



Middle East  
Centre



# GREENING SYSTEMS BY GREENING RELIGION

ECO-ISLAMIC  
VALUES AND  
WATER-ENERGY-  
NATURE NEXUS  
POLICIES IN KUWAIT

Ganga Shreedhar, Davide Contu, Patricia  
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The Kuwait Programme is funded by the Kuwait Foundation for the Advancement of Sciences.

# Greening Systems by Greening Religion: Eco- Islamic Values and Water-Energy-Nature Nexus Policies in Kuwait

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## Abstract

The study examines public support for water-energy-nature (WEN) nexus policies in Kuwait, considering the interconnectedness of different natural resource sectors in addressing climate change and sustainability. While previous research has focused on technical aspects, little is known about public perceptions and willingness to adopt nexus policies. The study specifically explores the impact of moral incentives, specifically eco-Islamic values, on public support through an informational intervention.

Using a randomised controlled trial (RCT) embedded in a discrete choice experiment survey, the researchers engaged a nationally representative sample of Kuwaiti residents (n=431). Participants were assigned randomly to either an informational control group or a moral incentives treatment group that emphasised eco-Islamic values. In the subsequent discrete choice experiment, participants expressed their preferences regarding three WEN nexus policy attributes: reduced emissions through renewable energy transition, increased recycled water from wastewater reduction, and tree planting for nature conservation.

Results indicate that exposure to eco-Islamic values increased support for WEN nexus policies; however, while supportive, respondents do not seem willing to pay for them. These results highlight the importance of leveraging socio-cultural factors, such as religion, to promote public support for climate change action. By appealing to eco-Islamic values, policymakers can facilitate the greening of systems and ensure that religious beliefs contribute positively to efforts addressing climate change.

## The Water-Energy-Nature Nexus in Kuwait

Over the past two decades, there has been a rapid growth in research and policy interest in factoring in interactions between energy, water, and natural resource systems and sectors when designing climate change policy.<sup>1</sup> These interdependencies have been framed as the water-energy,<sup>2</sup> water-energy-food nexus,<sup>3</sup> and more recently, the water-energy-food-forest nexus.<sup>4</sup> The main arguments for adopting such ‘nexus thinking’ in climate policy is that it promotes policy coherence through identifying optimal policy mixes.<sup>5</sup> By considering how policies affect climate change outcomes across all sectors, policy-makers can factor in unintended cross-sectoral trade-offs and synergies. This in turn can enable cost- and resource-use effectiveness governance arrangements across sectors.

For instance, there is a growing recognition that nexus thinking is crucial to mitigate climate change in the Gulf Cooperation Council (GCC) countries, including Kuwait, Saudi Arabia and Qatar.<sup>6</sup> These countries present high per capita emissions and water use, facing substantial risks in a warming world, apart from increasingly extreme weather events like dust storms.<sup>7</sup> Adopting nexus thinking is, therefore, particularly important to scale and hasten systemic transitions. Siderius et al. note that in Kuwait, for example, domestic agricultural production is strongly dependent on the availability of energy (e.g., burning more oil, and in future possibly solar), desalinating seawater and brackish groundwater water for irrigation, and recycling domestic wastewater.<sup>8</sup> They observe that Kuwait has a particularly high water-related energy usage, mostly for desalination with only a small fraction used to pump groundwater, treat wastewater, and produce food.<sup>9</sup> This study suggests that there is much scope to mitigate climate change by adopting nexus thinking and considering gradual introduction of renewable energy to reduce emissions, recycling wastewater, and planting crops to help sequester carbon. Which of these nexus policies would be acceptable to the Kuwaiti public is unclear.

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<sup>1</sup> Sabrina S. G. Rothausen and Declan Conway, ‘Greenhouse-Gas Emissions from Energy Use in the Sater Sector’, *Nature Climate Change* 1/4 (2011) pp. 210–9; Felipe Melo et al., ‘Adding Forests to the Water-Energy-Food Nexus’, *Nature Sustainability* 4/2 (2021).

<sup>2</sup> ‘Advancing Knowledge of the Water-Energy Nexus in the GCC Countries’, *World Bank Group* (2022). Available at: <https://www.worldbank.org/en/country/gcc/publication/advancing-knowledge-of-the-water-energy-nexus-in-the-gcc-countries> (accessed 30 January 2024).

<sup>3</sup> Christian Siderius et al., ‘Multi-Scale Analysis of the Water-Energy-Food Nexus in the Gulf Region’, *Environmental Research Letters* 15/9 (2020).

<sup>4</sup> Nina Weitz et al., ‘Closing the Governance Gaps in the Water-Energy-Food Nexus: Insights from Integrative Governance’, *Global Environmental Change* 45 (2017), pp. 165–73.

<sup>5</sup> Paul Burstein, ‘The Impact of Public Opinion on Public Policy: A Review and an Agenda’, *Political Research Quarterly* 56/1 (2003), pp. 29–40.

<sup>6</sup> Ali Aljamal, Mark Speece and Mohsen Bagnied, ‘Understanding Resistance to Reductions in Water Subsidies in Kuwait’, *Local Environment* 27/1 (2022), pp. 97–111.

<sup>7</sup> Ibrahim Alhumoud and Jasem Alhumoud, ‘Economic Viability and Analysis of Wastewater Treatment Processes in Kuwait’, *International Journal of Environment and Waste Management* 27/1 (2020), pp. 21–34.

<sup>8</sup> Christina Gravert and Ganga Shreedhar, ‘Effective Carbon Taxes Need Green Nudges’, *Nature Climate Change* 12/12 (2022), pp. 1073–4; Carla Rodriguez-Sanchez et al., ‘How Trust and Emotions Influence Policy Acceptance: The Case of the Irish Water Charges’, *British Journal of Social Psychology* 57/3 (2018) pp. 610–29.

<sup>9</sup> *Ibid.*

However, several scholars have pointed out that ‘governance gaps’ exist, where technical nexus thinking is disconnected from decision- and policy-making processes.<sup>10</sup> There is a dominant focus on technical debates around interactions across parts of the nexus and how to better coordinate and optimise information and solutions across these. Yet in comparison, the perceptions and political policy processes amongst different actors, including the public, are under-studied.<sup>11</sup> Public perceptions and opinions can be crucial from a governance perspective.<sup>12</sup> Transformations in renewable energy and water recycling infrastructure needs to be accompanied by public demand for, and the use of, such services and goods. Oil-dependent countries, such as Kuwait, also see potential impacts on inflation associated with energy transitions.<sup>13</sup> However, the public may not be willing to pay for such transitions, or even use novel goods, leading to the low take-up and ineffectiveness of nexus policies.

This may especially be the case in GCC countries like Kuwait, where many public services – including residential energy and water utilities – are run mainly by burning fossil fuels which are subsidised for the public.<sup>14</sup> These subsidies may partially explain the high residential water and energy consumption levels.<sup>15</sup> There is a strong public resistance to eliminating water subsidies, as well as low demand for novel goods like recycled water.<sup>16</sup> Emerging evidence also shows that there is possibly low public support for climate policies more broadly.<sup>17</sup> If there is resistance to moving away from the status quo and low support for such policies, top-down changes to the conditions and provisions of existing services can be met with public backlash against governments – as seen in the gilets jaunes protests in France, or the drawn-out protests against the introduction of water charges in Ireland.<sup>18</sup>

To increase policy acceptability, scholars have called for informational and communication campaigns to clarify the importance of tackling climate change in a way that directly addresses public perceptions and values.<sup>19</sup> For example, it may be hypothesized that resis-

<sup>10</sup> Nina Weitz et al., ‘Closing the Governance Gaps in the Water-Energy-Food Nexus: Insights from Integrative Governance’, *Global Environmental Change* 45 (2017), pp. 165–73.

<sup>11</sup> Alice Larkin, Claire Hoolohan and C. McLachlan, ‘Embracing Context and Complexity to Address Environmental Challenges in the Water-Energy-Food Nexus’, *Futures* (2020).

<sup>12</sup> Paul Burstein, ‘The Impact of Public Opinion on Public Policy: A Review and an Agenda’ *Political Research Quarterly* 56/1 (2003).

<sup>13</sup> Fatih Karanfil and Luc Désiré Omgba, ‘The Energy Transition and Export Diversification in Oil-Dependent Countries: The Role of Structural Factors’, *Ecological Economics* 204 (2023).

<sup>14</sup> Ali Aljamal, Mark Speece and Mohsen Bagnied, ‘Understanding Resistance to Reductions in Water Subsidies in Kuwait’, *Local Environment* 27/1 (2022), pp. 97–111.

<sup>15</sup> Ayele Gelan, ‘Kuwait’s Energy Subsidy Reduction: Examining Economic and CO<sub>2</sub> Emission Effects with or Without Compensation’, *Energy Economics* 71 (2018), pp. 186–200.

<sup>16</sup> Ibrahim Alhumoud and Jasem Alhumoud, ‘Economic Viability and Analysis of Wastewater Treatment Processes in Kuwait’, *International Journal of Environment and Waste Management* 27/1 (2020), pp. 21–34.

<sup>17</sup> Deen Shariff Sharp, Abrar Alshammari and Kanwal Hameed, ‘The Quiet Emergency: Experiences and Understandings of Climate Change in Kuwait’, *LSE Middle East Centre Kuwait Programme Paper Series*. Available at: [http://eprints.lse.ac.uk/112491/3/The\\_Quiet\\_Emergency.pdf](http://eprints.lse.ac.uk/112491/3/The_Quiet_Emergency.pdf) (accessed 22 August 2024).

<sup>18</sup> Gravert and Shreedhar, ‘Effective Carbon Taxes Need Green Nudges’; Rodriguez-Sanchez et al., ‘How Trust and Emotions Influence Policy Acceptance’.

<sup>19</sup> Farzaneh Shaikh Khatibi et al., ‘Can Public Awareness, Knowledge and Engagement Improve Climate Change Adaptation Policies?’ *Discover Sustainability* 2/18 (2021).

tance towards paying for water and more sustainable water management may decline if policies are supported by an effective communications campaign in Kuwait. Various factors can shape public opinion of technological nexus solutions, including socio-cultural, environmental and governance ones.<sup>20</sup> Therefore, it is also useful to study how to enhance support for WEN nexus policies in ways that take the socio-cultural context into account.

This paper examines public support for WEN nexus policies in Kuwait, examining whether leveraging moral incentives via an eco-Islamic message increases support for WEN policies, and the role of socio-religious identification and religiosity in moderating this. There is a rich emerging literature on the socio-psychological antecedents of climate policy support; these include the role of values, worldviews, policy perceptions, social and personal norms, environmental and climate concern and attitudes, political ideology, and ethnicity amongst others.<sup>21</sup> Remarkably, there is a noticeable lack of research on the impact interventions leveraging religious beliefs has on climate policy support and preferences.<sup>22</sup>

In this study, a randomised controlled trial embedded in a discrete choice experiment (DCE) via an online survey (n=431) and focus group discussions were used for data gathering. In the DCE, we assessed public support by estimating the willingness to pay for three main WEN nexus policy attributes: increasing the use of recycled wastewater for agricultural and industrial use; reducing CO<sub>2</sub> emissions by increasing renewable solar energy production; and planting more trees for nature conservation. Before expressing their preferences in the DCE, participants were exposed to either a message about the importance of addressing climate change with or without an appeal to eco-Islamic values and importance of addressing climate change (i.e., either the control or the moral incentive treatment condition). To examine how social identification affects responses to this moral incentive treatment, we studied whether responses were moderated by two factors, namely, socio-cultural group membership (identifying as either Kuwaiti or non-Kuwaiti Muslim, as a non-Muslim, or non-religious) and self-reported religiosity.

There is a lack of research about whether the public is willing to support nexus thinking in climate policies and willingness to pay (WTP) for nexus policy elements. There is mixed and sparse evidence about the role of religion and moral incentives on climate policy support, and existing research largely comes from Western, educated, industrialised, rich, and democratic contexts like the US. The main aims of this research are as follows. First, to examine the Kuwaiti public's support for and WTP for WEN nexus policies. Second, to estimate the causal effect of leveraging moral incentives in informational appeals via appealing to eco-Islamic values. Third, to examine whether socio-religious identification through group membership, and religiosity, moderates the impact of the moral incentive treatment. The hypotheses are stated overleaf:

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<sup>20</sup> Larkin, Hoolohan and McLachlan, 'Embracing Context and Complexity to Address Environmental Challenges in the Water-Energy-Food Nexus'.

<sup>21</sup> Sanchayan Banerjee, Manu Savani, and Ganga Shreedhar, 'Public Support for "Soft" Versus "Hard" Public Policies: Review of the Evidence', *Journal of Behavioral Public Administration* 4/2 (2021); Ding Ding et al., 'Support for Climate Policy and Societal Action are Linked to Perceptions about Scientific Agreement', *Nature Climate Change* 1/9 (2011).

<sup>22</sup> Stefan Drews, Jeroen C. J. M. Van den Bergh, 'What Explains Public Support for Climate Policies? A Review of Empirical and Experimental Studies', *Climate Policy* 16/7 (2016), pp. 855–76.

H1: Exposure to moral incentives via eco-Islamic values message will increase public support and WTP for all nexus climate policy attributes.

H2: The effect of the eco-Islamic values message on public support and WTP will be moderated by socio-religious identification via group membership and religiosity.

To recruit participants and implement the survey, we worked with the market research company's online panel, Kantar. We prepared the survey in Qualtrics and shared the survey link. Upon completion of the survey, participants received points proportional to the length of the survey which they could then redeem for products. To be eligible to participate, participants had to be at least 18 years old and residents of Kuwait. The survey was made available in both English and Arabic.

We estimated the sample size based on three main factors: power analysis, participant availability and resource constraints. The power analysis was conducted on G\*Power and indicated that 694 participants were needed assuming a small-to-medium effect size of 0.25, 95 percent power and a one-tailed t-test with two independent groups.<sup>23</sup> Due to data exclusion restrictions, we decided to aim for around 500 respondents for each group to factor in reduction in sample size. Data collection started on 21 June 2022 and was completed on 12 August 2022.

## Moral Incentive Treatment

Each participant was randomly assigned to either the control group, the moral incentive treatment, or the control group by the Qualtrics randomisation algorithm. In the control group, participants were informed of the WEN nexus in Kuwait and how the government was considering ways to address climate change. In the moral incentive treatment group, participants saw the control message and a moral message appealing to eco-Islamic values. Both groups then saw a message on WEN climate policies, i.e., investing in solar energy, recycling wastewater, and planting more trees.

The moral incentive treatment was based on eco-Islamic values. The overarching rationale was that religious beliefs can impact preferences only when relevant sections of the text are made accessible and salient,<sup>24</sup> and reinterpreted to relate directly to the issue and behaviour.<sup>25</sup> These particular texts were selected to instill the importance of climate change and environmental protection and nexus policy attributes more specifically.<sup>26</sup> These aspects emerged as important themes in the focus groups, and related to global

<sup>23</sup> Franz Faul et al., 'Statistical Power Analyses Using G\*Power 3.1: Tests for Correlation and Regression Analyses', *Behavior Research Methods* 41/4, pp. 1149–60.

<sup>24</sup> Anders Biel and Andreas Nilsson, 'Religious Values and Environmental Concern: Harmony and Detachment', *Social Science Quarterly* 86/1 (2005), pp. 178–91

<sup>25</sup> Abdelzaher, Kotb and Helfaya, 'Eco-Islam'.

<sup>26</sup> Jens Koehrsen, 'Muslims and Climate Change: How Islam, Muslim Organizations, and Religious Leaders Influence Climate Change Perceptions and Mitigation Activities', *Wiley Interdisciplinary Reviews: Climate Change* 12/3 (2021), p. 702.



and specific moral prescriptions to address climate change. We highlighted two quotes typifying the principle of *Khalifa*, which speaks to how Islam can conceptualise humans as vice-regents and guardians of the environment and our earth. We also mentioned that as vice-regents, we must act responsibly, and that the *Hadith* teaches humans to cultivate nature and not waste earth's resources. Referencing reducing waste related to reducing water and energy waste, both of which contribute to higher carbon emissions. Referencing cultivating and conserving nature, such as by planting trees, is a common feature of eco-Islamic initiatives.<sup>27</sup> The message was qualitatively piloted and checked with GCC residents who identified as Muslim and had varying degrees of religiosity.

## Water-Energy-Nature Attributes

After viewing the control or treatment messages, respondents engaged with the DCE, so we could elicit willingness to pay measures and preferences for WEN policies. A DCE was employed to allow for the estimation of specific attributes as well as the total value. Contrastingly, contingent valuation techniques did not lead to the estimation of specific attributes but only total demand. The DCE also helped estimate WTP indirectly, making it more difficult for respondents to answer strategically. It is worth noting that without such stated preference techniques, we would not be able to provide monetary estimations important for policy indications.

In the DCE, respondents were presented with different scenarios representing water, energy and nature conservation nexus policy attributes and another monetary cost attribute (namely, an increase in annual expenditure) varying at different levels. Respondents were then asked to choose their most preferred scenario from each set they were presented with. From these choices, we can infer the level of support for the attribute presented and the willingness to pay for each. We can also infer overall support for (any) WEN policy by measuring the number of times participants did not choose the status quo.

The finalised attributes and levels are presented in Table 1 below. An example of the choice tasks is presented in Figure 1. The selection of the attributes and associated levels was based on literature about recommended climate policies being debated in Kuwait and Intergovernmental Panel on Climate Change and the Environment recommendations.<sup>28</sup>

We were particularly concerned about payment and policy consequentiality. Hence, following the focus groups discussion, we decided to avoid a change in water and/or electricity bill as that could have generated opposition from the respondents. Rather, we proposed an increase in overall household expenditure associated to the undertaking of the policy packages, such as increase in prices in the supply chain and reduction of subsidies.

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<sup>27</sup> Will Jenkins, Evan Berry and Luke B. Kreider, 'Religion and Climate Change', *Annual Review of Environment and Resources* 43/1 (2018), pp. 85–108.

<sup>28</sup> E.g.: Osamah Alsayegh, Nathalie Saker and Ayman Alqattan, 'Integrating Sustainable Energy Strategy with the Second Development Plan of Kuwait', *Renewable and Sustainable Energy Reviews* 82 (2018), pp. 3430–40; 'Climate Change 2022: Impacts, Adaptation and Vulnerability', IPCC (2022). Available at: <https://www.ipcc.ch/report/ar6/wg2/> (accessed 10 November 2024).

The DCE design was initially prepared via orthogonal design, administered to 100 respondents, and then an efficient Bayesian design was prepared once the prior was obtained. Respondents were presented with a total of 6 choice tasks each, randomly picked from a possible 38. The designs were generated with the aid of the software NGENE.

**Table 1: Discrete Choice Experiment Attributes and Levels**

WEN Policy and Monetary Cost Attributes	Variable name	Levels
Producing more recycled water for agriculture and industrial purposes (Water)	Recycled water	0%, 1%, 5%, 10% in three years compared to current levels
Reducing CO2 emissions from desalination using more renewable energy (Energy)	Emission	0%, 1%, 5%, 10% in three years compared to current levels
Planting more trees to capture CO2 emissions and recharge groundwater (Nature conservation)	Trees	No increase, 500, 1000, 2000 in three years compared to current levels
Increase in annual household expenditure (Monetary cost)	Expenditure	No change, 50, 100, 125, 150, 200 Kuwaiti Dinars ( $\approx$ 15, 30, 40, 60 USD)

## Measured Variables

### Main Outcomes

We pre-registered that our main outcome would be the willingness to pay for the WEN nexus policy package. This metric would be derived from the choice experiments whose attributes and levels were presented above. WTP was estimated for the following: reducing CO<sub>2</sub> emissions at a 1%, 5% or 10% level; producing more recycled water for agriculture and industrial purposes at an increase of 1%, 5%, or 10%; planting more trees to capture CO<sub>2</sub> emissions and recharge groundwater at a rate of 500, 1,000, or 2,000 additional trees planted yearly. No significant WTP was found. Hence, we deviated from the pre-registration and focus on the total acceptability of any WEN nexus policy. This was measured by the number of times a given respondent selected the status quo option. In other words, they chose to reject any configuration of the nexus policy package. This variable ranged from a minimum of 0 to a maximum of 6, since participants faced 6 choice tasks. We also consider a binary variable taking value 1 when respondents selected the status quo at least once. Importantly, acceptability ought to be negatively correlated with the number of times respondents selects the status quo, as the greater the acceptance of the WEN nexus, the less often we expect respondents to select the status quo. This acceptability measure represents measures a broad acceptance of the nexus, rather than a WTP for specific attributes.

## Moderators

The two moderators were socio-religious identification that measured whether participants identified as a member of a socio-religious group, and self-reported religiosity. Socio-religious identification was captured using a categorical variable coded as follows: 1=Muslim- Kuwaiti, 2=Muslim- Not Kuwaiti, 3=Other religion, 4=Not religious. Religiosity was measured with 4 items adapted from Dali et al.<sup>29</sup> Our response scale went from 1 'Strongly disagree' to 5 'Strongly agree' for the following statements: I regularly pray five times a day; my religious beliefs influence which service providers that I use and what I buy; I believe Prophet Mohamed's (PBUH) traditions are suitable throughout all times; All humankind's good deeds will be judged and rewarded accordingly after death, and I believe Quranic teachings are suitable in today's life. A modified version of this scale, without reference to Islamic concepts, was administered to those who did not self-identify as Muslim. The Cronbach's alpha for the religiosity scales amounts to 0.93. We also make use of a 'religious' variable, which takes value 1 if the respondent selected agree or strongly agree across all the religiosity scales, 0 otherwise.

## Control Variables

Apart from these main variables, we measured several other factors to use as control variables in our examination of the treatment effects, both to understand which factors predicted WTP and policy support, and to ensure that our analyses was robustness.<sup>30</sup> Specifically, to measure climate change risk perception, we adapted three items modified from Lee et al.<sup>31</sup> This was combined to form a single composite measure of climate concern (Cronbach alpha=0.82). We asked if participants had undertaken past charitable activities (e.g. donations and volunteering) and if any had been for the environment. Past charitable environmental behaviour was coded as a categorical variable with three levels: 0=No, 1=Has donated to an environmental charity. Importantly, climate concern, religion and religiosity questions were asked before the eco-Islamic treatment. Socio-demographic variables included age, gender, residence location or Governorate, household income, education level and work status.

However, to ensure that data was of adequate quality and to gauge whether the treatment was indeed noticed by participants, we decided to include attention, seriousness, and manipulation check questions which acted as data exclusion conditions. This caused a substantial reduction of the overall sample size and lack of sample balance between the treatment and control group. Specifically, we omitted participants who failed both an instructional attention and seriousness check. To gauge treatment effectiveness, we also planned to exclude respondents who failed to answer the manipulation check question correctly. As part of the manipulation check, respondents were asked to confirm whether

<sup>29</sup> Nuradli R.S.M. Dali, Shumaila Yousafzai and Hanifah Abdul Hamid, 'Religiosity Scale Development', *Journal of Islamic Marketing* 10/1 (2019), pp. 227-48

<sup>30</sup> We also collected data on other psychological factors after the treatment and DCE, which are not used in the current analyses, such as environmental values and attitudes.

<sup>31</sup> Tien M. Lee et al., 'Predictors of Public Climate Change Awareness and Risk Perception Around the World', *Nature Climate Change*, 5/11 (2015).

they had seen some information in the previous sections of the survey. Respondents who received the eco-Islamic treatment the following: ‘You may have read some ways in which Islamic principles guiding us to protect the environment in previous questions in this survey. Please select what this principle was.’ We excluded respondents in the treatment group who do not choose the response option ‘Islamic principles teach us that we cannot waste the earth’s resources.’ Similarly, in the control group, those who did not choose ‘Islamic principles teach us that we cannot waste earth’s resources’ were excluded.

## Econometric Strategy

To elicit the effectiveness of the moral incentive treatment on policy support, we used ordinary least squares and Poisson regression models, since the count of status quo choice is the dependent variable. We also employ a Logit regression with the binary variable derived from the status quo count. These regression models enable us to estimate the average treatment effect and moderation relationships between the outcomes and treatment indicator, and socio-religion identification variables. In addition, to estimate WTP for the choice experiment attributes, we estimated Random Parameters Logit models.<sup>32</sup> In this report, we do not present robustness checks nor present latent class models or hybrid choice models applied to the DCE data.

## Results

In total, 1073 participants successfully completed the survey. Based on the pre-registration, and after removing those failing the attention, seriousness, and manipulation checks, 431 participants remained.<sup>33</sup> We therefore also report the sample characteristics from the entire sample, without excluding participants who passed the manipulation and seriousness checks.

The descriptive statistics of the sample’s characteristics results are presented below in Table 2. Of these, 65% of respondents are men (close to the population value of 61%),<sup>34</sup> and 35.1% are Kuwaiti nationals (slightly greater than the population value of about 30%).<sup>35</sup> 25.7% of the respondents were Muslim Kuwaitis, 45% Muslim non-Kuwaitis, 29% non-Muslims, and 7.9% identified themselves as not religious. Respondents were mostly from the Hawalli Governorate (33.8%), Farwaniya Governorate (18.8%), Ahmadi Gover-

<sup>32</sup> Daniel McFadden and Kenneth Train, ‘Mixed MNL Models for Discrete Response’, *Journal of Applied Econometrics* 15/5 (2010), pp. 447–70.

<sup>33</sup> The main reason for the drop-out rates is because most participants in the control group choose the optional response statement, ‘Islamic principles tell us not to waste earth’s resources.’ Based on subsequent qualitative evidence from interviews, however, it appeared that many Muslim participants believed it would be immoral to not select that option (even if they did not recall seeing such a message). We retain only those who passed both the seriousness and manipulation check, as we are interested in estimating the treatment effectiveness.

<sup>34</sup> ‘Population, male (% of total population) – Kuwait’, *World Bank Open Data*. Available at: <https://data.worldbank.org/indicator/SP.POP.TOTL.MA.ZS?locations=KW>, (accessed 7 November 2023).

<sup>35</sup> ‘The World Factbook – Kuwait’, *Central Intelligence Agency*. Available at: <https://www.cia.gov/the-world-factbook/countries/kuwait/#people-and-society> (accessed 7 November 2023).

norate (16%), Capital Governorate (15.8%). The average age of these sampled respondent is equal to 33.9 (slightly older than the population average of 30 years old),<sup>36</sup> with median equal to 33, and maximum equal to 64 years old. The sample was broadly representative based on region, age, gender, and nationality. All in all, we found respondents to be mildly concerned about climate change, with an average of 3.7 out of 5.

Comparison tests of these observed attributes characteristics between the treatment and control groups indicate a significant difference in terms of age and share of Kuwaiti nationals – the treatment group presents younger respondents and more Kuwaiti nationals. At the same time, there are no significant differences in terms of gender, share of high income, share of low education. With regards to religious characteristics, the treatment group presents individuals with a greater score of religiosities; it has a greater share of Muslims whereas the share of not religious is similar. There was also little difference between the two groups regarding the average climate change risk perception.

**Table 2: Descriptive Statistics by Treatment and Control Groups**

Variable	Treatment	Control	(Treatment & Control)	P-Value	All
Age	33.7	35.4	33.9	0.07	32.6
Kuwaiti	36.8%	25.8%	35.3%	0.04	39.5%
Women	34.1%	27.8%	35.1%	0.16	34.8%
Religiosity	4.23	3.78	4.17	0.00	4.04
Muslim Kuwaiti	27.1%	17.7%	25.7%	0.05	30.6%
Muslim Not Kuwaiti	46.8%	33.8%	45.1%	0.02	41.2%
Not Muslim	26%	48.3%	29.2%	0.00	28.1%
Not religious	7.8%	8%	7.9%	0.47	6.9%
High level of income	19.7%	17.7%	19.4%	0.35	29.6%
Low education	12.7%	17.7%	13.4%	0.14	15.5%
Climate risk perception	3.69	3.83	3.72	0.13	3.59
Sample size	369	62	431	/	1073

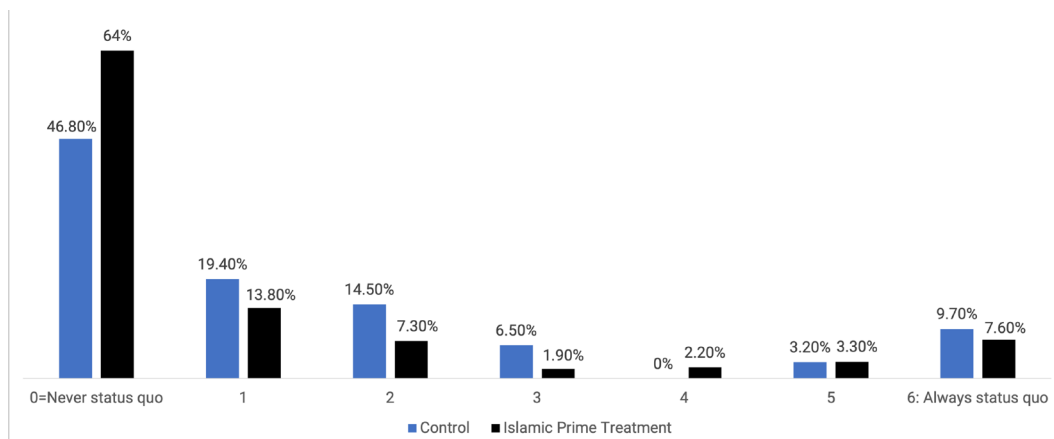
*Low education identifies respondents with high school or less. High income identifies respondents with stated 4000 KD income or higher. P-values refer to 2-tails T-test conducted to compare averages, 2-tails test of proportion to compare percentages between treatment and control group.*

<sup>36</sup> Ibid.

## Choosing the Status Quo from Discrete Choice Experiment Results

Before discussing the coefficients associated with the attributes, we focus on the analysis of the selection of the status quo option. Respondents who tend to repeatedly choose the status quo are taken to not support any combination of WEN nexus policies. Overall, 61% of the respondents never selected the status quo, and 8% always chose it. When comparing the number of times the status quo was chosen in the control versus treatment group (Figure 1), we find a significant association (Pearson  $\chi^2=12.9$ ,  $p\text{-value}=0.04$ ). Respondents in the Treatment group never chose the status quo more frequently as opposed to the control group (64% versus 46.8%), thereby signaling a greater degree of acceptance of WEN policy amongst the treated respondents. In Table 3 we report the main reasons for selecting the status quo at least once.

**Figure 1: Count of Status Quo Versus WEN Policy Package Choice (n=431)**



**Table 3: Reasons to Choose the Status Quo Option (n=431)**

Reason for Selecting Status Quo at Least Once	(n=431)
You found the average expenditure increase too high	16.2%
You do not think that it is your responsibility to pay for climate and environmental policies	10.9%
You did not find the increase in average household expenditure from these policies was credible	9%
You did not find the options realistic	8.3%
You do not believe in climate change, so you did not support any of these policies	3.9%
There is no need to invest in renewable energy in Kuwait	3.4%
There is no need to plant more trees in Kuwait	2.3%

*Note: the shares are computed as count of answers over total respondents. Not all respondents selected the status quo so not all respondents answered this question.*

Respondents found, overall, the survey to be policy-consequential. Only 4.6% stated that it was ‘extremely unlikely’ for the Kuwait government to enact policies that address climate change, water scarcity and nature conservation as described in this survey soon. In addition, only 8.5% would not expect policies addressing climate change, water scarcity and nature conservation, to influence household expenditures as described in this survey.

## Lack of WTP: Choice Experiment Results

The coefficients associated to the choice experiments attributes are presented in Table 4. We first present a Random Parameters Logit (RPL) model without interactions (Model 1) and then a model where all the attributes are interacted with the treatment variable (Model 2). For both models we report mean and standard deviations of the coefficients, assumed to follow normal distributions.

**Table 4: Choice Experiment Results**

RPL Models	(1)		(2)	
	Mean	S.D.	Mean	S.D.
Status quo	-3.268*** (0.287)	3.51*** (0.374)	-2.06*** (0.483)	2.34*** (0.414)
Emissions reduction	1.107 (0.891)	1.68 (3.65)	1.712 (2.598)	2.02 (4.13)
Recycled water	-0.277 (0.913)	3.28 (2.04)	-1.293 (2.119)	0.730 (1.216)
Planting more trees	0.033 (0.056)	0.477*** (0.112)	0.040 (0.152)	0.482*** (0.114)
Annual Expenditure	-0.44*** (0.124)	1.30*** (0.148)	-0.537 (0.362)	1.28*** (0.158)
Treatment*Status quo			-2.06*** (0.483)	2.88*** (0.453)
Treatment*Emission reduction			-0.628 (2.764)	0.028 (1.77)
Treatment*Recycled water			1.220 (2.350)	3.64 (3.13)
Treatment*Planting more trees			-0.009 (0.164)	0.183 (0.269)
Treatment*Expenditure increase			0.086 (0.381)	0.36** (0.197)
Observations	431		431	

Notes: \*\*\*1% significance, \*\* 5% significance, \* 10% significance. Robust standard errors. The dependent variable is the choice of the option A, B, or Status Quo. Respondents were presented with 6 choice tasks randomly picked from a total of 38 possible choice tasks. For each attribute and interaction with the attribute, we assume a normal distribution, reporting the mean and standard deviation (S.D.). The status quo variable presents value one if the respondent selected the status quo in a given choice task, 0 otherwise. The levels of the attributes are as per Table 1, with the exception of the attributes trees and annual expenditure that were scaled down by 100 units in order to ensure convergence of the model (this only impacts the magnitude of the coefficients and it is of no concern when not discussing WTPs).

In both models we see a statistically significant and negative mean coefficient associated to the status quo variable, indicating that overall respondents were more likely to choose one of the options rather than the status quo. However, none of the characteristics associated with the WEN package appears to have been significantly valued by the respondents. This indicates that respondents support WEN policies, but do not display a particular preference for one of the attributes. In addition, whilst in model (1) we do find a statistically significant and negative coefficient associated with the potential increment in annual expenditure, this becomes not significant in model (2). This points towards the lack of willingness to pay for any of the elements. Hence, we cannot estimate whether the willingness to pay was affected by the treatment. However, we see that the choice of the status quo was indeed impacted: those who received the treatment were even less likely to choose the status quo. This finding supports our H1 hypothesis.

## Effects of the Moral Incentive Treatment

Table 5 provides the results testing hypothesis H1, where the main outcome is the number of times the respondent chose the status quo. Ordinary Least Squares (OLS) model 1, Poisson model 3 and Logit model 5 have no control variables, whereas Models 2, 4 and 6 have a full list of controls (to assess whether results are stable and robust). Across models, individuals appeared less likely to choose the status quo when exposed to the treatment. However, results are significant in this regard only when considering the Logit model. These results provide initial empirical support for hypothesis 1: informational interventions priming Islamic values can increase support for WEN nexus policies, by reducing support for the status quo.

We then examine the evidence for hypothesis H2 by interacting the treatment indicator with religiosity and with socio-religious identification in Poisson regression models (Table 6). We do not find significant moderation effects of either religiosity and social identification when each is interacted separately with the treatment indicator (models 1 and 2) nor with three-way interaction between the moral incentive treatment, religiosity, and socio-religious identification (model 3). However, the treatment significantly reduced the likelihood of choosing the status quo among non-religious individuals who are otherwise more prone to reject WEN policies. It may be speculated that at least a portion of those who state to be non-religious are still respectful towards eco-Islamic values.



**Table 5: Direct Effect of Moral Incentive Treatment on Likelihood of Choosing the Status-Quo**

Regression Models	OLS (1)	OLS (2)	Poisson (3)	Poisson (4)	Logit (5)	Logit (6)
Moral incentive treatment	-0.373° (0.260)	-0.370° (0.270)	-0.305° (0.193)	-0.306° (0.209)	-0.702*** (0.276)	-0.775*** (0.196)
Religiosity		-0.052 (0.070)		-0.054 (0.069)		-0.196** (0.100)
Non-Kuwaiti Muslim		0.011 (0.231)		0.015 (0.210)		-0.306 (0.267)
Other religion		-0.185 (0.273)		-0.161 (0.262)		-0.498 (0.346)
Climate risk perception		-0.104 (0.096)		-0.101 (0.081)		-0.202* (0.110)
Age		0.007 (0.010)		0.006 (0.008)		-0.007 (0.121)
Female		-0.296* (0.172)		-0.288* (0.175)		0.072 (0.224)
Low education		0.266 (0.298)		0.221 (0.229)		0.172 (0.311)
High income		-0.637*** (0.168)		-0.779*** (0.214)		-0.272 (0.289)
Hawalli		0.025 (0.267)		0.049 (0.248)		0.077 (0.318)
Farwaniya		0.345 (0.318)		0.298 (0.263)		0.404 (0.356)
Ahmadi		0.168 (0.293)		0.160 (0.267)		0.407 (0.350)
Capital		-0.119 (0.286)		-0.144 (0.313)		0.084 (0.359)
Constant	1.41*** (0.242)	1.89*** (0.659)	0.350** (0.170)	0.831° (0.554)	0.129 (0.254)	2.11*** (0.795)
Observations	431	431	431	431	431	431
R-Squared	0.005	0.04			0.011	0.035
Controls	No	Yes	No	Yes	No	Yes

Notes: \*\*\*1% significance, \*\* 5% significance, \* 10% significance, °15% significance (note: this level of significance is usually considered too low to infer a significant effect). A negative coefficient indicates a lower likelihood of choosing the status quo option (hence greater support for WEN-options). Robust standard errors. In models 5 and 6, the dependent variable is binary (0: never chosen status quo, 1: chosen status quo at least once).

**Table 6: Moderation Analyses of Social-Religious Identification and Religiosity on Likelihood of Choosing the Status-Quo**

RPL models	(1)	(2)	(3)
Moral incentive treatment = 1	-0.228 (0.411)	-0.681* (0.388)	0.747 (0.918)
Religiosity	0.091 (0.099)		0.257* (0.134)
Treatment*Religiosity	-0.028 (0.021)		-0.338° (0.213)
Non-Kuwaiti Muslim		-0.506 (0.505)	-0.497 (0.477)
Other religion		-0.205 (0.435)	-0.056 (0.411)
Not religious		0.077 (0.389)	1.00* (0.588)
Treatment*Non-Kuwaiti Muslim		0.821° (0.550)	0.326 (1.19)
Treatment*Other religion		0.073 (0.532)	-0.082 (1.03)
Treatment*Non-Religious		-0.138 (0.535)	-1.41° (0.908)
Treatment*Non-Kuwaiti Muslim*Religiosity			0.111 (0.249)
Treatment*Other religion*Religiosity			-0.016 (0.242)
Constant	0.006 (0.341)	0.597* (0.345)	-0.479 (0.583)
Observations	431	431	431

Notes: \*\*\*1% significance, \*\* 5% significance, \* 10% significance, °15% significance (note: this level of significance is usually considered too low to infer a significant effect). A negative coefficient indicates a lower likelihood of choosing the status quo option (hence greater support for WEN-options). Robust standard errors.

## Discussion and Conclusion

This paper examines the public willingness to support WEN nexus policies amongst a representative sample in Kuwait using a DCE and examines whether informational interventions priming eco-Islamic values can raise support for such policies. It addresses important gaps in the literature about the public support for systemic climate policies that simultaneously address the interactions arising resource use from multiple sectors like energy, water, and nature. It also examines if greening religion through public-facing climate policy information can enhance support for such policy packages. This is especially important given debates around the importance of addressing WEN nexus while addressing climate change in under-studied contexts like the Middle East. Furthermore, eco-Islamic scholars have called for greater attention to study not only why we should take care of the environment and based on what principles, but how practicing Islam can guide climate-relevant behaviours.<sup>37</sup>

We found that making eco-Islamic values can increase stated support for WEN policies by reducing support for the status quo. In other words, we found that informational interventions attempting to 'green' religions by making eco-values salient, can also help increase stated support for WEN policies aimed at 'greening' systems. This supports the proposition that religions have the potential to provide a clear pathway to tackling environmental issues. As noted by Chuvieco, even if religious traditions are not currently a leading force behind national environmental policies, it is clear they have large potential for guiding new attitudes to the environment.<sup>38</sup> However, there was no significant WTP for WEN policies overall. Public communications making salient eco-Islamic values, therefore, cannot in isolation overcome resistance. The effect of stronger interventions that can be both educational but is also a question of laws and monetary incentives that needs examining.

There are many ways to build on this work and tackle current limitations. For example, this study focused on responses from a broadly representative sample of adults in Kuwait. However, it relies on a single country's data. Future work can examine whether results generalise to other countries and religions in the Middle East, as well as investigating whether and to what extent self-reported non-religious individuals can be still affected by religious values. In addition, variations of the manipulation check employed in this study should be considered to minimise the reduction of respondents in the control group. Whereas we embedded this informational intervention in a survey, future work can estimate how such interventions can play out in field settings and actual campaigns. To this extent, it can also examine whether there are any effects on actual climate behaviours, rather than policy support. Finally, within the WEN nexus and eco-Islamic values framework, it might be worth exploring how Islamic values may be influenced by Western secular values, for instance due to social media, distinguishing between idealisms and reality in self-reported information about religion and values.

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<sup>37</sup> Abdelzaher, Kotb and Helfaya, 'Eco-Islam'.

<sup>38</sup> Emilio Chuvieco, 'Religious Approaches to Water Management and Environmental Conservation', *Water Policy* 14 (2012), pp. 9–20.



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