Article

Sustainable Policy for Water Pricing in Kuwait

Ali Aljamal ^{1,*}, Mark Speece ² and Mohsen Bagnied ¹¹ College of Business and Economics, American University of Kuwait, Salmiya 24795, Kuwait² College of Management, Mahidol University, Bangkok 10400, Thailand; markwilliam.spee@mahidol.ac.th

* Correspondence: aaljamal@auk.edu.kw; Tel.: +965-22248399 (ext. 3524)

Received: 16 February 2020; Accepted: 10 April 2020; Published: 17 April 2020

Abstract: This research investigates consumer willingness to pay (WTP) for water in Kuwait as a foundation for policy decisions on reducing water subsidies. Heavy subsidies have encouraged unsustainable very high consumption, but efforts to cut subsidies can generate strong political opposition. A survey ($n = 443$) indicates that WTP is greater at lower prices, but resistance is not purely about price. The presence of a continued partial water subsidy for basic household use slightly increases WTP, probably mainly from perceptions of fairness. Information about Kuwait's water scarcity also has a small impact. All of these effect sizes are small, so we discuss these issues using a nudge framework from behavioral economics. A number of policies can foster small shifts in WTP; collectively they may have larger impact and make subsidy reduction relatively painless.

Keywords: willingness to pay; water pricing; subsidies; sustainability; Kuwait

1. Introduction

Kuwait, along with most countries of the Middle East/North Africa (MENA), lies in an arid region with limited options for sustainable water supply. In the modern era, expensive thermal desalination coupled with oil wealth seemingly solved this problem, allowing policies to expand water production rather than control demand. Expanding supply is common worldwide, but this is increasingly recognized as problematic (e.g., [1]). Demand reduction is often critical in meeting sustainable development goals for urban areas [2]. Kuwait compounds the problem by highly subsidizing water, also common in some arid areas, especially where governments have substantial oil revenues. The water subsidy has fluctuated slightly around 90 percent or a little more for over a decade [3].

One common approach to reducing water demand is a progressive rate structure, instead of a highly subsidized flat rate. Realistic pricing can reduce excessive resource usage causing environmental harm [4]. Ma et al. [5], however, point out that policies often have multiple conflicting goals, and, further, that it is quite difficult to monetize some critical considerations for inclusion in standard economic analysis. Marketization can trigger resistance unless implemented carefully (e.g., [1]). "Part of the water challenge in the Middle East and North Africa lies in managing demands and putting the right water saving incentives in place. These are politically sensitive issues, yet they are essential to improve water services delivery and water resources productivity" [6] (p. 14). Kuwait illustrates this; the government has traditionally fostered political support through subsidies on basic commodities, which remain a considerable part of the national budget [7].

Cutting water subsidies has consistently generated resistance, and Kuwait has had to substantially scale back attempted cuts to various key subsidies in recent years [8]. Such resistance is not mainly because Kuwaitis fail to understand their impact, and certainly, most citizens are well able to pay more for currently subsidized commodities. Rather, willingness to pay (WTP) also depends on other factors besides water prices. "Economic models of WTP have proven to be incomplete, that is, they have restricted explanatory power and need to be supplemented by psychological and sociological models" [9] (p. 106).

This research uses a survey with multiple versions of a WTP question to examine non-economic aspects of WTP for water in Kuwait. Results demonstrate that price has only a small impact on WTP. Continued partial subsidy also has a small impact, but this likely represents a feeling of “fairness,” rather than worry about household expense. Providing brief information about why higher prices are needed also had a small impact. None of these effects was very large, but “nudge” perspectives from behavioral economics (e.g., [10,11]) are used to this. Small effect sizes are common in nudge research.

For example, a recent review of nudges to reduce excessive food consumption found that many nudge effect sizes are not even statistically significant [12]. In their meta-analysis, Arno and Thomas [13], report an average effect size of about 15 percent in nudge interventions aimed at fostering healthy dietary behaviors. Because “nudges do not always create large absolute shifts in behavior, scholars and policymakers may underappreciate their value” [14] (p. 1042). Nudge tools may have smaller impact than big programs, but they do not usually cost much, so they can be very cost effective.

Kuwait may well need bigger initiatives, but big comprehensive programs are hard to implement quickly without generating political resistance. A coherent package of small initiatives can quickly begin to improve WTP. This could help reduce water usage and improve cost recovery, while also sensitizing Kuwaitis to the issues so that larger programs gain better support later on.

These issues are organized to briefly describe the Kuwait context first, including WTP issues. Current literature on non-price aspects of WTP is noted as part of this, although the aim is not so much to propose a theoretical framework for testing. These non-price aspects are not mainstream economics, but neither are they entirely new, and research in behavioral economics and marketing has already demonstrated their usefulness. Thus, the concepts are used to understand the situation in Kuwait in a section developing the study’s working hypotheses. The simple questionnaire and the sampling methodology are discussed, along with a summary of sample characteristics. Basic statistical results are noted, which, as often in nudge-type research, are somewhat inconclusive, and additional analysis using nudge philosophy is detailed. Finally, policy issues are briefly examined.

1.1. Willingness to Pay for Water in the Kuwaiti Context

The Gulf is a highly urbanized area, with many important trading cities historically. These cities mostly had to import water (e.g., [15]). Before the modern oil era, for example, Kuwait imported water by ship from the Shatt al-Arab in modern Iraq (e.g., [16]). In the modern era, technology and oil wealth seemingly solved the water shortage, and desalination plants became common. Kuwait built its first thermal desalination plant in the early 1950s [17] and has since come to depend almost exclusively on manufactured water. Most “efforts to alleviate water scarcity are divided between supply enhancement and demand management” [18] (p. 2). With plenty of oil wealth and modern technology, Kuwait opted for massively expanding water production.

Kuwait subsidizes about 92 percent of production cost, making water prices among the lowest in the world. This has encouraged rampant consumption. Despite having among the lowest per capita renewable water resources in the world, Kuwait has one of the highest per capita consumption rates [6,19]. It ties for most water-stressed country in the world with several other countries, mostly in the Gulf [20]. The World Bank [6] (p. 98) shows that water stress in Kuwait is caused almost entirely by socioeconomic factors. (Climate and climate change are important in many MENA countries, but not Kuwait.).

Kuwait’s booming modern economy and rapidly expanding population have now outstripped the capacity of purely technical solutions [21]. Just recently, the *ArabTimes Online* [22] reported that “consumption has begun to exceed production” in Kuwait for the first time. Quite apart from ability to supply needed volume, recent lower oil prices have also demonstrated that the government cannot afford heavy water subsidies long-term [23,24]. Spending has outstripped revenues for the past five years, and the government has drawn down reserves to cover budget deficits [25]. Clearly, current trends are not sustainable [26].

Although Kuwait has been somewhat slow in rationalizing its economy compared to other Gulf States, the country is starting to make some progress [23]. Still, “gradually phasing out fuel, electricity, and water subsidies and transfers” is one of four key recommendations from a very recent IMF visit [27].

Kuwait could meet future water needs with existing capacity by simply improving water use efficiency. In terms of wastage in the distribution system, or reuse of treated water, Kuwait already scores fairly well compared to MENA countries [6], so action on these issues will bring little gain. Improvement must mostly come from demand management, which depends on more realistic pricing and requires addressing four key issues. These issues are impact of prices, impact of subsidy, impact of information, and “involvement level” in marketing terminology, which is a nudge issue about “System 1” decision-making. All of these issues are intertwined with both WTP and consciousness about the need to conserve water.

The first WTP issue, of course, is basic economics. If prices at least partially reflect production costs, generally WTP should decline with higher prices. Much recent research on demand reduction through pricing, however, often adopts a standard economic approach, notably use of price and income elasticities (e.g., [18,28]). Such understanding is usually necessary, but frequently not sufficient (e.g., [5,29]). For example, prices would need to be set at levels that do not generate very strong resistance, which is not entirely an economic issue. People may view water to be a basic right, which has a basis in Islamic law (*haqq al-shafa*) as well as under the UN [30–32]. When water is considered a public good, people may not want to pay at all. For example, one study in Tunisia demonstrated fairly strong support for constructing a desalination plant, but little WTP for the desalinated water [33].

WTP often contains such non-price considerations. Vatn [34] shows that standard utility functions may not always be sufficient for understanding behavior, even when they account for utility more broadly than in monetary terms. He argues for including formal and informal institutions in the analysis, basically discussing intrinsic and extrinsic motivations that are beyond purely economic issues. Cooper and Crase [35] conceptualize motivations into three dimensions: calculative, social, and moral. Prices are a calculative economic consideration. Social reference is essentially an extrinsic factor in Vatn [34], and moral is intrinsic.

Even simple awareness that others engage in an activity (such as reducing water consumption) can be effective in triggering reference to social norms (e.g., [36,37]). Thaler and Sunstein [11] point out that this impact may be at the subconscious level (i.e., System 1), which operates when people are not thinking consciously about issues. Perceptions of fairness are also related to social norms. In their discussion of compliance with water usage restriction in Australia, Cooper and Crase [35] point out that pure self-interest is not necessarily very effective. Such things as perceptions of legitimacy and fairness play a role.

Thus, in addition to price, the second key issue in Kuwait is the impact of a partial subsidy. On the surface, this might seem like a price issue, but in Kuwait, it actually relates to a sense of fairness. Vatn [34] notes similar examples where seemingly monetary issues trigger non-monetary extrinsic motivations. Kuwaitis perceive that the government is rich, and most believe that water is a public good. Thus, it is only fair that the government share costs, even if citizens must also help. “Fairness” in water pricing is not widely addressed [38], although it does occasionally receive some attention (e.g., Greece [39], China and India [40], Yemen [41], Canada [42]). Often, however, the discussion is more about recovering full water cost “fairly” (e.g., [26]), rather than what share citizens versus government should pay.

Third, some literature (e.g., [34,35]) shows the importance of intrinsic motivations for compliance with many government regulations; this includes a moral sense that translates into civic duty. For example, data about waste management from several OECD countries suggest that a sense of civic duty can have a bigger impact on recycling activity than simply meeting social norms, and also may be more important than financial benefits from recycling [43]. Environmental consciousness is probably

an intrinsic moral issue; and some research has found stronger WTP among environmentally conscious consumers [44]. These non-price issues may play an important role in WTP.

For most urban residents in a high income society, financial costs/incentives are relatively small compared to overall income, so would not have much impact on living standards, even though there can be strong psychological responses. Other extrinsic and/or intrinsic issues may be relevant, such as considerations of fairness and civic duty. A number of observers (in addition to Liebe et al. [9], noted above) have called for more research on such issues to help develop government policy, e.g.:

Regrettably, the paradigm generally employed in economics to describe and anticipate behaviour (particularly the theory adopted for policy analysis) provides limited allowance for personal moral values. This raises questions as to whether regulatory policy developed by economists is adequately grounded. [35] (p. 12) (parentheses in the original)

The fourth key issue is water as a low-involvement product. Classical discussions of WTP for water rarely address this issue, although it is common in buying behavior for fast-moving consumer goods (FMCG; e.g., [45–47]). Rational decision-making is rare for small things that consumers habitually buy. In marketing language,

under conditions of low consumer involvement . . . consumer behavior does not pass through the usual belief-attitude-behavior sequence. Consumers do not search extensively for information . . . Because they are not highly involved with the product, consumers may not evaluate the choice even after purchase. [48] (p. 156)

Behavioral economics uses the same concept but different language in recognizing two kinds of thinking:

one that is intuitive and automatic, and another that is reflective and rational. We will call the first the Automatic System and the second the Reflective System. In the psychology literature, these two systems are sometimes referred to as System 1 and System 2, respectively. [11] (p. 19)

A critical point is that “more information” may have little impact, because consumers are not looking for much information. Consumers typically use only a few product attributes in their (fairly superficial) evaluation of low-involvement products (e.g., [46,49]). Dörnyei et al. [50] call these primary attributes, and demonstrate that even with more information, focus on the primary attributes does not change, nor does the number of attributes considered. Secondary attributes may shift, although sometimes seemingly randomly because consumers are not thinking about them very deeply. Indeed, “the Automatic System is rapid and is or feels instinctive, and it does not involve what we usually associate with the word thinking” [11] (p. 19).

Much WTP research assumes careful thinking by consumers. Tanellari et al. [51] examine WTP for improvements in water quality and infrastructure using a very common consumer decision-making model. The obvious problem is that several stages (information search, information processing, evaluation of alternatives) are normally not present in low-involvement decisions. WTP in Tanellari et al. [51] was fairly weak, and 44 percent of the sample were not willing to pay for quality or infrastructure improvement. The little research investigating such issues demonstrates that household water use is low-involvement, System 1. For example, while examining hygiene in rural Nigeria, Curtis et al. [52] (p. 1) found that “water use behaviour was governed, not by an immediate desire to maximise health, but by long-established routines,” i.e., “habit loyalty” in marketing language.

Consumer “greenness” may not change decision styles. “Green” consumers are not more involved with their FMCG purchases, and they do not employ more deliberative decision-making (e.g., [47]). Rather, for some, the “greenness” of FMCG makes its way into the small set of product attributes that they normally consider, and purchasing the green product becomes habit. Even for larger

environmentally friendly products (wooden desk), Jongmans et al. [53] show that more information about environmental issues does not usually increase the overall weight given to environment in purchase decisions, except for people who are strongly environmentally conscious to start with, i.e., the environment is already a high-involvement issue for them.

Visual presentations, rather than complex information-rich messages, usually convey information more effectively in low-involvement situations (e.g., [46,54]). Eventually, System 1 may integrate the information into choice criteria without much cognitive processing. Water is a low-involvement product, and most people are unlikely to think much about secondary attributes such as social or moral issues. Thus, policy initiatives must aim to shift such secondary attributes into the small set of relevant criteria even though consumers are not particularly attentive to information.

1.2. Conceptualizing WTP for Water in Kuwait

Such policy initiatives must be consistent with actual market conditions, and this research investigates Kuwaiti consumer thinking using theory outlined above. In Kuwait, the water cost is small compared to average household income, so price may not have a big impact on WTP. Nevertheless, we would expect that WTP is slightly higher for lower prices, assuming basic economic theory.

H1: *lower water prices $\rightarrow$ higher WTP.*

Many Kuwaitis feel that it is only fair that their rich government share costs, even if citizens also pay part of the costs. Thus, a subsidy is not purely an economic issue, but is related to perceptions of fairness, a social issue [35], or an extrinsic motivation [34].

H2: *WTP is higher with a partial subsidy than with no subsidy.*

Water usage is an everyday, “low-involvement” activity; thus, the moral sense [35] or intrinsic motivation [34] is not normally top-of-mind. Communicating information about very high usage of water in Kuwait and the difficulty of supplying water in an arid region can trigger Kuwaitis’ environmental consciousness and/or sense of civic duty.

H3: *WTP is higher in the presence of a message about reasons for conserving water than without such a message.*

Cooper and Crase [35] show that whether social or moral considerations are more important can depend on the specific population being sampled. In New South Wales moral considerations were important for compliance with water regulations, but social considerations were not. This was reversed in Victoria. Overall, the predominance of moral considerations in NSW may partially explain why residents in that state showed overall higher compliance rates in conserving water. This suggests that the moral component is often a stronger factor than the social one, which is consistent with other research.

H4: *At a given price level, WTP with the message $\geq$ WTP with the subsidy.*

These issues were investigated through a survey. Some nudge proponents prefer behavioral experiments, discounting surveys because intentions only partially translate into behavior. Considerable research, however, has shown that despite the gap, intention and behavior are connected (e.g., [55]). In general, intentions based on feelings (affect) have stronger follow-through than those based on cognitive attitudes [56], which is useful in our low-involvement context.

Leading nudge experts accept surveys because they are a simple way to get useful information, and “current evidence suggests that intentions get translated into action approximately one-half of the time” [11] (p. 511). They note conditions under which a survey can strengthen the intention–behavior link. Momsen and Stoerk [57] demonstrate that some specific nudges do substantially improve moving people from intention to action on choosing renewable energy sources. Such work suggests that surveys can demonstrate whether there is an impact, even if exact behavioral change cannot be quantified.

2. Materials and Methods

This section briefly discusses the questionnaire and sampling used for the survey. The questionnaire contained 12 questions about water usage, plus five questions on basic demographics. Most of the usage questions were about basic issues, and are not discussed much here. One question was about whether the family bought bottled water for drinking. The majority do usually buy bottled water, which suggests that WTP for tap water is not entirely about price.

Two questions asked whether respondents were aware of current prices (which are very low with the current subsidy) and how often they pay for water (many do not, since the government rarely goes after delinquent bills). Two questions asked about conservation efforts, and one asked whether the household was connected to the municipal pipe network. Most are, but houses in outlying areas may not be and would have to pay for water delivery by truck. (This is mostly very affluent families with a villa in some attractive location off the pipeline network.) The main WTP question was relatively simple, and is discussed in some detail after an overview of sampling.

2.1. Sampling

The sampling was convenience-based, essentially snowball, but starting from multiple points. Household decision-makers are somewhat difficult to access in Kuwait, particularly because women play a substantial role in household financial management. Snowball techniques are well suited for hard-to-reach populations (e.g., [58–60]). The starting seeds in the snowballs were based on judgment of ability access respondents. Consideration of access is an important part of judgment sampling, and very common in international business research (e.g., [61,62]).

In practice, economics students in an upper division Environmental Economics class in Fall 2018 each distributed questionnaires first to one of their connections who was head of household, and then followed up on referrals from the first respondent through the connections network. Access is often a key consideration for getting good data in non-Western relationship-oriented cultures, and snowball samples following connections networks often work well (e.g., [63]). Sadler et al. [64] discuss how snowball sampling is useful in adapting to cultural conditions, and van Meter [65] shows that it can be (but not always is) fairly representative. Baltar and Brunet [66] demonstrate that snowball sampling online can actually improve representativeness for hard-to-reach populations. A total of 443 questionnaires were returned (Table 1). The number of respondents for any single questionnaire version ranged from 29 to 47. The questionnaire and summary statistics on it can be seen in the Supplementary.

Table 1. Questionnaire versions for question 7 on WTP.

Version	Price	Subsidy	Information on Why Charging for Water	Sample Size
1	10 KD	No	no	40
2	6 KD	No	no	35
3	14 KD	No	no	39
4	10 KD	Yes	no	36
5	6 KD	Yes	no	44
6	14 KD	Yes	no	47
7	10 KD	No	yes	29
8	6 KD	No	yes	32
9	14 KD	No	yes	36
10	10 KD	Yes	yes	36
11	6 KD	Yes	yes	29
12	14 KD	Yes	yes	40

Sixty percent of the respondents were male. There is somewhat stronger representation of men in advanced economics classes, and slight difficulty in directly contacting non-relative women in Kuwaiti culture. The two most common household sizes were 5–6 (25%) and 7–8 (23%). Another 24 percent of

households were even larger, about half of these over 10 people. This reflects both the extended family structure of Kuwaiti society, and the fact that most middle-class Kuwaiti households have one or more live-in domestic workers.

Only 3 percent of the households had annual income under KD 12,000 (about USD 36,000 annually). Sixty-two percent had annual income over KD 30,000 (USD 90,000). Eighty-five percent of respondents were over age 25, with 25–35 (early career) and 35–59 (mid to later career) constituting most of the sample. Slightly over 80 percent had college education, also reflecting the middle-class status of most of Kuwaiti citizens. There were no significant differences in demographic characteristics by questionnaire version.

2.2. Measuring WTP

One question measured the dependent variable, WTP. Although some researchers argue that more sophisticated methods get better results, surveys to assess WTP are fairly common (e.g., [67–69]). Recent survey work on domestic water pricing has gotten good results (e.g., [70]). At any rate, our purpose here was not to get precise estimates, but rather, to demonstrate the impact of the factors discussed above on WTP. Thus, survey data were judged adequate.

The questionnaire had three different prices, 6, 10, and 14 KD per 1000 gallons per month (1 KD $\approx$ USD 3.00), so that the impact of prices comes from the experimental design. The 10 KD level is roughly complete cost recovery; so 6 KD represents a 40 percent partial subsidy, and 14 KD represents a 40 percent surplus. Respondents tend to choose lowest prices when simply given a range, as well as to overestimate WTP in hypothetical situations. Some research also suggests that it is easier for respondents to state whether a specific price is acceptable, rather than to give an acceptable price [71]. Thus, multiple versions of the questionnaire each had only one price, similar to the approach used in Cameron and James [72] for estimating WTP.

Question 7 on the survey captured WTP. The following example shows the 10 KD version; two other versions had either 6 or 14 KD.

Average residential water consumption is about 3000–4500 gallons per person per month. Many countries have a cost for water consumption. If this were considered in Kuwait, how willing would you be to pay 10 KD per 1000 gallons per month for tap water? (scale: 1 = very willing to pay; 5 = not at all willing to pay)

To assess the impact of continuing a partial subsidy, some versions also said that the government would continue to subsidize water usage up to 1500 gallons per month per person, and the water prices would only apply for usage above that level. The subsidized consumption level is well below current usage, but roughly equals current per capita domestic consumption in Egypt and Oman, or in Kuwait in the 1980s [19]. Thus, this impact is also assessed from the experimental design. The added text was:

Suppose Kuwait were to consider a policy of only partial subsidy for water, where half of the average water consumption (1500 gallons per person per month) remains at current prices, and any consumption above that would need to be paid for.

The experimental design was also used to capture the impact of information about the need for water prices. Brief information about waste, shortages, and cost was included in some versions. Recalling the high wastage and the difficulty of continuing to supply water may trigger some sense of environmental consciousness and/or civic duty. The added text said:

A high proportion of this water is wasted because people are not very careful in water usage. Kuwait is facing either water shortages in the future, or much higher costs of producing enough water, which will put a lot of pressure on government budgets.

Finally, one questionnaire version presented both the subsidy and the information, as worded in the two versions just above. Tanellari et al. [51] used a similar procedure to include a brief statement

about water safety on one questionnaire version, a brief statement about water infrastructure on another version, and a control version with neither statement. Our questionnaire had 12 versions, as shown in Table 1. Overall, this represents a $3 \times 2 \times 2$ design.

3. Results

Three-fourths of the respondents live in single family homes (with the qualification noted about extended families and domestic workers). Ninety-seven percent are connected to the pipeline network for fresh water; and seventy percent also have a brackish water connection. Eighty-two percent use tap water on a daily basis, and another 10 percent use it at least several times a week. Ninety-four percent use a water filter—Kuwait’s manufactured water is very pure, but the pipeline network is old in places, and can contain sediment or rust.

Nearly half of the respondents reported that they use bottled water for drinking, and another fifth use it about three-fourths of the time. Only five percent never use it. This demonstrates that WTP for tap water is not purely about price—most respondents already pay for drinking water, even though they could get it from the tap. Another question shows that use of tap water for drinking is lower than other uses. The most frequent usages are for bathing and washing dishes. There were no significant differences in nature of water connections or type or frequency of usage by questionnaire version.

A slight majority (53%) reported that they do not know anything about water rates. Only about one quarter of respondents reported paying on a monthly basis, and three-fifths reported that they pay a few times a year. About 45 percent said that their families do make some effort to conserve water, but the open-ended question asking “how” rarely indicated substantial effort. Most answers were about things such as turning off the tap when not using water. Only a few respondents listed such actions as installing water-efficient fixtures, or monitoring kids or domestic workers to discourage wastage.

WTP was assessed with dummy variable regression, using WTP as dependent, and price, subsidy, and information as independent. The 10 KD price was the base, with the 6 KD dummy coded as 1 for that value and otherwise 0; and the 14 KD dummy 1 for that value and otherwise 0. Subsidy and information were both coded as absent (0) or present (1). The regression was significant ($p = 0.027$), and all coefficients show the expected signs, but only the 6 KD price dummy was individually significant (Table 2).

Table 2. Regression for impact of price, subsidy, information on WTP.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.193	0.167		19.067	0.000
Dummy for 6 KD	−0.425	0.187	−0.126	−2.275	0.023
Dummy for 14 KD	0.153	0.182	0.047	0.845	0.398
Subsidy	−0.054	0.150	−0.017	−0.361	0.718
Information	−0.094	0.150	−0.030	−0.628	0.530

Dependent variable: Q7 willingness to pay; regression sig = 0.027; R-sq = 0.025.

Recalling the scale (1 = very willing to pay; 5 = not at all willing to pay), the negative coefficient on 6 KD indicates that respondents were more willing to pay than at 10 KD (H1). The positive coefficient on 14 KD suggests that respondents would be less willing to pay than at 10 KD (H1), although this is not significant (at $\alpha = 0.05$). The negative coefficient on subsidy suggests that respondents are more willing to pay than without a subsidy (H2), but this is not significant either. Similarly, the negative coefficient on information suggests that reminding respondents of water issues fosters greater WTP (H3), but again, this is not significant.

While most parameters are not significant, they exactly follow predicted direction. According to the binomial distribution [73–75], the probability of being correct on all four coefficients, plus the

prediction that the coefficient for information $\geq$ for subsidy (i.e., H4), with prior probability of 0.5 for right/wrong (Equation (1)), is:

$$P(x \geq 5/5 | p = 0.5) = 0.031 \quad (1)$$

This non-parametric test indicates that at 95 percent confidence, these results cannot be random, but follow the predictions outlined above.

Figure 1 shows graphical representation of mean WTP for each of the three price levels. Generally, for each price level, WTP without either subsidy or information < WTP with subsidy alone $\leq$ WTP with information alone < WTP with both subsidy and information. However, 10 KD without either subsidy or information is an anomaly. (This questionnaire version apparently had sampling problems.) For different price levels with any combination of subsidy and information, generally WTP at 6 KD > WTP for 10 KD > WTP for 14 KD; again, the 10 KD version without either subsidy or information is an anomaly.

Figure 1. Mean WTP by questionnaire version. Scale: 1 = very willing to pay; 5 = not at all willing to pay; questionnaire version 1 is clearly an anomaly.

Pairwise t-tests for the 23 differences in means implied by the set of hypotheses showed that only a few differences were significant. However, the directions of the differences were mostly as predicted. Table 3 indicates that there are 18 correct predictions out of 23. The probability of 18 correct predictions if results are random (with $p = 0.5$ for correct vs. incorrect prediction) is 0.005 (Equation (2)).

$$P(x \geq 18/23 | p = 0.5) = 0.005 \quad (2)$$

If we eliminate the anomaly questionnaire version (KD10, no subsidy, no info = four comparisons), three of the wrong predictions and one correct one in Table 3 disappear, and evidence is even stronger that our basic theory about impacts is correct (Equation (3)):

$$P(x \geq 17/19 | p = 0.5) = 0.000 \quad (3)$$

Table 3. Pairwise predictions.

H1: WTP Greater for Lower Prices	Direction of Difference in Means
no subsidy and no info*: WTP @ 6 KD > WTP @ 10 KD*	Wrong
no subsidy and no info: WTP @ 10 KD* > WTP @ 14 KD	Correct
subsidy and no info: WTP @ 6 KD > WTP @ 10 KD	Correct
subsidy and no info: WTP @ 10 KD > WTP @ 14 KD	Wrong
no subsidy and with info: WTP @ 6 KD > WTP @ 10 KD	Correct
no subsidy and with info: WTP @ 10 KD > WTP @ 14 KD	Wrong
both subsidy and info: WTP @ 6 KD > WTP @ 10 KD	Correct
both subsidy and info: WTP @ 10 KD > WTP @ 14 KD	Correct
H2: WTP with subsidy > WTP no subsidy	
@ 6 KD and no info:	Correct
@ 10 KD and no info*:	Wrong
@ 14 KD and no info:	Correct
@ 6 KD + info:	Correct
@ 10 KD + info:	Correct
@ 14 KD + info:	Correct
H3: WTP with info > WTP no information	
@ 6 KD and no subsidy:	Correct
@ 10 KD and no subsidy*:	Wrong
@ 14 KD and no subsidy:	Correct
@ 6 KD + subsidy:	Correct
@ 10 KD + subsidy:	Correct
@ 14 KD + subsidy:	Correct
H4: WTP with info $\geq$ WTP with subsidy	
@ 6 KD:	Correct
@ 10 KD:	Correct
@ 14 KD:	Correct

* these are comparisons which include version 1, the anomaly questionnaire.

These tests are significant (at 95% confidence), demonstrating again that the basic pattern of results follows what the hypotheses predict.

Nudge proponents explicitly warn against discounting small impacts. “It is also crucial to understand that many improvements may superficially appear to be quite small: a 1 or 2% change in some outcome. . . . when the stakes are in billions of dollars, small percentage changes add up” [76] (p. 226). Thus, these results are translated into percentages, as often used in nudge work.

Table 4 shows percentage change in the mean of WTP, compared to the worst case (14 KD, no subsidy and no information). The table also shows the ratio of willing to pay (sum of 2 scale points: 1 = very willing + 2 (not labeled)) to unwilling to pay (sum of 2 scale points: 4 (not labeled) + 5 = not at all willing). The worst case generates quite strong resistance, with the mean WTP well into the “unwilling” side of the scale, and a ratio of 0.48, i.e., about twice as many unwilling to pay as willing. Even at this price, resistance weakens by about 10 percent simply by adding the subsidy (no price hike for the first 1500 gallons per person per month) and/or adding brief basic information about why Kuwaitis need to worry about water prices.

Assuming that questionnaire version 1 is an anomaly, the other 10 KD versions show a similar pattern, and also indicate that 10 KD is still a relatively high price in consumer perceptions—WTP is not much different from the 14 KD case. However, at 6 KD, there is nearly a 20 percent decline in resistance, and the mean WTP moves slightly into the “willing” side of the scale. With both 1500 gallons/month continued (almost full) subsidy, and the information campaign, WTP has shifted almost 30 percent.

Table 4. Means of WTP, percent change from worst case, and ratio of willing to unwilling.

Version	Price KD	Subsidy	Info	Mean (Low Mean = More WTP)	Mean as % of Worst Case	% Decline in Resistance from Worst Case	Ratio Willing/Unwilling
3	14	no	no	3.56	100.00	0.00	0.48
6	14	yes	no	3.22	90.27	9.73	0.86
9	14	no	yes	3.18	89.12	10.88	0.75
12	14	yes	yes	3.13	87.86	12.14	0.80
1	10	no	no	2.80	78.56	21.44	1.67
4	10	yes	no	3.34	93.79	6.21	0.73
7	10	no	yes	3.34	93.85	6.15	0.69
10	10	yes	yes	3.08	86.51	13.49	0.81
2	6	no	no	2.86	80.16	19.84	1.50
5	6	yes	no	2.72	76.34	23.66	1.33
8	6	no	yes	2.66	74.53	25.47	1.55
11	6	yes	yes	2.52	70.63	29.37	2.14

Note: worst case, 14 KD, no subsidy, no info; smaller numbers compared to worst case indicate declining resistance; i.e., more WTP.

This 30 percent shift changes the policy environment. 14 KD and 10 KD both have more respondents on the unwilling side. Even with the continued subsidy on the first 1500 gallons per month, and information about reasons for the hike, there is substantial resistance, and only a small constituency who would be arguing in favor. At 6 KD, however, the ratio turns positive—more people will accept this price than resist. With both the 1500 gallons/month and the information campaign, twice as many people are willing to accept the price hike as oppose it. With this much social support, it is much more likely that a price hike can be implemented without serious political resistance. The next section outlines what such a program might look like.

4. Discussion

Thaler [76] notes three key elements of successful nudges: (1) there must be good reason to believe that (at least some) people will benefit; (2) there must be some support (which might be passive); and (3) the policy changes should be low-cost. There is little doubt that Kuwaiti society would benefit if water usage were more sustainable; and, in fact, Kuwaitis generally know this. Already a decade ago, a substantial proportion were developing some degree of greenness [77]. Kuwait has made substantial effort since then to educate citizens further about environmental issues [78] but (aside from education) Kuwaitis do not think the government is doing much to improve things [79].

Nor are average consumers themselves actually doing very much; we noted above that 45 percent of families in our survey say they make some effort to conserve water, but usually it is not actually very extensive effort. Even environmentally conscious consumers may not always think much about such issues—these are the low-involvement (marketing)/System 1 (behavioral economics) responses in action. Kuwait's extensive educational campaigns to build environmental awareness are an excellent foundation, but alone, they are not sufficient to get substantial change in water consumption behavior, including WTP more realistic prices for (some) water.

Thus, we propose the outlines of a more comprehensive policy, which must include multiple elements to start gaining some impact even without very much conscious attention. Technically, price itself is not a nudge, but the starting point is the need to charge more for water. The nearly zero current price encourages wasteful consumption, as most Kuwaitis already know when they think about it rationally. The price must balance using the demand curve to reduce consumption, cost recovery to relieve budgetary pressure, and minimizing the potential political costs of raising prices.

A higher water price is a loss to consumers, even if not very substantial for affluent Kuwaitis. On the other hand, consumers usually have a threshold (reservation) price, which is an upper limit of what is acceptable (e.g., [80,81]). Figure 2 shows the ratio of willingness/unwillingness from Table 4. The rough superimposed response curve suggests that 10 KD and 14 KD are above this reservation price, but 6 KD is within the acceptable range for most people. Thus, the water price should be 6 KD.

Figure 2. Ratio of willing to unwilling to pay by questionnaire version. Willing = (1 very willing to pay + 2); Unwilling = (5 not at all willing to pay + 4); questionnaire version 1 is clearly an anomaly.

Loss aversion, often called “asymmetric response” in consumer research (e.g., [82]), is one key non-rational factor that nudges can help overcome (e.g., [11,76,83]). Our data indicate that positive information can have a small impact on overcoming it, which is consistent with other WTP work on commodity food products examining the impact of brief, ethically positive information about social and environmental benefits (e.g., rice [84], coffee [85]). System 1 usually responds better to messages about avoiding loss than to messages showing benefits, so the specific message can be framed as avoiding future loss. Acting now helps prevent even more environmental damage, which will reduce quality of life in the future, and helps prevent future budget crises, which will endanger government’s ability to continue supporting Kuwaiti citizens very much.

The partial subsidy (first 1500 gallons/person/month) is also part of the policy. This allows an additional communications element pointing out that there is actually no real disadvantage to citizens at all. The government continues to provide water for basic needs—1500 gallons is simply a “return to our more sustainable practices before we got carried away with wastefulness,” i.e., about the average consumption level Kuwait had in the 1980s, and similar to current average consumption levels in some other Arab countries. A partial subsidy also recognizes the legitimacy of traditional attitudes that water is a basic right.

Thaler and Cass [11] (p. 37) show that framing as a loss if one does not do something is more effective than framing as a saving if one does it. Thus, for water usage above 1500 gallons, the message is that wastefulness causes a monetary loss. The billing paperwork can show citizens about how they can easily avoid this loss, a successful intervention in many nudge applications (e.g., [11,76]). A well-designed monitoring and billing system can easily show households a simple graph of water usage over time, as well as average rates in the neighborhood, and provide tips on reducing water usage further (e.g., [83]). Such feedback can quickly educate consumers about how they can reduce their consumption to the basic support level of usage so that they can eliminate payments under the new plan.

These points simply indicate the broad outline of how Kuwait can develop coherent, effective water policy to reduce consumption, recover some water costs, and avoid political problems due to moving away from near completely subsidized water. A full plan needs much more detail, and more

consumer survey data to inform decisions about the details. The outline here simply demonstrates that the approach is feasible, and that Kuwaitis are actually quite open to more effective water policy if it is implemented carefully.

5. Conclusions and Future Research Orientations

Recently a few observers have begun to call for a more sophisticated assessment of water pricing policies for urban areas. Simply pricing for cost recovery and/or for reducing demand may not gain desired results, because there are many non-economic aspects that must be considered, such as perceptions of fairness and equity (e.g., [5]). This research assessed WTP for water using price and two key non-monetary motivations sometimes cited (social/extrinsic and moral/intrinsic), and suggested how such information can be used in developing urban water pricing policy. We framed the discussion as examining the influence of involvement level (marketing language)/System 1 thinking (behavioral economics), since water is a low-involvement product for most consumers. Their lack of much conscious thinking about water usage has major implications for policy decisions as Kuwait works to reduce subsidies without serious political repercussions.

This is an important contribution of this research. All Arabian Gulf countries face a water situation similar to Kuwait's, with only minor variations in detail [86,87], and indeed, these issues are relevant throughout much of the arid MENA region [6,79]. In the Gulf, much discussion continues to focus on technological advances to increase or conserve supply (e.g., [26,88,89]), or even modern versions of Kuwait's pre-oil water imports from Iraq (e.g., [90]). Such discussions occasionally mention the need for demand management, and even subsidy reduction, but give little real guidance on how to do this.

Policy-oriented discussions of water in MENA do usually point out the need to reduce subsidies [19,27], but they rarely explore practical ways to do this without exacerbating "politically sensitive issues" [6] (p. 14). Most attempts to eliminate water subsidies in MENA use what nudge proponents call "command-and-control" [11]. This does not work and generates strong political opposition. Neither do massive education campaigns work well in the short term. As noted above, Kuwait already has extensive education about these issues [78] and high awareness [77]. Nevertheless, the low-involvement, System 1 nature of everyday water usage means that this knowledge is rarely engaged. Such attitudes in Kuwait do not seem much different from other Gulf countries, where many citizens demonstrate at least some environmental awareness and some willingness to help in improving things [91]. However, System 1 thinking seems to prevail. A recent study in Qatar, for example, showed willingness to reduce consumption levels, but low awareness of actual consumption habits [92].

Policy-makers need to move away from heavy reliance mainly on command-and-control, and big education campaigns, and implement things that account for this low-involvement, System 1 (lack of) thinking. The survey indicates that effect size on WTP is small—higher prices, subsidy (representing fairness, a social issue), and information (representing a moral issue) all show correct signs, but are not significant. Non-parametric tests indicate that subsidy, information about Kuwait's water scarcity, and price do actually have a small impact. Nudge thinking is well-suited for dealing with small impacts, and the small impacts can easily be translated into percentage change in people's perceptions under the treatments. There, the pattern is much more clear, and a set of policy decisions can be worked out which fit with specific features of consumer thinking as revealed by survey research.

Our results are consistent with nudge concepts, and with (somewhat scanty) prior research on non-price issues in WTP. They suggest that overall, Kuwaiti citizens seem quite receptive to coherent efforts to reduce water usage, but it must be done in the right way. If they perceive that government aims to offload its responsibilities onto citizens, there will likely be strong opposition. However, citizens are willing to help deal with looming water shortages, and are willing to pay substantially more if they perceive the policies as fair. This includes shared responsibility (citizens and government, i.e., partial subsidy), and a coherent communication campaign.

Such things seem quite feasible with careful implementation. Indeed, such policies are not entirely new to the region. The World Bank, for example, says that "well-designed subsidy removal

and pricing policies also include accurate targeting of price changes—as in Bahrain, which targets higher consumption users—and public campaigns explaining the reason for pricing changes and the availability of compensatory mechanisms” [6] (p. 92). Kuwaitis will not support policy perceived as unfair or inequitable, but they are not against more efficient water usage or shared responsibility for water cost recovery. There actually seems to be substantial support for carefully considered policies.

Future research needs to look in more detail at specific policy options to assess how well they might work. One limitation of this study is that the aim has been to show that nudge thinking is very relevant to the situation, and can have some impact. That aim has been achieved well, but most nudge proponents (quite reasonably) argue that specific policies should be devised based on evidence of how their impact would work. This research could not anticipate details of policy options, and only shows that the basic principles hold. More specific projects are needed for assessing specific policy initiatives. Nevertheless, it is very clear that nudge concepts can be useful. Such research is likely to be forthcoming once demonstrated that it can be very useful, and will further clarify how to improve water sustainability in Kuwait and other MENA countries.

Supplementary Materials: The following are available online at <http://www.mdpi.com/2071-1050/12/8/3257/s1>.

Author Contributions: Conceptualization, A.A., M.S., M.B. Methodology, A.A., M.S., M.B. Software, not applicable. Validation, A.A., M.S., M.B. Formal analysis, A.A., M.S. Investigation, A.A., M.B. Resources, A.A., M.B. Data curation, M.S., M.B. Writing—original draft preparation, M.S. Writing—Review and editing, A.A., M.S., M.B. Visualization, M.S. Supervision, A.A., M.B. Project administration, A.A. Funding acquisition, A.A. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Acknowledgments: An early discussion of this paper was presented at the 15th EBES Conference, Lisbon, 8–10 January 2015. The authors would like to thank the College of Business and Economics, American University of Kuwait, for a small grant to support fieldwork.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Grafton, R.Q.; Horne, J.; Wheeler, S.A. On the marketisation of water: Evidence from the Murray-Darling Basin, Australia. *Water Resour. Manag.* **2016**, *30*, 913–926. [CrossRef]
2. Horne, J. Water demand reduction to help meet SDG 6: Learning from major Australian cities. *Int. J. Water Resour. Dev.* **2019**, 1–12. [CrossRef]
3. Al-Ojayan, H.; Gaskell, G.; Veltri, G.A. *Utilising Applied Behavioural Research to Execute Subsidy Reform in Kuwait*; LSE Middle East Centre Paper Series 31 February 2020; London School of Economics: London, UK, 2020; Available online: <http://eprints.lse.ac.uk/103631/> (accessed on 10 March 2020).
4. Rey, D.; Pérez-Blanco, C.D.; Escrivá-Bou, A.; Girard, C.; Veldkamp, T.I.E. Role of economic instruments in water allocation reform: Lessons from Europe. *Int. J. Water Resour. Dev.* **2019**, *35*, 206–239. [CrossRef]
5. Ma, X.; Wu, D.; Zhang, S. Multiple goals dilemma of residential water pricing policy reform: increasing block tariffs or a uniform tariff with rebate? *Sustainability* **2018**, *10*, 3526. [CrossRef]
6. World Bank. *Beyond Scarcity: Water Security in the Middle East and North Africa*; World Bank: Washington, DC, USA, 2017.
7. Kuwait Times. Up to KD 6 Billion Deficit Expected in the 2018–2019 State Budget. Available online: <http://news.kuwaittimes.net/website/kd-6-billion-deficit-expected-2018--2019-state-budget/> (accessed on 15 April 2019).
8. The National. Kuwait’s Government Upheaval Puts Energy Reforms in Jeopardy. Available online: <https://www.thenational.ae/business/energy/kuwait-s-government-upheaval-puts-energy-reforms-in-jeopardy-1.673210> (accessed on 10 April 2019).
9. Liebe, U.; Preisendörfer, P.; Meyerhoff, J. To pay or not to pay: Competing theories to explain individuals’ willingness to pay for public environmental goods. *Environ. Behav.* **2011**, *43*, 106–130. [CrossRef]
10. Thaler, R.H. Behavioral economics: Past, present, and future. *Am. Econ. Rev.* **2016**, *106*, 1577–1600. [CrossRef]
11. Thaler, R.H.; Sunstein, C.R. *Nudge: Improving Decisions about Health, Wealth, and Happiness*; Yale University Press: New Haven, NJ, USA, 2008.

12. Wright, B.; Bragge, P. Interventions to promote healthy eating choices when dining out: A systematic review of reviews. *Br. J. Health Psychol.* **2018**, *23*, 278–295. [CrossRef] [PubMed]
13. Arno, A.; Thomas, S. The efficacy of nudge theory strategies in influencing adult dietary behaviour: A systematic review and meta-analysis. *BMC Public Health* **2016**, *16*, 676. [CrossRef] [PubMed]
14. Benartzi, S.; Beshears, J.; Milkman, K.L.; Sunstein, C.R.; Thaler, R.H.; Shankar, M.; Tucker-Ray, W.; Congdon, W.J.; Galing, S. Should governments invest more in nudging? *Psychol. Sci.* **2017**, *28*, 1041–1055. [CrossRef] [PubMed]
15. Potter, L.G. Introduction. In *The Persian Gulf in History*; Potter, L.G., Ed.; Palgrave Macmillan: London, UK, 2009; pp. 1–26.
16. Villers, A. Some aspects of the Arab dhow trade. *Middle East J.* **1948**, *2*, 399–416.
17. Hamoda, M.F. Desalination and water resource management in Kuwait. *Desalination* **2001**, *138*, 385–393. [CrossRef]
18. Boudmyxay, K.; Zhong, S.; Shen, L. Designing optimum water-saving policy in China using quantity and price control mechanisms. *Sustainability* **2019**, *11*, 2529. [CrossRef]
19. AFED. *Arab Environment: Sustainable Consumption: 2015 Report of the Arab Forum for Environment and Development*; AFED: Beirut, Lebanon, 2015.
20. Biswas, A.K.; Tortajada, C. Water crisis and water wars: Myths and realities. *Int. J. Water Resour. Dev.* **2019**, *35*, 727–731. [CrossRef]
21. Fadlilmawla, A. Towards sustainable water policy in Kuwait: Reforms of the current practices and the required investments, institutional and legislative measures. *Water Resour. Manag.* **2009**, *23*, 1969–1987. [CrossRef]
22. ArabTimes Online. Water Consumption Reaches 461.7m Gallons; Power Stands at 14,670 mw. Available online: <https://www.arabtimesonline.com/news/water-consumption-reaches-461-7m-gallons-power-stands-at-14670-mw/> (accessed on 15 November 2019).
23. Gulf Business. Kuwait: Oil Habits Are Hard to Break. Available online: <http://gulfbusiness.com/kuwait-oil-habits-hard-break/> (accessed on 15 April 2019).
24. The Times Kuwait. Subsidies Being Rolled Back Across the GCC. Available online: [http://www.timeskuwait.com/upload/pdf/The_Times\(24--30_Jan_2016\).pdf](http://www.timeskuwait.com/upload/pdf/The_Times(24--30_Jan_2016).pdf) (accessed on 15 April 2019).
25. ArabTimes Online. Kuwait Govt Spending More than it is Earning. Available online: <https://www.arabtimesonline.com/news/kuwait-govt-spending-more-than-it-is-earning/> (accessed on 15 November 2019).
26. Aliewi, A.; El-Sayed, E.; Akbar, A.; Hadi, K.; Al-Rashed, M. Evaluation of desalination and other strategic management options using multi-criteria decision analysis in Kuwait. *Desalination* **2017**, *413*, 40–51. [CrossRef]
27. International Monetary Fund. Kuwait: Staff Concluding Statement of the 2018 Article IV Mission, 28 January 2019. Available online: <https://www.imf.org/en/News/Articles/2019/01/28/ms012819kuwait-staff-concluding-statement-of-the-2018-article-iv-mission> (accessed on 15 November 2019).
28. Wang, L.; Simayi, Z.; Yang, S.; Mamitimin, Y. Research on economic bearing capacity of farmers to agricultural irrigation water prices in the ebinur lake basin. *Sustainability* **2019**, *11*, 2155. [CrossRef]
29. Bakker, K. The business of water: Market environmentalism in the water sector. *Annu. Rev. Environ. Resour.* **2014**, *39*, 469–494. [CrossRef]
30. Biswas, A.K.; Rached, E.; Tortajada, C. *Water as a Human Right for the Middle East and North Africa*; Routledge: London, UK, 2008.
31. Faruqi, N.I.; Biswas, A.K.; Bino, M.J. *Water Management in Islam*; United Nations University: Tokyo, Japan, 2001.
32. UNDP. *Water Governance in the Arab Region: Managing Scarcity and Securing the Future*; United Nations Development Programme, Regional Bureau for Arab States: New York, NY, USA, 2013.
33. Ben Brahim-Neji, H.; del Saz-Salazar, S.; Besrour, A.; González-Gómez, F. Estimating willingness to pay for desalinated seawater: The case of Djerba Island, Tunisia. *Int. J. Water Resour. Dev.* **2017**, *35*, 126–144. [CrossRef]
34. Vatn, A. Cooperative behaviour and institutions. In *Sustainability Analysis: An Interdisciplinary Approach*; Shmelev, S., Shmeleva, I., Eds.; Palgrave Macmillan: London, UK, 2014; pp. 103–128.
35. Cooper, B.; Crase, L. Urban Water Restrictions: Accounting for Behavioural Differences. Available online: <https://ageconsearch.umn.edu/record/100539/files/Cooper%20B.pdf> (accessed on 1 April 2019).

36. Brent, D.A.; Cook, J.H.; Olsen, S. Social comparisons, household water use, and participation in utility conservation programs: Evidence from three randomized trials. *J. Assoc. Environ. Resour. Econ.* **2015**, *2*, 597–627. [[CrossRef](#)]
37. Ferraro, P.; Messer, K.D.; Wu, S. Applying behavioral insights to improve water security. *Choices* **2017**, *32*, 1–6.
38. Heino, O.; Takala, A. Social norms in water services: Exploring the fair price of water. *Water Altern.* **2015**, *8*, 844–858.
39. Kanakoudis, V.; Tsitsifli, S.; Gonas, K.; Papadopoulou, A.; Kouziakis, C.; Lappos, S. Determining a socially fair drinking water pricing policy: The case of Kozani, Greece. *Procedia Eng.* **2016**, *162*, 486–493. [[CrossRef](#)]
40. Lee, F.; Aggarwal, V.; Nickum, J. Urban domestic water pricing in India and China. *Water Policy* **2016**, *18*, 68–82. [[CrossRef](#)]
41. Al-Saidi, M. Urban water pricing in Yemen: A comparison of increasing block tariffs to other pricing schemes. *Water Int.* **2017**, *42*, 308–323. [[CrossRef](#)]
42. Renzetti, S. Water pricing in Canada. In *Water Policy and Governance in Canada. Global Issues in Water Policy*; Renzetti, S., Dupont, D.P., Eds.; Springer: Berlin/Heidelberg, Germany, 2017; pp. 201–212.
43. Ferrara, I.; Missios, P. Household waste management: Waste generation, recycling, and waste prevention. In *Handbook on Waste Management*; Kinnaman, T.C., Takeuchi, K., Eds.; Edward Elgar: Cheltenham, UK, 2014; pp. 75–119.
44. del Saz-Salazar, S.; García-Rubio, M.A.; González-Gómez, F.; Picazo-Tadeo, A.J. Managing water resources under conditions of scarcity: On consumers' willingness to pay for improving water supply infrastructure. *Water Resour. Manag.* **2016**, *30*, 1723–1738. [[CrossRef](#)]
45. Bauer, H.H.; Sauer, N.E.; Becker, C. Investigating the relationship between product involvement and consumer decision-making styles. *J. Consum. Behav.* **2006**, *5*, 342–354. [[CrossRef](#)]
46. Silayoi, P.; Speece, M. Packaging and purchase decisions: An exploratory study on the impact of involvement level and time pressure. *Br. Food J.* **2004**, *106*, 607–628. [[CrossRef](#)]
47. Thøgersen, J.; Jørgensen, A.K.; Sandager, S. Consumer decision making regarding a “green” everyday product. *Psychol. Mark.* **2012**, *29*, 187–197. [[CrossRef](#)]
48. Kotler, P.; Armstrong, G.; Ang, S.H.; Tan, C.T.; Yau, O.H.-M.; Leong, S.M. *Principles of Marketing: An Asian Perspective*, 4th ed.; Pearson: Essex, UK, 2017.
49. Vranešević, T.; Stančec, R. The effect of the brand on perceived quality of food products. *Br. Food J.* **2003**, *105*, 811–825. [[CrossRef](#)]
50. Dörnyei, K.R.; Krystallis, A.; Chrysochou, P. The impact of product assortment size and attribute quantity on information searches. *J. Consum. Mark.* **2017**, *34*, 191–201. [[CrossRef](#)]
51. Tanellari, E.; Bosch, D.; Boyle, K.; Mykerezi, E. On consumers' attitudes and willingness to pay for improved drinking water quality and infrastructure. *Water Resour. Res.* **2015**, *51*, 47–57. [[CrossRef](#)]
52. Curtis, V.; Dreibelbis, R.; Buxton, H.; Izang, N.; Adekunle, D.; Aunger, R. Behaviour settings theory applied to domestic water use in Nigeria: A new conceptual tool for the study of routine behaviour. *Soc. Sci. Med.* **2019**, *235*, 112398. [[CrossRef](#)] [[PubMed](#)]
53. Jongmans, É.; Jolibert, A.; Irwin, J. Is more always better? Counter-intuitive effects in consumer assessment of environmental product attributes. *Rech. et Appl. en Mark. (Engl. Ed.)* **2014**, *29*, 10–34. [[CrossRef](#)]
54. Buchholz, L.M.; Smith, R.E. The role of consumer involvement in determining cognitive response to broadcast advertising. *J. Advert.* **1991**, *20*, 4–17. [[CrossRef](#)]
55. Webb, T.L.; Sheeran, P. Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychol. Bull.* **2006**, *132*, 249. [[CrossRef](#)] [[PubMed](#)]
56. Sheeran, P.; Webb, T.L. The intention–behavior gap. *Soc. Personal. Psychol. Compass* **2016**, *10*, 503–518. [[CrossRef](#)]
57. Momsen, K.; Thomas, S. From intention to action: Can nudges help consumers to choose renewable energy? *Energy Policy* **2011**, *74*, 376–382. [[CrossRef](#)]
58. Atkinson, R.; Flint, J. Accessing hidden and hard-to-reach populations: Snowball research strategies. *Soc. Res. Update* **2001**, *33*, 1–4.
59. Browne, K. Snowball sampling: Using social networks to research non-heterosexual women. *Int. J. Soc. Res. Methodol.* **2005**, *8*, 47–60. [[CrossRef](#)]
60. Magnani, R.; Sabin, K.; Saidel, T.; Heckathorn, D. Sampling hard to reach and hidden populations for HIV surveillance. *AIDS* **2005**, *19*, 67–72. [[CrossRef](#)] [[PubMed](#)]

61. Eriksson, P.; Kovalainen, A. *Qualitative Methods in Business Research*; Sage: Los Angeles, CA, USA, 2008.
62. Yang, Z.; Wang, X.; Su, C. A Review of research methodologies in international business. *Int. Bus. Rev.* **2006**, *15*, 601–617. [\[CrossRef\]](#)
63. Srijumba, R.; Larpsiri, R.; Speece, M. Qualitative exploratory research on customer acceptance of technology in financial services. In *Research Methodology in Commerce and Management*; Sharma, R.D., Chahal, H., Eds.; Anmol Publications: New Delhi, India, 2004; pp. 60–86.
64. Sadler, G.R.; Lee, H.C.; Lim, R.S.H.; Fullerton, J. Recruitment of hard-to-reach population subgroups via adaptations of the snowball sampling strategy. *Nurs. Health Sci.* **2010**, *12*, 369–374. [\[CrossRef\]](#) [\[PubMed\]](#)
65. Van Meter, K. Methodological and design issues: Techniques for assessing the representatives of snowball samples. *NIDA Res. Monogr.* **1990**, *98*, 31–43. [\[PubMed\]](#)
66. Baltar, F.; Brunet, I. Social research 2.0: Virtual snowball sampling method using Facebook. *Internet Res.* **2012**, *22*, 57–74. [\[CrossRef\]](#)
67. Breidert, C.; Hahsler, M.; Reutterer, T. A review of methods for measuring willingness-to-pay. *Innov. Mark.* **2006**, *2*, 8–32.
68. Voelckner, F. An empirical comparison of methods for measuring consumers' willingness to pay. *Mark. Lett.* **2006**, *17*, 137–149. [\[CrossRef\]](#)
69. Miller, K.M.; Hofstetter, R.; Krohmer, H.; Zhang, Z.J. How should consumers' willingness to pay be measured? An empirical comparison of state-of-the-art approaches. *J. Mark. Res.* **2011**, *48*, 172–184. [\[CrossRef\]](#)
70. Wang, H.; Xie, J.; Li, H. Water pricing with household surveys: A study of acceptability and willingness to pay in Chongqing, China. *China Econ. Rev.* **2010**, *21*, 136–149. [\[CrossRef\]](#)
71. Brown, T.C.; Champ, P.A.; Bishop, R.C.; McCollum, D.W. Which response format reveals the truth about donations to a public good? *Land Econ.* **1996**, *72*, 152–166. [\[CrossRef\]](#)
72. Cameron, T.A.; James, M.D. Estimating willingness to pay from survey data: An alternative pre-test-market evaluation procedure. *J. Mark. Res.* **1987**, *24*, 389–395. [\[CrossRef\]](#)
73. Bradley, J.V. A survey of sign tests based on the binomial distribution. *J. Qual. Technol.* **1969**, *1*, 89–101. [\[CrossRef\]](#)
74. Lehmann, E.L. *Nonparametrics: Statistical Methods Based on Ranks*; Holden and Day: San Francisco, CA, USA, 1975.
75. Whitley, E.; Ball, J. Statistics review 6: Nonparametric methods. *Crit. Care* **2002**, *6*, 509–513. [\[CrossRef\]](#)
76. Thaler, R.H. *Misbehaving: The Making of Behavioral Economics*; WW Norton: New York, NY, USA, 2015.
77. Mostafa, M.M. Shades of green: A psychographic segmentation of the green consumer in Kuwait using self-organizing maps. *Expert Syst. Appl.* **2011**, *36*, 11030–11038. [\[CrossRef\]](#)
78. AFED. Environmental Education for Sustainable Development in Arab Countries: 2019 Annual Report of the Arab Forum for Environment and Development. 2019. Available online: <http://www.afedonline.org/webreport2019/FINAL-DRAFT-low-web.pdf> (accessed on 22 January 2020).
79. AFED. Arab Environment in 10 Years: 2017 Annual Report of Arab Forum for Environment and Development. 2017. Available online: <http://www.afedonline.org/webreport2017/FINAL/L/AFEDreport2017-L.pdf> (accessed on 26 July 2018).
80. Ding, Y.; Zhang, T. Price-directed consumer search. *Int. J. Ind. Organ.* **2019**, *58*, 106–135. [\[CrossRef\]](#)
81. Jedidi, K.; Jagpal, S. Willingness to pay: Measurement and managerial implications. In *Handbook of Pricing Research in Marketing*; Vithala, R.R., Ed.; Edward Elgar: Northampton, UK, 2009; pp. 37–60.
82. Casey, G.P.; Owen, A.L. Good news, bad news, and consumer confidence. *Soc. Sci. Q.* **2013**, *94*, 292–315. [\[CrossRef\]](#)
83. Madrian, B.C. Applying insights from behavioral economics to policy design. *Annu. Rev. Econ.* **2014**, *6*, 663–688. [\[CrossRef\]](#)
84. Depositario, D.P.T.; Nayga, R.M., Jr.; Wu, X.; Laude, T.P. Effects of information on consumers' willingness to pay for golden rice. *Asian Econ. J.* **2009**, *23*, 457–476. [\[CrossRef\]](#)
85. Lange, C.; Combris, P.; Issanchou, S.; Schlich, P. Impact of information and in-home sensory exposure on liking and willingness to pay: The beginning of Fairtrade labeled coffee in France. *Food Res. Int.* **2015**, *76*, 317–324. [\[CrossRef\]](#)
86. Al-Zubari, W.; Al-Turbak, A.; Zahid, W.; Al-Ruwis, K.; Al-Tkhais, A.; Al-Muataaz, I.; Abdelwahab, A.; Murad, A.; Al-Harbi, M.; Al-Sulaymani, Z. An overview of the GCC unified water strategy (2016–2035). *Desalin. Water Treat.* **2017**, *81*, 1–18. [\[CrossRef\]](#)

87. Abulibdeh, A.; Zaidan, E.; Al-Saidi, M. Development drivers of the water-energy-food nexus in the Gulf Cooperation Council region. *Dev. Pract.* **2019**, *29*, 582–593. [[CrossRef](#)]
88. Awadh, S.M.; Al-Mimar, H.; Yaseen, Z.M. Groundwater availability and water demand sustainability over the upper mega aquifers of Arabian Peninsula and west region of Iraq. *Environ. Dev. Sustain.* **2020**, 1–21. [[CrossRef](#)]
89. Haroun, M.; Punjabi, S.; Suboyin, A.; Anastasiou, S.; de Bakker, J. Integrated management of water resources: A novel approach for water-stressed regions. *Syst. Res. Behav. Sci.* **2019**, *36*, 827–834. [[CrossRef](#)]
90. Abdulrahman, S.A. Water shortage in GCC countries: Transferring water from Iraqi Kurdistan Region. *Int. J. Environ. Stud.* **2019**, 1–17. [[CrossRef](#)]
91. Howari, F.; Qafisheh, N.; Nazzal, Y. Environmental service-learning in the United Arab Emirates: Is it mediated by the effects of biographical and demographical variables? *Appl. Environ. Educ. Commun.* **2019**, *18*, 300–312. [[CrossRef](#)]
92. Sahin, E.S.; Bayram, I.S.; Koc, M. Demand side management opportunities, framework, and implications for sustainable development in resource-rich countries: Case study Qatar. *J. Clean. Prod.* **2019**, *241*, 118332. [[CrossRef](#)]

© 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).