about the intrinsic value of water as a resource that is worth saving. Hence, water conservation being simply, the right thing to do.

4.4 Summary

Analysis has identified six themes which provide in-depth and more comprehensive understanding of water consumption behaviour. A diagram to summarise all six themes and sub-themes is presented below (Figure 4.2).

Across both contexts, the UK and Egypt, the similarities in water consumption patterns were more than the differences. Analysis suggests that common misperceptions associated with water – as reflected in the identified themes, are the main issue. Despite the different context, many of these misperceptions are common across samples. Thus, reported water consumption behaviour and the likelihood to prioritise convenience was identified in both contexts similarly. This finding of common misperceptions helps explain a pattern noted in a review of water conservation literature which concluded that "practices are similar even though the participants come from different countries" (Salas-Zapata et al., 2023, p. 4).

There are two main differences across samples (i.e. UK and Egypt) in terms of problem recognition and abundance perceptions (theme 1), as well as, morality (theme 6). While in the UK, a lack of problem recognition and high abundance perceptions was identified, in Egypt there was relatively higher problem recognition and lower abundance perceptions. This pattern was associated with exposure to media and policy cues signalling a potential problem with water in Egypt, while these cues were missing in the UK. Despite this difference in theme 1, the other subsequent themes and reported water consumption behaviour were quite similar. One aspect that helps understand this is: perceived problem significance – relevant to urgency and threat perception (theme 3). The data suggests that problem recognition alone is not sufficient to induce behaviour change, the problem has to be also perceived as highly significant and high in proximity. Furthermore, morality manifested similarly in both samples, except for an extra aspect that was only found in Egypt and contributes to the intrinsic value of water: religious beliefs. In both contexts, analysis suggests that socio-demographics such as age and gender of participants are not associated with reported perceptions and water consumption behaviour. However, some implications for income level were identified in terms of perceptions about affordability of water bills.

The following table (Table 4.4) provides an overview of the similarities and differences in identified themes between the UK and Egypt.

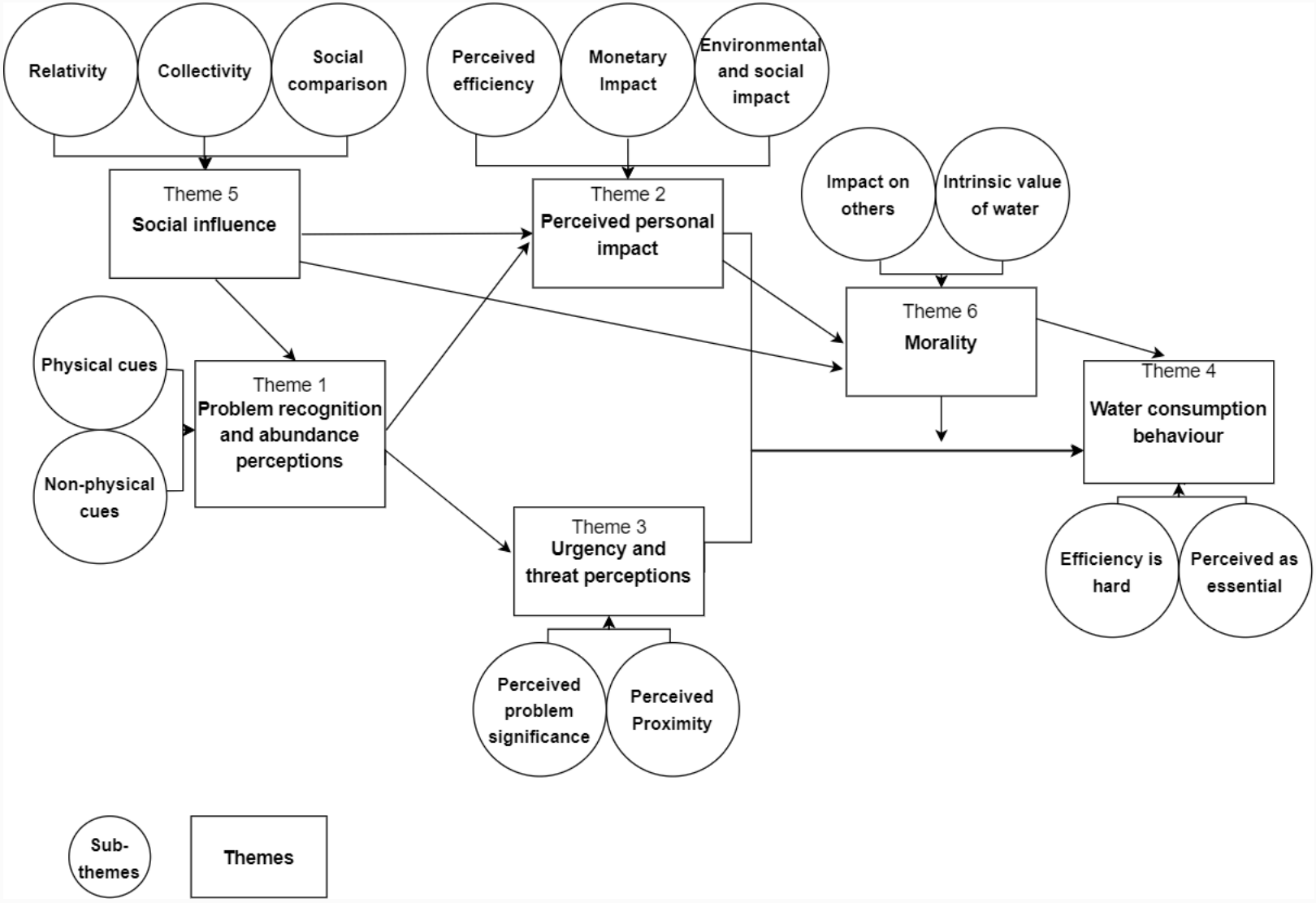
Table 4.4: Comparison between themes in UK and Egypt

Themes	Definition of theme	UK	Egypt
Theme 1: Problem recognition	Perceptions about a current or potential problem with water availability	Lack of problem recognition. Lack of supporting physical, as well as, non-physical cues (media, social and policy) signalling a problem (present or future) with water.	Problem recognition identified. Despite lack of physical cues, media and policy cues are signalling a potential future (rather than present) water problem.
Abundance perceptions	Perceptions about water availability and present/future abundance	Water is perceived as highly abundant in the present time. Perceptions about future abundance are mostly positive. In some cases, it is assumed to last forever.	Relative to the UK, water is perceived as less abundant in present and future time. However, participants reported "no evidence" of present lack of abundance. Unlike in the UK, a potential lack of abundance in the future was assumed by several participants.
Theme 2: Perceived personal impact	Perceptions about the impact of personal water usage	Monetary, environmental, social impact are perceived as low. In both contexts, water is relatively cheaper than other utilities, making saving money on bills to not be perceived as an incentive for water conservation. Environmental and social impact of personal consumption is difficult to comprehend and usually trivialised (although more acknowledged in Egypt and usually associated with relatively higher perceptions of	

		communality of water resources) because several participants assume "there is enough" water for everyone to use without impacting others. Hence, they think saving/wasting water will not "make any difference" (positive/negative).
Theme 3: Urgency and threat perceptions	Perceived distance in terms of time and place of a potential water shortage	Low urgency and threat perceptions. In both contexts, a water shortage is perceived as distant –in terms of the time when and place where it might occur. Even in Egypt, where a problem recognition is identified, perceived problem significance was low because the potential problem is assumed to happen in the far future.
Theme 4: Water usage behaviour	Reported water behaviour	Convenience was prioritised in both contexts. Practices that do not involve high hedonic/comfort factors were reported to be easier to change (e.g. turning off the tap while brushing teeth). On the other hand, practices such as long hot showers or daily baths were reported to be more difficult to give-up. One difference in water practices is that taking a bath was not common in Egypt.
Theme 5: Social Influence	Perceptions about how others in social group are using water and the extent to which it shapes one's behaviour	In both contexts, several participants believe that collective effort can make a difference (i.e. collective efficacy), relative to the trivialised personal impact (positive or negative). In both contexts, several participants assume their consumption is lower than "others". Hence, awareness of their higher personal water consumption compared to neighbourhood average (vignette 2) is found to encourage water conservation intention in both contexts.

Theme 6: Morality	Perceptions about consequences of personal usage on others.	Lack of knowledge about potential consequences of one's behaviour on others identified. In some interviews, even when commonality of water resources was acknowledged, the high abundance perceptions blocked any moral recognition of the impact of one's behaviour on others.	Relative to the UK, potential consequences of one's behaviour on others was more acknowledged. This could be explained by the relatively higher acknowledgement of commonality of water resources, as a shared resource.
	Perceptions about the intrinsic value of water as a resource that is worth saving –regardless of consequences	Acknowledging the intrinsic value of water was associated with family influence, potential shortages and empathy with less-fortunate people.	Similar to the UK, the intrinsic value of water was identified. An additional aspect unique to Egypt was identified; religious beliefs relevant to the value of water and calling for its preservation.

Figure 4.2: Summary of themes and sub-themes



CHAPTER 5: DISCUSSION AND CONCLUSION

Overview

In this chapter, firstly, a thorough illustration of how the findings have answered the research questions and links to previous literature is provided. Second, the research contributions are discussed and classified into theoretical, practical and methodological contributions. Social marketing implications in terms of downstream, midstream and upstream measures are discussed under practical contributions. Finally, limitations are explained and avenues for future research are presented.

5.1 Research Questions

The aim of this research was to gain an in-depth understanding of households' water consumption behaviour and explore relevant variables that would help encourage water conservation. In order to achieve the research objective, five main research questions were developed. These questions, alongside the literature, were the basis for designing the interview guide to ensure the interviews were informative and insightful. Furthermore, these questions were utilised as a rough guide to help navigate data analysis – while at the same time, maintaining a flexible and inductive approach that allowed for additional relevant aspects to emerge. This section provides a detailed discussion of how the research findings have answered the research questions. Moreover, it highlights contrast/overlap between the findings and previous literature.

RQ1: How do households perceive water conservation?

This question is relevant to and was answered by insights from theme 1: (lack of) problem recognition and abundance perceptions, as well as, theme 3: (underestimating) urgency and threat perceptions.

Findings indicate that the majority of participants acknowledge that water conservation is the "right" behaviour and that water should not be wasted. However, they perceive water conservation in terms of changing their behaviour to conserve water as unnecessary. One of the core reasons identified is lack of problem recognition and the associated high abundance perceptions (see Theme 1, p. 103). When there is no apparent/ obvious problem with water availability (e.g. water shortages; restrictions: hosepipe ban), many participants assumed a favourable water situation in the UK and Egypt. Thus, water conservation is perceived as a solution for a problem that, in their opinion, does not exist. In

water conservation literature, few studies have acknowledged the notion of problem recognition as the initial step in the water conservation decision "process" (e.g. Rodriguez-Sanchez and Sarabia-Sanchez, 2021; Sarabia-Sánchez et al., 2014). Moreover, awareness about water issues or "problem awareness" is acknowledged as one of the main factors influencing water conservation intentions – although alone it does not translate into behaviour change (see Ehret et al., 2021). The notion of problem recognition is in line with the initial first step in the NAT to trigger altruistic behaviour; "attention to need" (Schwartz and Howard, 1981). In PEB literature, "problem awareness" is acknowledged as one of the main determinants, however, it is conceptualised as "awareness that performing or not performing a certain behaviour increases environmental problems" (van Valkengoed et al., 2022, p. 1484), which is different from problem recognition in this study. Overall, previous literature did not address the antecedents of problem recognition and did not specify which type of information enhances recognition. These aspects were further explored in the data analysis and contributing aspects to the lack of problem recognition were identified, namely contextual "cues" (i.e. physical and non-physical cues). Findings indicate that absence of physical/non-physical cues that signal a current/future problem with water further augment the lack of problem recognition, high abundance perceptions and low urgency that eventually discourage water conservation. These findings are consistent with the notion of "situational cues" acknowledged in the psychology literature as a main tool for "disrupting" strong habitual behaviour (e.g. Verplanken and wood, 2006) such as water consumption. Furthermore, the significant impact of cues to guide behaviour is examined in the moral decision making literature in business context (e.g. Zou and Chan, 2019). More insights on cues identified in this study is discussed later in this section (see RQ5, p. 182).

RQ1.1: How do households consume water?

This question is relevant to and was answered by insights from theme 4: water consumption behaviour (prioritising convenience), as illustrated next.

Since water is perceived as highly abundant, several participants reported using water "freely" to meet their needs in the most "comfortable" and "convenient" way. The most frequently reported water efficient practices were the ones that did not require any extra effort to do and/or did not involve an added hedonic value (e.g. turning off the tap while brushing teeth). Accordingly, participants did not perceive these practices as a sacrifice of comfort/convenience. These findings are in line with some previous research which indicated that individuals engage less regularly in activities that involve a high degree of "personal

sacrifice" (e.g. turning off the tap when soaping up in the shower) because they are "unwilling to suffer any reduction in comfort" (Glig and Barr, 2006, p. 405). On the other hand, long showers and daily baths were not perceived as wasteful, but as a necessity. Participants believe water is being put to a good use and is satisfying an essential need. In addition, since water is perceived as abundant, many believe there is no significant reason for them to change their behaviour and give up the associated convenience, enjoyment and/or comfort. In line with previous research in PEB (e.g. Rau et al., 2022) and social marketing (e.g. McKenzie-Mohr, 2000), convenience is also identified as one of the main barriers to water conservation (e.g. Dolnicar and Hurlimann, 2010) and will be discussed in more detail in RQ4 below (p. 180). Understanding of individuals' perceived necessity of different practices that involve water was not adequately addressed in previous studies. One recent study by Russell and Knoeri (2020) touched on the distinction between discretionary and non-discretionary practices. They noted that many essential practices (e.g. showering) include a "non-essential" or "discretionary component" (e.g. long relaxing shower). They added that interventions should focus on targeting these "nonessential" practices. Nevertheless, findings indicate that the extent to which practices are perceived as essential is highly subjective and thus, individuals' perceptions of necessity should be taken into consideration when designing interventions. This study provides a better understanding of factors that contribute to perceived necessity of different water practices (e.g. convenience, well-being, hedonic outcomes).

RQ1.2: How do they perceive their water consumption pattern?

This question is relevant to and was answered by insights from theme 2: (trivialising) perceived personal impact.

Almost all participants reported being satisfied with their current level of water consumption. They perceive their water usage as "moderate" and unwasteful. One of the main reasons identified was the absence of regular usage feedback. For instance, in almost all UK interviews, participants reported not having, or not knowing if they have, a water metre. In addition, water bills were either included in rent, or paid annually in bulk. In Egypt, several participants reported sharing a metre with other flats in the building and "splitting" the bill at the end of each month. This means participants do not have access to timely accurate information about the water consumption and can not track it. Thus, participants' perceptions about their water usage are based on speculation and participants are usually overestimating their water efficiency. Findings indicate that when usage rate is

underestimated, its impact is trivialised. This link between perceived usage rate and the perceived impact of one's behaviour, has not been examined before in the literature and these insights help to better understand findings from previous studies. For instance, in a recent study by Vazquez-Casaubon et al. (2023) participants who "overestimate" their water efficiency (i.e. underestimate their water usage) scored low on the intention to conserve, as well as, on concern about the environment or the well-being of others. They proposed this lack of concern as an explanation for the low intention to save water. Nevertheless, reasons why these participants reported low concern were not addressed. Findings of this study propose a different potential explanation. The reported low concern about the environment and the well-being of others, could be because the impact of their usage is also perceived as low. Meaning that, the lack of concern could be actually rooted in an inability to see how their usage could "make a difference" to the environment and/or other people rather than merely being genuine apathy, as implied by the conclusion of Vazquez-Casaubon et al. (2023). This finding is consistent with evidence in the PEB literature on the significant positive impact of "outcome efficacy" perceptions – which reflect "the extent to which people perceive their behaviour as effective in contributing to resolving environmental problems", (see review by van Valkengoed et al., 2022, p. 1484). In the water conservation literature, the notion of perceived efficacy and its role was examined in a few studies (e.g. Sarabia-Sánchez et al., 2014). This research contributes to a better understanding of the underlying factors that shape efficacy (mis)perceptions and would (dis)encourage water conservation (e.g. lack of usage feedback, underestimating personal usage, high abundance perceptions).

RQ1.3: What are their water-specific beliefs and knowledge?

This question is relevant to and was answered by insights from theme 1: (lack of) problem recognition and abundance perceptions, as well as, theme 6: morality.

Relevant to the identified lack of problem recognition, the most prevalent belief by several participants was assuming water is highly abundant, and some even perceive it as an "infinite" and "renewable resource". These participants also reported less water efficient practices than other participants who perceived water as less-abundant. These findings align with some previous research which found that "utilitarian" beliefs that water is unlimited and should be freely used by humans led to higher water consumption (Corral-Verdugo et al., 2003), while believing that water is "scarce" led to more water conservation (Jorgensen et al., 2009). Nonetheless, previous research did not provide sufficient explanation for the reasons why these beliefs exist. Data analysis has not only revealed the water-specific beliefs of

participants, but also provides insights to better understand where these beliefs stem from. For instance, three cues that signal a problem with water availability and contribute to shaping these beliefs were identified. The identified cues are discussed in more detail below in RQ 5 (p. 182) as they are also relevant to context-related aspects.

Furthermore, some participants reported water-specific beliefs beyond the notion of availability/abundance and more in terms of the intrinsic value of water. For instance, they refer to water as "life", express how "precious" it is and perceive it as a "blessing". The beliefs about the intrinsic value of water and the meanings that people attach to it are not adequately addressed in the literature, despite analysis showing its relevance and role in shaping water usage patterns. One study by Cauberghe et al. (2021) looked at the perceptions about the "uniqueness" and value of water and has found that it is linked to a higher moral obligation to conserve water. The notion of intrinsic value will be discussed in more detail next as it is relevant to RQ2 on morality.

RQ2: How can perceptions about morality (i.e. perceived moral intensity) of water conservation help in understanding water consumption behaviour?

This question is relevant to and was answered by insights from theme 6: morality.

The notion of morality helps understand why despite abundance perceptions, several participants still perceive water wastage as "wrong". If the impact of their water usage is trivialised (see Theme 2, p. 120) and is perceived to "make no difference" to the environment in terms of affecting water availability, why do many report that they still try to be mindful about their water usage? Further data analysis indicated that morality is relevant to water conservation in two distinct ways. First, several participants reported that knowing that their usage has an impact on other people would be their greatest motive to change – which contradicts previously noted Vazquez-Casaubon et al's (2023) findings that people lack concern about the well-being of others. Second, acknowledging that the intrinsic value of water and acknowledging the inherent morality of water conservation was a common theme among participants who have reported the most water efficiency practices. This was usually associated with expressing that water is a "precious" resource that should be "appreciated" and preserved, regardless of the environmental or social consequences. Analysis identified four aspects that contribute to the intrinsic value of water and inherent morality of water conservation perceptions (i.e. family influence, potential shortages, less-fortunate others, and religious beliefs). Support for the relevance of potential shortages and intrinsic value of water

was found in a recent study which found a significant positive relationship between scarcity concerns and perceived water value (Cauberghe et al., 2021). It is worth noting that analysis suggests that family status has a moral implication, as parents usually perceive water conservation as a virtue that they are keen to teach their kids. Participants who have children (i.e. parents) usually acknowledged the moral intensity of water conservation and reported teaching/encouraging their children to save water.

RQ2.1: How could NAT constructs (Personal norms, awareness of consequences (AC) and ascribed responsibility (AR)) help capture households' water consumption from a moral perspective?

This question is relevant to and was answered by insights from theme 6: morality, as well as, theme 1: (lack of) problem recognition and abundance perceptions

NAT constructs provided a useful lens to help understand the reported and identified patterns. Nonetheless, they were found to be insufficient representations of the complexity of water usage behaviour. Analysis has revealed that NAT constructs cannot solely explain water usage behaviour and that other underlying aspects should be taken into consideration. Earlier research has attempted to expand the NAT model and to increase its predictive power. For instance, Stern (2000) argued that personal norms are not only activated by ascribed responsibility (AR) and awareness of the consequences (AC), as suggested by Schwartz (1977), and added the "ecological worldview" which reflects peoples' environmental concern or orientation. Moreover, Setiawan et al. (2020) proposed integrating Theory of Planned Behaviour constructs to the NAT model to provide a more "comprehensive perspective".

Similarly, data analysis indicates that while AC is relevant, mere awareness is inadequate to trigger behaviour change, as participants' perceptions about the magnitude of these consequences also play an important role. Magnitude of consequences is one of the main determinants of "moral intensity" in Jones's (1991) ethical-decision making model. The moral intensity construct has not been utilised in the PEB literature before. Nonetheless, there is emergent evidence in few studies of its effectiveness in predicting PEB (e.g. Culiberg and Bajde, 2013)Analysis has indicated that despite reporting AC, several participants still trivialised the impact/magnitude of these consequences and their behaviour (see Theme 2, p. 120). Ultimately, they reported being discouraged to engage in water efficiency. These findings are in line with the few recent studies in PEB literature examining perceived impact. For instance, Pasca (2022) concluded that individuals tend to underestimate their impact

relative to others and that low perceived impact leads to low intentions to engage in PEB. Similarly, with AR, findings indicate a link between perceived impact and responsibility. In a sense, it is argued that: with great magnitude comes greater responsibility, and vice versa. Thus, participants who perceive the consequences of their usage as trivial would usually push the responsibility onto others (e.g. society, big companies, or government) – whom their usage consequences are perceived as bigger (i.e. higher magnitude) and hence, perceived as more responsible. Therefore, they are less motivated to engage in water efficiency. These findings are consistent with recent research in PEB literature that found a positive significant relationship between perceived responsibility and sustainable consumption (Čapienė et al, 2022). Furthermore, these insights provide possible explanations for the results of earlier studies that examined the link between consequences and responsibility. For instance, Wells et al. (2011) found that more respondents reported feeling responsible for tackling rather than for causing climate change. The notion of perceived magnitude of consequences helps explain this pattern. As findings indicate that participants' perceived magnitude of consequences is underrated and thus, they reject any implied individual responsibility for causing harm/benefit on a bigger scale. Furthermore, some participants in interviews where an internal sense of obligation towards water conservation was expressed (i.e. personal norm), AC and AR were not reported, while aspects relevant to inherent morality of water conservation and its intrinsic value (see RQ2, p. 176) were identified. This suggests that morality perceptions could expand NAT as an additional variable that activates personal norms, in addition to AC and AR proposed by Schwartz (1977).

Finally, personal norms could help understand why several participants reported feeling “guilty” when perceiving their water usage as wasteful. Guilt has been examined in various previous studies in PEB literature. A recent meta-analysis provided evidence of its impact on intentions as well as actual PEB (Shipley and van Riper, 2022). According to Schwartz (1977) failure to meet self-expectations by engaging in behaviours that conflict with the personal norms leads to feelings of guilt. However, analysis indicates that it is not the sole predictor of guilt. For instance, some participants reported feeling guilty when – hypothetically, assuming a negative impact of their usage on someone else, without necessarily reporting an internal moral obligation (i.e. personal norm) to conserve water. These findings contribute to better understanding of antecedents of guilt as one of determinants of PEB.

RQ3: How can social norms perceptions help in understanding water consumption behaviour?

This question is relevant to and was answered by insights from theme 5: social influence.

Analysis identified participants' social norm perceptions and aspects that contribute to shaping these perceptions. Moreover, it explored how these perceptions are reflected in reported water consumption. A common pattern across interviews is negative social norms perceptions, in terms of negative assumptions about the water efficiency of "others". Other households and/or businesses are perceived as higher water users and hence, more wasteful. This was associated with participants in several interviews, reporting their perceived usage as within or below "normal" or "average" consumption. Consequently, they expressed "surprise", "shock" or "confusion" when later presented with a hypothetical scenario of receiving a water bill that shows their usage is actually more than the neighbourhood average. These findings are in line with the few recent studies that examined individuals' water usage perceptions relative to others. For instance, Vazquez-Casaubon et al. (2023) indicated that most individuals "misperceive" their water usage and referred to this as a "cognitive bias of self-assessment". Similarly, a study by Haeffner et al. (2023) found that the majority of households are underestimating their usage relative to neighbours. They proposed the term "relative water use perception bias" and stated that absence of actual relative information about water usage rate is one of its main reasons.

Research findings indicate that receiving solid information about social norms acts as a benchmark for participants to assess their consumption and challenge their inaccurate perceptions. Almost all participants reported intentions to adjust their high water usage to match the hypothetical neighbourhood average given in the vignette. These findings support previous literature advocating the effectiveness of social norms in promoting PEB as supported in a meta-analysis by Bergquist et al. (2019). Furthermore, in the context of water conservation a review of water interventions by Lu (2019) indicated that "socially comparative feedback" is one of the most effective interventions because it represents a "reference point" or a benchmark. Furthermore, these findings are inline with social marketing literature advocating the role of social influence and midstream interventions on behaviour change (e.g. Lefebvre, 2011; Luca et al., 2016).

Further analysis was conducted to understand how normative messages are interpreted by participants and to understand why perceived norms are relevant in water conservation

despite the lack of social visibility. Findings expand previous research which indicated that normative messages could trigger aspects such as self-efficacy (Jugert et al., 2016; Thogresen, 2006) and competitiveness (Abrahamse et al., 2005) by identifying one more additional factor. Analysis shows that norms also give a sense of collective efficacy that encourage behaviour change. When participants reported negative perceptions about what the majority of people are doing (i.e. water waste as the descriptive norm) it was associated with discouragement to save and low perceived impact. On the other hand, the more positive norm perceptions the more water they reported they were motivated to save. These findings contribute to a better understanding of the impact of descriptive normative messages reported in previous studies. For instance, communicating unfavourable descriptive norms – implying the prevalence of negative behaviour in a social group, were found to increase littering (Cialdini et al., 2006) and energy usage (Schultz et al., 2007). This pattern shows that when the collective is acting in an unfavourable way, PEB is discouraged and vice versa –therefore, supporting the relevance of the notion of collective efficacy. These findings are consistent with extant evidence of the significant influence of collective efficacy perceptions in PEB literature (e.g. Cuadrado et al., 2022; Jugert et al., 2016) as well as water conservation literature (Seger et al., 2019). Furthermore, this pattern contributes to better understanding of underlying reasons for the well-established success of community-based social marketing (e.g. McKenzie-Mohr, 2011) and midstream interventions (e.g. Luca et al., 2019; Kamin and Kokole, 2016) in encouraging behaviour change.

RQ4: What are the barriers/enablers to engaging in water conservation?

This question is relevant to and was answered by insights from all six identified themes.

Analysis indicates that barriers to water efficiency are mainly, misperceptions that are usually associated with a failure to acknowledge why saving water is important, rather than lack of knowledge on how to save water. These misperceptions are reflected in all the identified themes starting from the inaccurate assumptions about abundance and problem severity, trivialising personal impact, underestimation of urgency to perceptions about social norms and the moral implications that their usage entails. Three main non-physical cues (i.e. media, social and policy cues; see Theme 1, p. 103) were identified as the basis and key contributors to shaping some of these perceptions – in addition to physical cues of abundance (e.g. frequent rainfall). Addressing these non-physical cues to signal a problem with water and/or low water abundance/availability has the potential to debunk these misperceptions and

hence, act as enablers to water efficiency. These findings are consistent with previous research reporting limited effectiveness of interventions providing "how-to tips", despite being the most commonly used (Ehret et al., 2021; Liang et al., 2015). Thus, it is proposed that providing knowledge on water availability and why it is important to save water– rather than how to save, is needed more. Moreover, the unsupportive non-physical cues such as "cheap" water bills relative to other household expenses, act as a barrier and a disincentive for water conservation. Findings indicate that the extent to which a water bill could (dis)encourage behaviour change depends on its perceived affordability which varies across sample subgroups with different occupations/income levels (e.g. students). This was not addressed in previous literature and helps explain the reported mixed findings on the influence of income level on water conservation (e.g. Trumbo and O'Keefe, 2001) and the limited effectiveness of increasing water prices (see García-Valiñas and Suárez-Fernández, 2022).

An additional misperception involves associating water efficiency with "hardship" and inconvenience – which would take them out of their "comfort zone". Analysis shows that patterns of water consumption usually offer a certain level of added value that is hard to give up and hence, hinders behaviour change. For instance, the enjoyment/relaxation value in long showers and the time efficiency/convenience in washing cars with a hosepipe rather than a bucket. These findings are in line with a recent review of PEB literature which indicated that interventions where the sustainable alternative was the most convenient, were the most effective (Rau et al., 2022). Similarly, in line with some studies in water conservation where "inconvenience and impracticality" are reported as the main barrier for water conservation practices (e.g. Dolnicar and Hurlimann, 2010).

The various range of misperceptions associated with water efficiency shows that learning more about the users' perspective is essential. However, although (mis)perceptions are important to address, this does not mean the onus to conserve water only relies on individual perceptions. In other words, the importance of external structural aspects and tools should not be undermined. Structural aspects have the potential to address some of the misperceptions mentioned previously. In line with social marketing literature, contextual aspects and structural changes play a role in facilitating behaviour change (e.g. Truong, 2014; McKenzie-Mohr, 2000). For instance, several participants under-rate their water usage and hence, trivialise its impact. A smart metering system and regular billing providing accurate usage feedback to address this misperception could be helpful. Furthermore, built-in devices

that make water efficiency the default (e.g. taps with sensors) or the more convenient alternative (e.g. dishwashers) were found to encourage participants. Hence, these could act as enablers.

These findings show how complex water conservation behaviour is. Moreover, it shows that various dimensions could be hindering water conservation and thus, behaviour change should be targeted at different levels. These insights are consistent with social marketing advocacy for multi-levels approach (e.g. French and Russell-Bennett, 2015) and systems- approach (e.g. Truong et al., 2019) to behaviour change. Moreover, these findings agree with some previous research acknowledging water conservation as a "complex phenomenon" (Salas-Zapata et al., 2023) that should be tackled by a comprehensive approach" (Ehret et al., 2021). Acknowledging the complexity of water usage behaviour and the diverse nature of barriers it includes, social marketing implications on three levels (downstream, midstream and upstream) will be provided in the practical contribution section (5.2.2, p. 190) below.

RQ5: How could context-related aspects (e.g. risk of drought in a country) help in understanding households' behaviour and perceptions?

This question is relevant to and was answered by insights from theme 1: (lack of) problem recognition and abundance perceptions, as well as, (underestimating) urgency and threat perceptions.

Analysis has indicated an important distinction between the actual water situation in a country and individuals perceptions about the water situation. For instance, Egypt is a water-stressed country (see p. 18) for a detailed review of the water situation in Egypt). Nonetheless, several participants underestimate the severity of the situation because of lack of "evidence" or cues signalling water scarcity. Two types of cues that shape participants' perceptions about the water situation were identified: physical (e.g. rainfall, water cuts) and non-physical cues (i.e. media, social and policy) (see p. 108). There is a lack of research that makes a distinction between types of cues shaping perceptions about water abundance.

Analysis shows that participants take physical cues (e.g rainfall) as the sole representation of the water situation, unless they learn otherwise. Thus, their abundance perceptions are not necessarily accurate. Previous research did not address perceptions about water abundance sufficiently. Only one study referred to a similar notion of a "myth of abundance" that is prevalent in humid regions with high rainfall (Praskievicz, 2019).

Moreover, the potential that non-physical cues (i.e. media, social and policy) have to challenge the accuracy of these abundance perceptions by signalling a problem with water availability was not examined previously. Non-physical cues could provide better representation of the water situation – even in the absence of aligning physical cues. Few studies noted that increasing water prices in times of low rainfall (i.e. policy cue) is "adequate mechanism to signal scarcity" (see Echeverría, 2020, p. 2). The importance of non-physical cues was observed in how UK and Egypt participants perceptions about future abundance differ (p. 116). Despite both countries – at the present time, enjoying uninterrupted water access (i.e. lack of physical cues), participants in Egypt were concerned about future water availability, while in the UK the current state of perceived abundance is assumed to last forever. One main reason is the higher exposure to media cues (i.e. non-physical) communication information about potential threats to Egypt's share of water caused by a dam being built on the Nile River in an upstream country (see p. 18for a detailed review of the water situation in Egypt). These findings indicate that the lack of problem recognition and abundance perceptions in a context were associated with perceiving a water shortage as distant, in terms of the time when and place where it will happen. Even the concerns in Egypt about future abundance were more long-term than short-term. Thus, the urgency of water problems, potential personal threat and thus, problem significance and the need to change behaviour were all underrated in both contexts. The data indicates that few participants who showed a higher personal threat perception also reported more water conservation behaviour. This finding is consistent with a previous study which indicates that individuals who perceive environmental issues as a "threat for one's personal welfare" are more likely to engage in resource conservation (Glig and Bar, 2006, p. 411). Moreover, this finding helps understand results in some previous studies that found participants living in areas experiencing water scarcity to report more personal involvement and water conservation behaviour (Sarabia-Sánchez et al., 2014; Rodriguez-Sanchez and Sarabia-Sanchez, 2020). The comparative approach in this study and the insights it provides on how problem recognition and abundance perceptions differ across contexts (i.e. UK and Egypt) helps explain previous research that reported a significant impact of perceived risk of scarcity on water conservation (Cauberghe et al., 2021; Sarabia-Sanchez et al., 2021). However, samples in these studies were within the same country and a cross-country lens –which this study offers, is missing . In summary, each research question was found relevant to one or more of the key themes identified in this study. The following table (5.1) illustrates the link between research questions and themes.

Table 5.1: Themes and relevant research questions

Theme	Research Question (RQ)
(Lack of) problem recognition and (assuming) abundance perceptions	RQ1, RQ1.3, RQ2.1, RQ4 and RQ5
(Trivialising) perceived personal usage and impact	RQ1.2 and RQ4
(Underestimating) urgency and threat	RQ1.3 and RQ5
(Prioritising) convenience vs efficiency	RQ1.1 and RQ4
Morality	RQ1.3, RQ 2, RQ 2.1 and RQ4
Social influence	RQ3 and RQ4

The prevalence of the problem recognition and abundance theme across RQs shows that it is the basis and core contributor for all the preceding themes and perceptions. Thus, it implies that correcting perceptions about abundance and highlighting a problem with water could have a significant impact on water usage. Furthermore, morality is the second most frequent theme, which indicates that various perceptions have a moral dimension and implications. For example, in the first instance RQ 1.3 – about water specific beliefs, might seem to be only relevant to problem recognition and abundance perceptions. However, analysis has revealed that these beliefs could go beyond physical abundance of water to include a more spiritual aspect of valuing water as a "precious" resource.

5.2 Research Contributions

The research contributions are classified into theoretical, practical and methodological contributions and are discussed next.

5.2.1 Theoretical contributions

Findings have contributed to theory and knowledge in the three main research streams; water conservation, social marketing and morality.

Contributions to Theory

- **Expanded Norm-activation theory**

  This research explored NAT constructs and indicated their relevance to water conservation. NAT is one of the most widely researched models for moral motivation in PEB, and its core construct – personal norm is argued to be the "strongest predictor" of PEB (Helferich et al., 2023). However, studies that utilised NAT in household water conservation context are insufficient. Therefore, this research contributes to this gap and provides an understanding of how NAT variables apply to the water conservation context. Moreover, it explores a potential for moral intensity to expand NAT, by enhancing perceptions about ascribed responsibility and awareness of consequences and eventually, triggering personal norm activation.

- **Exploring morality and expanding theory-use in social marketing**

  Theory use is one of the main benchmarks in social marketing (French and Blair-Stevens, 2005). This study has explored the relevance of two theories of moral behaviour that have not been used before in the social marketing domain. The issue contingent model (Jones, 1991) and NAT (Schwartz, 1977) offer great potential for social marketers to understand the moral decision making process and achieve more durable behaviour change. Hastings (2017) argued that the notion of morality has implications for social marketing. He noted that "we all have within us the moral agency to make the right choice even when it is the difficult one; we just have to reconnect with it" (p. 223). Thus, he argued that social marketing has a "crucial task" to "reawaken our moral agency" (p. 225). This study contributes to this call and provides a better understanding of morality in water conservation context.

- **Explores the applicability of moral decision-making theory in a PEB context**

  Some studies have acknowledged that PEB is a moral imperative (e.g. Gatersleben et al., 2019; Rex et al., 2015; Steg and Vlek, 2009). However, there is a lack of research that looks at PEB and water conservation from a moral perspective by

integrating a theory from the moral decision-making literature. This research expands the application of the issue-contingent model (Jones, 1991) beyond the business context to help explain individuals PEB. No previous studies have explored its applicability to explain a PEB, except for one study by Culiberg and Bajde (2013) looking at recycling. This research contributes to this gap by providing tentative evidence that moral decision-making is relevant to PEB. Several constructs from the Jones model were found to be relevant to the identified key themes in the data set. For instance:

Moral recognition is argued to be the first and most crucial step to trigger moral decision making (Jones, 1991; Rest, 1986). However, previous research has not provided sufficient explanation on antecedents of moral recognition. In the context of water conservation, findings indicate that realising a potential impact (positive/negative) of water usage on others depends on two main factors: realising the commonality of the water resources and water abundance perceptions. In cases where water is acknowledged to be a common resource shared by members of a social group and is limited/scarce, individuals are more likely to rationalise their water consumption. These findings are consistent with arguments by Russell and Fielding (2010) that water is a "collective resource" subject to the assumptions of the "tragedy of commons".

Furthermore, moral intensity (MI) – the core construct of Jones (1991) model is found relevant to water conservation. Five out of six items of moral intensity identified by Jones are consistent with the key themes. Hence, each of the key themes were found to be relevant to one, or more, MI items. For instance, problem recognition and abundance perceptions were relevant to probability of effect (e.g. a water shortage is very unlikely), personal usage and its impact aligned with magnitude of consequences (e.g. my usage rate does not make a difference), urgency and threat is closely related to temporal immediacy (e.g. a drought may occur but only in the far future), social influence is similar to social consensus (e.g. everyone is saving/wasting water), and morality is relevant to proximity (e.g. no one in my social group is affected by my usage rate).

Contributions to Knowledge

Water Conservation

- **Water conservation is overlooked in PEB literature**

  While behaviours such as energy usage, recycling and green transportation are widely researched, relatively less attention is given to water. A recent review of PEB literature by Grilli and Curtis (2021) reported that the most researched topics are energy usage and waste disposal, while water efficiency came in third place. This study contributes to this gap and extends the literature and understanding of antecedents of water conservation behaviour.

- **In-depth understanding of water consumption behaviour from households' perspective.**

  This research provides detailed illustration of the antecedents of water consumption behaviour and reveals various relevant variables that have not been addressed previously (e.g. physical/non-physical cues, perceived problem significance, perceived necessity of water practices, intrinsic value of water, perceived, moral recognition). Analysis has uncovered the underlying perceptions and beliefs that ultimately shape individuals' water consumption. These "latent determinants" of water conservation are less examined in previous research, as concluded by a recent review of literature by Cominola et al. (2023). Nevertheless, addressing aspects have great potential to increase the adoption of water conservation practices. This study has not only highlighted the core significant areas of misperceptions associated with water conservation, but also identified the underlying factors contributing to those misperceptions, as well as, the potential tools to counter their effect on water consumption.

- **Understanding how individuals interpret social norms and normative messages**

  This study provides an in-depth understanding of the reasons why social norms are effective in driving behaviour change, and provides insights on how such impact could be capitalised and enhanced. Several studies have supported the effectiveness of normative messages on water conservation (e.g. Lede et al. 2019). However, the mechanism through which social norms impact water consumption was not addressed previously. Previous studies usually attributed the effectiveness of

normative messages on behaviour/intentions to social approval/disapproval and social rewards/sanctions (e.g. Cialdini et al., 2006). However, these attributes seem less relevant and applicable to household water conservation – a behaviour that is relatively private, compared to other PEBs such as recycling or cycling to work. There have been calls by Thorgen (2006) for future research to examine the "paths" through which norms affect behaviour, however, there is a lack of studies addressing this in water conservation context. This study contributes to this gap by revealing how social norms messages are interpreted by individuals (e.g. as a benchmark to assess one's behaviour) and what thoughts/emotions it triggers (e.g. competitiveness, self-efficacy).

- **Expanding the understanding of households water efficiency in the UK and Egypt**

  Previous research on household water conservation in the UK and Egypt is still inadequate. A systematic literature review indicated that the majority of studies are in areas "more prone to drought" such as southern Europe (Cominola et al., 2023) as well as the US and Australia (Salas-Zapata et al., 2023). Despite some previous studies examining household water conservation in the UK, the focus is on testing the impact of predetermined sets of variables on water conservation intentions, rather than embarking on an open inquiry to understand households' behaviour. In Egypt, most studies on water efficiency are in the agricultural sector, as the largest water consumer. This study contributes to this gap by providing insights on household water conservation in two overlooked contexts.

Social Marketing

- **Expanding social marketing research on PEBs**

  Social marketing is dominated by studies in public health (Truong, 2014). Nonetheless, it has expanded to include sustainable behaviours such as: food waste (e.g. Kim et al., 2022) and littering (e.g. Kaur and Singh, 2023). However, there are relatively few studies that examine water conservation from a social marketing perspective (e.g. Warner et al., 2022). This study further contributes to expanding the scope of social marketing in the PEB domain by exploring household water conservation behaviour and providing implications for downstream,midstream and upstream interventions (see section 5.2.2 below).

- **In-depth understanding of the "value-in behaviour" notion**

French and Gordon (2015) introduced the value in behaviour concept and called for more studies to explore it. Since then, there has been some research in areas such as energy consumption (Gordon et al., 2018), services marketing (Zainuddin and Gordon, 2020) and plastic waste (Muposhi et al., 2023). However, it has not been examined in a water conservation context. This research contributes to the literature by not only providing insights on value-in water conservation but also, aligns with calls by French and Gordon (2015) to further explore the "societal value" aspect. While a societal value is implied in social marketing interventions, understanding of antecedents that shape this value perceptions remain unclear. The moral perspective adopted in this study contributes to this research gap by revealing perceptions about the inherent value of water conservation, what it entails, and factors that enhance these perceptions in both contexts. Furthermore, it expands the notion of value to include the perceived value-of water itself (i.e. intrinsic value), rather than solely exploring the value-in water conservation behaviour.

Morality

- **Understanding morality beyond personal norms**

Previous studies focused on examining morality in terms of moral obligation/personal norms – as a significant predictor of PEB (see Helferich et al., 2023), rather than exploring individuals' meanings of morality. This research provides in-depth understanding of morality in the context of water conservation. Furthermore, it uncovers how perceptions about morality are shaped and identifies factors relevant to moral recognition and eventually, water conservation behaviour. Findings provide insight on the first and most crucial step of moral-decision making, moral recognition, by revealing that perceptions of high water abundance blocks the recognition of potential impact on others sharing the common resource (i.e. water). Hence, resource commonality is insufficient in triggering moral recognition, abundance perceptions are also relevant. Therefore, this research provides understanding of how morality manifests in the context of resource (i.e water) conservation.

5.2.2 Practical contributions

This research provides an in-depth understanding of households' water consumption and contributes to the "formative research" stage – the first and most important step (Andreasen, 2002) in designing social marketing interventions. Hence, practical contributions of this research are presented as implications for designing social marketing interventions.

These implications will help practitioners design interventions that meet all the benchmark criteria of social marketing (French and Blair-Stevens, 2005) as follows: recommendations are based on interview data which provides in-depth market "insight" and adopts a "consumer orientation" to a achieve "behavioural influence" (i.e. water conservation); a diverse range of tools and "methods mix" which targets different levels/sources of barriers "competition" is suggested to help social marketers tailor interventions to their target audience and select the best match to their "segmentation" strategy; moral "theory" informed many of the implications and help guide interventions' value proposition towards value-in behaviour and beyond "exchange".

The social marketing approach adopted in this study is of great value to practitioners as it provides a well-established framework that accounts for different levels at which behaviour change can be targeted. In PEB, a recent review by Rau et al. (2022) classified interventions into three types: policy, community and individual. They noted that the majority were targeting individual-level behaviour change, while the most effective interventions were the ones that utilised a "combination" of all three levels. Furthermore, in a recent report by the Institute of Water, Kamat et al. (2022) examined sixty interventions by the water sector in the UK stating that information provision shapes 68% of interventions. It called for a move beyond information provision as it puts "the onus" on the individual, and that other aspects such as structural physical aspects as well as community and social aspects should be considered. These calls are inline with the multi-levels perspective of social marketing and the significance of systems-approach that acknowledges entities/factors that interplay in the "social matrix" to shape behaviour (Truong et al., 2019).

Therefore, a holistic approach that acknowledges the complexity of behaviour change beyond downstream/individuals is needed. According to Echeverría's (2020) review of the water conservation literature, evidence of the intention-behaviour gap as well as behaviour-"stable reductions" gap is prevalent. They referred to it as a "double gap" and

Echeverría called for future research to address this issue. These practical implications could help achieve more durable results and sustained behavioural change.

Before deciding whether a downstream, midstream or upstream social marketing intervention is appropriate, the first step in designing interventions should be selecting a target behaviour (Lynes et al., 2014; Andreasen, 2002). Hence, when designing a water efficiency intervention it is important to decide which behaviour exactly is being targeted. Based on the findings of this research, the following targeting strategies are recommended:

- **Target one behaviour at a time**

  Data analysis indicates that participants feel overwhelmed by interventions which communicate messages about water efficiency in general without specifying one practice in particular. Thus, analysis indicates that focusing on one behaviour per communication would be better to avoid overwhelming the audience as well as increase the chance of message recall and behaviour change. These findings are in line with McKenzie-Mohr (2011) advice for interventions to narrow down their focus as each behaviour has a "unique" set of barriers. Similarly, a review of water efficiency community-based interventions recommended that "divisible behaviours" (e.g. outdoor water conservation) should be "broken down" into more specific behaviour (e.g. use a watering can; collect rainwater) to increase interventions effectiveness (Fries et al., 2020).

- **Target behaviours that are perceived as less essential**

  Findings indicate that participants tend to shape their perceptions about the necessity of a practice by the value that it offers them (e.g. long shower/bath helps in relaxation; washing a car with a hose pipe offers convenience). This suggests that the more essential a behaviour is perceived the more difficult to change, and vice versa. Therefore, the perceived necessity of different practices should be taken into consideration while designing interventions as it could act as a barrier and hence, decrease the probability of behaviour change. This recommendation is in line with previous studies arguing that in deciding which behaviours to target social marketers a main benchmark should be considering the behaviour's "potential impact, penetration and probability" (Lynes et al., 2014). The perceived necessity of different water practices were not addressed in previous studies.

After selecting a target behaviour, the social marketing approach that best matches the identified set of barriers associated with this behaviour is selected. Thus, implications are organised as downstream, mid-stream and upstream measures to provide a holistic approach and guide practitioners in designing more effective water efficiency interventions.:

- ***Downstream***

Selecting the tools to use at downstream level is a crucial step. The most widely used type is usually information, in terms of "conservation tips" and these types of interventions usually "fail" (Liang et al., 2015). Findings help explain this pattern. Data analysis indicates that participants are not lacking knowledge on how to save water, rather they are looking for a strong reason "why" they should. Consequently, findings suggest that interventions need to target the misperceptions that undermine audiences' perceived significance of water efficiency and discourage behaviour change by utilising tools such as:

- **Education:** social marketers should educate individuals to fix misperceptions about water abundance by communicating solid information on water availability such as rainfall rates, rivers and reservoirs levels. There is a need to move beyond conservation and how-to tips that have proven to be ineffective (Ehret et al., 2021; Liang et al., 2015).

- **Information provision:** social marketers should adjust perceptions of necessity associated with some practices by communicating information that sets solid criteria to help them assess the extent to which a behaviour is essential. This would be particularly useful in times of droughts when water restrictions are imposed. For instance, a hosepipe ban will not achieve the aspired reduction in water usage if households are still taking daily full baths and long showers. Thus, communications in this case would urge households to reduce all non-essential water usage. Perceived necessity of different water usage activities has not been addressed by previous studies. However, one study noted that essential activities (e.g. showering) now involve a high unessential component (e.g. long relaxing showers) making water conservation more challenging (Russell and Knoeri, 2020).

- **Social norms and Social comparative feedback:** social marketers should capitalise on the social influence and incorporate normative messages in their communication to augment collective efficacy perceptions (more details are discussed midstream section

below, p. 195). Providing regular feedback on consumption relative to a social performance (e.g. neighbourhood average). This provides a benchmark to help them accurately assess their usage rate and counter the tendency to misperceive/overestimate their efficiency. It should be noted that this requires wider adoption and enforcement of obligatory metering systems for water as with other utilities (gas and electricity). This is discussed in upstream measures below (p. 196) in more detail. Social comparison has proven its effectiveness in previous studies in water conservation (e.g. Lede et al., 2019) and energy consumption (e.g. Schultz et al., 2017).

Furthermore, it is important to choose a suitable framing strategy and communication channel to convey water efficiency messages. Based on insights from data analysis, it is proposed that practitioners should:

- **Frame water conservation as a moral issue**

  Findings indicate a great potential for moral framing in communications. Therefore, practitioners should move beyond the financial and environmental benefits of saving water to highlight the moral side of water conservation by utilising a moral appeal in communications. This could be done in two distinct ways. First, pinpointing the broader societal benefits of water conservation. This is in line with findings of a recent study by Brick et al. (2023) that "the most effective nudges were those that appealed to households to act in the public interest (public good)" (p.1). To achieve better results, the commonality of water resources and its limited abundance should be communicated with this type of framing. Second, enhance the intrinsic value of water as a precious resource that is worth saving to activate moral obligation (Cauberghe et al., 2021). Carefully selecting a message framing strategy is a crucial step in social marketing and a core aspect in CBSM communication benchmark (Lynes et al., 2014).

- **Use a diverse/creative mix of media platforms and tools**

  Several participants reported very low exposure to any communications about water efficiency. This indicates that using a well designed mix of platforms would help create a buzz and trigger conversations about water efficiency. Social media was mentioned by several participants as a preferred platform. Social marketing should "leverage" modern media platforms as they offer more customer engagement than traditional media (Bernhardt et al., 2012). Similarly, the potential of integrating "persuasive technology" (e.g. augmented or virtual reality) in social marketing communications is acknowledged in the literature (Rodriguez-Sanchez, 2023).

Moreover, in line with previous studies in PEB and social marketing literature (e.g. Mckenzie-Mohr and Schultz, 2014; Schultz, 2014) findings indicate that convenience is a major concern for participants. Therefore, social marketers should aim to make the water-efficient option also time and effort-efficient and hence, easier for people to engage in. This could be achieved by tools such as:

- **Augmented products:** findings suggest that technological measures such as, water-efficiency devices that are easy to use, affordable and durable would help with water reduction. Thus, water companies should provide water efficiency devices and "retrofits"**.** The role of "augmented products" in facilitating behaviour change and in value creation has been acknowledged in social marketing literature (e.g. Zainuddin et al., 2017). Taps with sensors to turn off automatically were widely mentioned in interviews, however, usually associated with concerns about its affordability, durability and maintenance. These concerns should be addressed to encourage the adoption of these augmented products. For instance, these products should be offered for free, or with subsidised prices, with an option to pay in instalments, and free periodic maintenance/warranty could be offered. In addition, practitioners should also work on making them more accessible. It is worth noting that imposing technological changes solely without educating customers on water efficiency might backfire and lead to an increase in water consumption (e.g. take longer showers because a water-efficient shower head is installed). Thus, it is recommended to augment this strategy with previously mentioned education/information interventions to achieve the targeted water savings.

- ***Midstream***

Social norms have been identified as a key aspect that shapes water conservation (e.g. Nemati and Penn, 2020; Keizer and Schultz, 2018). In the same vein, findings in this research show the significance of social influence and thus, reveal a great potential for community-level interventions. These insights are in line with previous literature advocating the role of community-based social marketing (e.g. McKenzie-Mohr and Smith, 1999) and midstream interventions (e.g. Luca et al., 2019; Kamin and Kokole, 2016). Therefore, it is recommended that in designing interventions, practitioners could employ tools such as:

- **Goal-setting and Social modelling:** Findings indicate that communicating a common water reduction target for a neighbourhood and providing feedback on households water usage relative to the neighbourhood average (i.e. social comparison) encourage water conservation. This type of intervention implicitly signals a positive descriptive norm (i.e. majority people are saving water) and has proven effective on water reduction (e.g. Lede at al., 2019) and ultimately, enhances perceptions about collective efficacy. Furthermore, it would trigger conversations about the issue among members of a social group and bring water to the front of their minds. These implications are inline with findings of previous experimental study on UK households that concluded that a message framed to enhance collective efficacy (e.g. if everyone turns off the tap while brushing their teeth we can save enough water to fill in the reservoirs) positively influences water conservation (Seger et al., 2019).

- **Social diffusion:** Findings suggest that targeting water efficiency at social institutions such as the workplace, schools, and/or places of worship would help establish social norms on a meso-level rather than on a broader societal level. These norms could later be transferred to the audience's family and friends and expand adoption of water efficiency practice. This recommendation is in line with several studies that acknowledged the great influence of social diffusion in PEB literature (e.g. Mckenzie-Mohr and Schultz, 2014; Schultz, 2014). In a previous study, the reach of an educational intervention at schools was found to extend to the student's household members (Thompson and Serna, 2016).

- ***Upstream***

The following upstream measures require changes in policy, law and regulations. Thus, the involvement of and collaboration between social marketing practitioners, water companies, policy makers and/or governmental/non-governmental bodies is crucial for successful implementation. According to the data analysis, the lack of policy cues (i.e. metering and pricing) signalling a problem with water is one of the main reasons why high abundance perceptions remained unchallenged. Unmetered consumption and relatively cheap water tariffs positioned water as a "free resource" that can be used without any restrictions. Therefore, policy makers should utilise tools such as:

- **Provide Feedback:** Imposing compulsory metering would provide usage feedback and help households track/assess their water consumption. Data analysis indicates that several participants in this study do not have a water metre or were reluctant to install a water metre and perceived the process as messy and costly – despite it being provided for free upon request. These concerns in addition to (infra)structural aspects that installing a water metre could involve (e.g. pipework) should be taken into consideration. Therefore, water companies should facilitate and encourage the installation process of water metres. Currently, approximately 50% of households across the UK have water metres and there are plans for obligatory metering by 2030 (DEFRA, 2022).

- **Monetary (dis)incentives by:**
    - **Changing the pricing structure:** Findings indicate that water is perceived as a "cheap" resource because water bills are usually lower than other utilities (i.e. electricity and gas). Current water tariffs do not reflect the significant value of water as a limited resource. Attaching a monetary value to water consumption would be relatable to many and could trigger water conservation. Taking into consideration the fairness issues raised in the literature and in data findings, applying an increasing block tariffs scheme –in which the higher the usage the higher the tariff per cubic metre– would be a better alternative than increasing tariffs for all, regardless of consumption level. This is consistent with a meta-analysis by Marzano et al. (2018) that shows that this type of pricing is the only one associated with reductions in water demand.

- **Applying tax on high water use appliances:** Data analysis indicates that participants pay less attention to the water efficiency of the appliance relative to energy efficiency. Applying tax on inefficient appliances could augment the water tariffs scheme and would make water efficiency a priority in purchase decisions. DEFRA has introduced a labelling system for high-water appliances which is a great first step. However, it remains an advisory/informational intervention and will not achieve the desired reduction in water usage unless the labelling is augmented with a tax scheme. In this case, less water efficiency becomes reflected as tax and a higher price relative to more water-efficient appliances. Similar to the fairness concern raised previously in increasing water tariffs, before applying tax policy makers should ensure that customers have access to other water efficient alternatives easily available in the market.

- Choice architecture by introducing policies to enforce building regulations: Data analysis indicates a tendency to prioritise convenience and avoid any sacrifice of personal comfort which suggests that structural changes that make water efficiency the default would be effective. In addition to installing retrofits to already existing buildings, it is recommended that regulations should facilitate an embedded-system of water efficiency in new buildings. For instance, providing incentives for construction companies to install low-flow taps and shower heads; build an infrastructure for water recycling and/or reuse (e.g. collecting rain water or greywater to flush toilets). These "changes to context" are referred to as "choice architecture" and their role in facilitating PEB is acknowledged in the literature (van Valkengoed et al., 2022, p. 1485).

- **Social diffusion through a city/county-wide water reduction strategy/ intervention:** Data analysis has indicated that policy cues trigger changes in social cues (e.g. an increase in energy prices led to more conversations among social groups). Therefore, it is suggested that at a broader-level across the country –rather than localised– policy changes and water efficiency targets/campaigns offer an opportunity to increase individuals' sense of collective efficacy. A national target should be announced, a shared goal that all stakeholders in society (i.e. household and non-household consumers; water companies; government) collaborate to achieve. In addition, timely group-based feedback (van Valkengoed et al., 2022) should be

provided on the overall progress to encourage further reductions and sustain the achieved savings. This would also trigger collaboration and enhance collective efficacy perceptions.

Overall, downstream, midstream and upstream measures will communicate non-physical cues – media, social, and policy cues, respectively. Consequently, signalling a current/potential problem with water availability and enhancing the significance of water conservation.

5.2.3 Methodological contribution

Previous studies have mainly employed a quantitative methodology to test pre-determined constructs based on the researcher's view of what is relevant and/or could predict water usage (see review Bhakta et al., 2022). There is a lack of studies that employed a qualitative methodology for a better understanding of households water usage from the individuals' perspective.

Conducting in-depth interviews have provided rich insights and better understanding of water consumption. Moreover, this has revealed various constructs that have not been addressed in previous literature such as: non-physical cues, problem perceived significance, perceived impact of personal usage, and perceptions about intrinsic value of water. Moreover, it provides a deeper understanding and proposes explanations for some patterns reported in the previous literature. For instance, findings help explain why normative messages are effective in behaviour change by uncovering the mechanism/routes through which these messages are interpreted by individuals.

Overall, the qualitative methodology allowed for better understanding of "what" constructs are relevant to water consumption, "how" individuals perceive water/water conservation, as well as, the reasons "why" these perceptions exist.

5.3 Limitations

Adopting a qualitative approach has provided in-depth illustration of antecedents of households' water conservation behaviour. Nevertheless, relative to quantitative research the sample size is small, analysis is interpretive and hence, findings are subjective. Consequently, research findings reflect the views of research participants and thus, can not be easily generalised. Taking this into consideration, the proposed implications should be adopted with caution, preferably tested on a pilot study before applying on a bigger scale.

Furthermore, data collection was conducted during COVID pandemic with social distancing restrictions in place. This has led to a reliance on online platforms to recruit the sample units and conduct the interviews. It was very challenging to reach older age groups who might have limited online presence. Therefore, the sample representativeness is limited – in terms of age diversity, as the majority of the participants were less than sixty years old with average age ranging from twenty to thirty-nine years old. Furthermore, sample diversity in terms of a socio-economic aspect such as educational level was limited. Almost all participants reported being university graduates, with some participants reporting holding a higher degree (e.g. master's or PhD).

In addition, a rigorous data collection and analysis approach was conducted to ensure participants' perspectives were captured/ represented as accurately as possible. Nonetheless, due to time constraints, it was not possible to share the findings and identified themes with participants to allow for "member checking" (Lincoln and Guba, 1985) that could help verify findings. Moreover, expanding the analysis to further explore the perceptions of sub-groups within the sample (e.g. parents, students) was not possible due to time constraints.

Finally, this research explored participants' typical water consumption patterns and daily life practices performed at homes, as their natural setting. This research scope allowed for rich insights to emerge. However, it constrained any further exploration of the durability/consistency of their reported behaviour in other contexts (e.g. at their workplace, or during a vacation in a hotel).

5.4 Future Research

Employing a quantitative approach to empirically test some of the findings in one of the main future research objectives. This research has provided rich insights on potential links between various constructs that can be investigated in future research. A quantitative methodology would allow for recruiting a bigger, more representative sample and hence, more generalisable results. In addition, the statistical tools would help test the proposed links between different themes as well as indicate the direction and significance level of correlations and causation. In addition, there is an opportunity to design and validate appropriate scales to measure some of the constructs/themes identified in this research, that were not examined in previous literature (such as: perceived problem significance; exposure to cues; perceived usage impact). Furthermore, increasing the number of participants in older age groups would provide insights on the relevance of demographics in shaping water

consumption. Similarly, expanding the sample to include participants from different educational levels would help understand how knowledge and awareness about water issues/conservation are shaped. Moreover, analysis suggests that participants' occupation/income level and family status (e.g. parents vs non-parents) have implications for perceived affordability of water bills and perceived morality of water conservation, respectively. Therefore, future research that contrasts between groups would provide a rich understanding of the role of these aspects in water conservation. This would also contribute to water conservation literature as these sociodemographics are not sufficiently examined relative to other aspects such as age and gender.

Additionally, there is great potential for expanding research findings by exploring their applicability to other contexts in terms of other geographical locations (e.g. other countries), other settings (e.g. workplace or hotels), different water users (e.g. non-household) and/or other PEBs (e.g. energy consumption). This would help enrich the findings and provide a more comprehensive framework to explain PEB, beyond water conservation.

Morality of water conservation is one avenue that is worth further exploration. For instance, an experimental design would be a useful tool to examine the relationship between perceived moral intensity and water conservation. This design allows for the manipulation of different items of moral intensity to test for variance in water conservation under different scenarios. Furthermore, a research study to compare the effectiveness of morally framed messages to encourage water efficiency relative to environmental and/or financial appeals could be conducted. This would provide further evidence to support the relevance of morality in the water conservation domain.

5.5 Conclusions

Water conservation is a crucial demand-management strategy to achieve future water security. Interventions aiming to encourage individuals to engage in water efficient practices need to first understand antecedents of water consumption behavioural patterns. Previous research and interventions did not acknowledge the complexity of water consumption and relied on information provision – especially, how-to tips. This has led to limited effectiveness of interventions that fail to achieve the aspired water reduction objectives. Findings of this research provide insights for social marketing to design and implement more effective audience-oriented interventions. This research has provided an in-depth/comprehensive

understanding of water consumption behaviour, as well as, the underlying perceptions associated with/contributing to such behaviour – at household level. A qualitative approach has allowed constructs to be uncovered (e.g. cues, intrinsic value of water) which have not been examined by previous studies in water conservation. Furthermore, it has allowed for a better understanding of the mechanisms in which some well-established constructs influence behaviour (e.g. social norms/normative messages). In addition, findings have shown a great potential for morality in water conservation, an untapped research perspective in PEB.

In conclusion, despite the role of downstream measures and individual-level interventions, insights advocate a move towards a more holistic systems-approach to achieve durable behaviour change and create a culture of water efficiency across the society. Moreover, findings propose that moral motives to water conservation should be capitalised on by researchers and social marketing practitioners.

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Appendices

Appendix 1: Ethical approval

UNIVERSITY of York

Lina Khattab <lk911@york.ac.uk>

ELMPS decision Lina Khattab 42 2020 21

Tony Royle <tony.royle@york.ac.uk> 26 March 2021 at 10:22
To: Lina Khattab <lk911@york.ac.uk>
Cc: Debbie Haverstock <debbie.haverstock@york.ac.uk>

Dear Lina

Your ethics application is now approved.

Just two minor advisory points, it would have been better if the revised application had a new date (e.g. 25 March) and I think the word 'Prospects' needs to be changed to 'participants'?

[Quoted text hidden]

Appendix 2: Email invitation to participants

UNIVERSITY of York

Lina Khattab <lk911@york.ac.uk>

***** Invitation to Participate *****

Lina Khattab <lk911@york.ac.uk> 9 December 2021 at 13:24
To: [redacted]

Hello [redacted]

Hope this finds you well.

You are invited to participate in an interview to talk about your domestic water usage!

This interview is part of my PhD looking at UK households' water consumption and has been approved by the ethics committee at the University of York.

How could your participation help?

By simply sharing your thoughts and experiences regarding using water in daily activities around the house , you will be providing invaluable insights to better understand how households use water.

Where and when the interview will take place? How long does it take?

Interviews will be conducted online via zoom. You get to decide a date and time that are convenient for you. It will be a friendly chat that lasts between 45-60 minutes.

Interested?

To know more about the study, please read the attached information sheet for more details. If you would like to participate just fill in the Expression of Interest form by clicking this link (https://forms.gle/jHoCPts22Rr25Yvt7). Then, I will contact you to schedule an interview!

Thank you.

I am happy to answer any questions you might have. Feel free to contact me on lk911@york.ac.uk

Kind Regards,

Lina Khattab

Information Sheet.pdf
175K

Appendix 3: Information sheet

THE UNIVERSITY of York

Participant Interview Information Sheet

My name is Lina Khattab, I am a doctoral research student at York Management School. My research topic aims to better understand how people use water in their homes. You are invited to participate in an interview to talk about this issue.

Please take time to read the following information carefully and decide whether you wish to join the study.

What is the purpose of the study?

The goal of the study is to better understand water consumption behaviour of households. Everyday water consumption in homes includes activities such as washing laundry, doing the dishes, showering, cooking and much more. I am interested to understand how individuals carry out such daily activities and to understand their opinion on water consumption.

Why have I been chosen?

By simply sharing your thoughts and experience on water consumption you will help me better understand how households use water. Also, your thoughts will help in designing more relatable and effective communication messages to encourage water conservation.

What will the interview be like?

I will contact you to set a date and time for the interview that are convenient for you. I will request your consent before the interview as your official approval to join the study. In the interview, I will ask you some questions about your domestic water use. There will not be right or wrong answers. Knowing how you really use and think about water is the main interest of the interview. The interview is flexible and you are free to skip any questions that you do not want to answer.

Appendix 4: Expression of interest form

Expression of Interest Form

Thank you for your interest to participate in my study about understanding water consumption behaviour of households. Kindly, take a moment to answer few questions.

THE UNIVERSITY of York

1. Your email (or other preferred contact)

_____

2. When will you be available for an interview? (Please state date and time)

_____

3. Do you have a water meter installed in your house? (i.e. Does the amount you pay for the water bill vary according to your water consumption/ meter reading?)

Mark only one oval.

- ◯ Yes
- ◯ No

4. Are you the one responsible for paying the water bill?

Mark only one oval.

- ◯ Yes
- ◯ No

5. What is your geographical location? (i.e. name your city/area/county)

_____

6. Please select your age group

Mark only one oval.

- ◯ 20 - 29
- ◯ 30 - 39
- ◯ 40 - 49
- ◯ 50+
- ◯ Prefer not to say
- ◯ Other: _____

7. Please specify your gender

Mark only one oval.

- ◯ Male
- ◯ Female
- ◯ Prefer not to say
- ◯ Other: _____

Appendix 5: Intercoding Evidence

UNIVERSITY of York

Lina Khattab <lk911@york.ac.uk>

Coding and translation review

2 messages

Lina Khattab <lk911@york.ac.uk> 20 September 2023 at 13:26
To: m.hammad@liverpool.ac.uk

Dear Mohamed,

Thanks again for agreeing to help with this.

The attached file includes a table of participants statements and the assigned code/ theme for each. In addition, quotes form Egypt interviews are presented in their original Arabic along with an English translation.

Please review the emergent codes/themes, the extent to which they are relevant to the assigned statements, and the English translation of the quotes.

Your review and feedback is highly appreciated.

Kindly, find attached file.

Thank you.

Kind Regards,
Lina

Egy quotes and transaltion plus relevant themes.docx
248K

Hammad, Mohamed [mhammad] <M.Hammad@liverpool.ac.uk> 21 September 2023 at 18:26
To: Lina Khattab <lk911@york.ac.uk>

Hi Lina,

Many thanks for your message

I have made very little changes to the attached. Looks really good. Well done!

Regards,
Mohamed

From: Lina Khattab <lk911@york.ac.uk>
Sent: 20 September 2023 14:26
To: Hammad, Mohamed [mhammad] <m.hammad@liverpool.ac.uk>
Subject: Coding and translation review

Caution: This email originated from outside of the University. Do not click links or open attachments unless you recognise the source of this email and know the content is safe. Check sender address, hover over URLs and don't open suspicious email attachments.

[Quoted text hidden]

Egy quotes and transaltion plus relevant themes - Lina (MM Feedback).docx
49K