# Can Religion and Science Play a Complementary Role in Raising Environmental Awareness?*

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**Abstract**

This paper examines whether religion and science, which are often seen as opposing perspectives, can act as complementary forces in influencing environmental beliefs and attitudes. We explore this question through an online experiment in Jakarta—the world's fastest-sinking city—where we randomize exposure to video messages containing different narrative framing (religious vs. scientific) and presenter identity (Imam vs. scientist portrayed by the same actor). Several patterns emerge. First, compared to a placebo, all treatment messages increase respondents' beliefs about land subsidence, willingness to adopt mitigation behaviors, and confidence in their ability to address the problem. Second, the scientist portrayal, which is perceived as more persuasive and trustworthy, generates stronger effects when combined with a religious narrative, highlighting the complementary role between scientific credibility and religious values. Third, effects on beliefs are larger among those with low prior knowledge and high institutional trust, but heterogeneous effects on mitigation behaviors are limited. These findings suggest that perceived scientific credibility combined with religious narratives can effectively influence environmental beliefs in a predominantly Muslim context.

**Keywords:** land subsidence, environmental awareness, religion, science, Indonesia
**JEL Classification:** Q54, Q58, Z12

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# 1 Introduction

Despite overwhelming scientific evidence on climate change (IPCC, 2023), why does public opinion remain sharply divided? While ideological differences (Dunlap et al., 2016; Egan and Mullin, 2017; Djourelova et al., 2023) and widespread misinformation (McLennan, 2024) have been well documented as key drivers of polarization, the tension between religious and scientific perspectives remains underexplored (Jenkins et al., 2018). This dynamic is especially relevant in developing countries where limited resources, competing policy priorities, and complex cultural contexts further complicate efforts to build public support for climate action.

Low-cost, targeted information campaigns offer a promising policy tool.[1] Leveraging both religious and scientific perspectives in these campaigns could help shift beliefs and shape environmental attitudes. Religious teachings, particularly in Islam, often emphasize pro-sustainability values (Dien, 2000; Kula, 2001), which have the potential to resonate with local cultural values in developing countries (Bénabou and Tirole, 2016; Bassi and Rasul, 2017; Nunn, 2019; Buccione, 2023). Similarly, exposure to scientific narratives has also proven effective in increasing public support for climate action (e.g., Bruine de Bruin and Bostrom, 2013; Motta, 2018). Although religious and scientific messaging have potential for broad appeal, their relative effectiveness and interaction remain empirically untested within the same setting.

In this paper, we address this gap by focusing on the interplay between messenger identity and message content from both scientific and religious perspectives, and exploring how this interaction influences the effectiveness of environmental messages. While understanding these dynamics is crucial for designing more effective communication strategies (Haaland et al., 2023), isolating their effects is challenging. Messengers may intentionally tailor their content to align with audience beliefs, while audiences may adopt the stances of their thought leaders regardless of content, as suggested by motivated cognition theory (Bénabou and Tirole, 2016).[2] To overcome

[1] Previous work has shown that endorsements from influential figures can increase vaccination rates (Banerjee et al., 2020; Alatas et al., 2024), while informational interventions (Jessoe and Rapson, 2014), social comparisons (Allcott, 2011; Allcott and Rogers, 2014), moral suasion messages (Ito et al., 2018), and behavioral nudges (Brandon et al., 2019) can effectively promote energy conservation.

[2] Wang et al. (2023) provide evidence of motivated cognition among Chinese Muslim students during Ramadan, demonstrating how respected religious leaders' guidance influences students' fasting decisions during critical college

these challenges, we isolate the effect of perceived identity from individual characteristics by varying the scientific or religious identity of an otherwise unknown messenger: a trained actor who portrays both the role of an Imam (Muslim religious leader) and a scientist. This cost-effective and potentially replicable approach allows us to investigate the relative influence of messenger identity versus narrative style, and whether aligning these factors can amplify their impact.[3]

In collaboration with Qualtrics, we conducted an online experiment with 2,827 participants in the Jakarta metropolitan area between July and August 2023. We focus on a global pressing climate change issue that is especially pertinent to Jakarta: the gradual sinking of the Earth's surface or land subsidence, primarily driven by human actions such as excessive groundwater extraction (Famiglietti, 2014; McDonald et al., 2014).[4] Our hired actor delivered an environmental video message in either a religious or scientific narrative style while portraying an Imam or a scientist, creating a $2\times2$ study design.[5] Thus, our intervention comprises of four treated groups along with a control group, which watched a placebo video about the history of Jakarta.[6]

Jakarta provides an ideal setting for this study for several reasons. As the world's fastest-sinking city, it faces existential threats that directly affect its 31 million residents and US$ 200 billion economy.[7] Despite evidence that reducing groundwater extraction could mitigate further subsidence (Herrera-García et al., 2021), public awareness remains low (Takagi et al., 2021). For instance, as measured at baseline, in our sample only 47% of participants reported substantial knowledge about land subsidence, with just 16% claiming to be extremely knowledgeable. Furthermore, only 34.6% identified groundwater extraction as a key contributor to the problem.[8]

We report three main findings. First, we establish that our treatments increase beliefs in both Jakarta's submergence risk by 7.5-13.5 pp (9.5-17.2 % relative to the control mean) and its

entrance exams.

[3]Our work builds on recent evidence that both messenger identity and its interaction with content significantly shape audience responses (Afrouzi et al., 2024; Alsan and Eichmeyer, 2024).

[4]Land subsidence affects 22% of major cities worldwide, putting over 600 million people in flood-prone areas at risk by 2040 (Herrera-García et al., 2021).

[5]Indonesia is a predominantly Muslim country and more than 80% of Jakarta residents and 67% in our sample are Muslims.

[6]Similar to Dechezleprêtre et al. (2025), we use informational videos in online surveys, though our focus is on immediate environmental impacts rather than broader climate policies.

[7]See https://www.bbc.com/news/world-asia-44636934.

[8]Appendix Figure A.1 illustrates this knowledge gap.

link to groundwater extraction by 8.0 to 11.6 pp (12-17.5 %). Second, we observe an increase in respondents' confidence in their ability to address the subsidence issues (3.5-5.1 pp or 5.8-8.5 %). Importantly, these effects appear to translate to greater willingness to adopt mitigating actions by 0.12-0.20 SD; however, they do not lead to increased support for policies addressing the issue. Third, and most importantly, while Imams are widely trusted for environmental information in Indonesia (UIN, 2024), our study reveals that the scientist delivering a religious narrative produces the largest and most consistent positive effects on beliefs. For instance, when the scientist delivers the religious narrative, it has an additional 5.6 pp (7.1 %) effectiveness in raising environmental awareness, relative to the Imam. This approach is also effective in promoting water conservation (7.2 pp or 13.3 %) and sharing information about the harmful impacts of groundwater extraction (5.2 pp or 7.2 %). Together, these findings highlight complementary role of scientific credibility and religious values, suggesting that combining scientific authority with culturally resonant messaging can make environmental communication more persuasive to diverse audiences. Indeed, our participants rate the scientist portrayal as more convincing than the Imam across both narrative styles.

Heterogeneity analysis reveals that the perceived scientific expertise of the information source has a stronger influence on beliefs for certain subgroups, namely individuals with limited prior knowledge about subsidence, those with higher trust in authorities, and those who rely on bottled water for drinking. Most importantly, the above additional effectiveness of the scientist delivering the religiously motivated environmental message, is primarily driven by individuals with low pre-existing knowledge of the land subsidence issue who report an 8 pp (10 %) higher effect. However, the analysis reveals more limited heterogeneous impacts on willingness to take mitigating action, highlighting a potential disconnect between increased awareness and self-reported behavior change.

Overall, our results suggest that manipulating perceived credibility of the information source and narrative framing in a low-cost information campaign can effectively influence environmental beliefs and attitudes. We contribute to the literature on information experiments (see Haaland et al. (2023) for a review), especially on the role of messenger identity in shaping beliefs and behaviors.

We provide the first evidence on how perceived credibility—scientific versus religious—of the messenger interacts with the corresponding message narrative to influence environmental beliefs and attitudes in a real-life and high-stake setting. While previous studies have investigated the effects of celebrities (Alatas et al., 2024), expert credentials (Banerjee et al., 2020; Korlyakova, 2021; Wang et al., 2023; Sievert, 2024), and political leadership (Ajzenman et al., 2023) on various behaviors, we know relatively little about how different forms of perceived expertise of the messenger and their interactions with narratives shape message effectiveness. Some exceptions include Alsan and Eichmeyer (2024) who study demographic concordance on vaccine decisions, and Afrouzi et al. (2024), who study the interaction between presidential identity and message content in shaping immigration beliefs. Our study differs from these works by using the *same* actor to portray both religious leader and scientist roles, allowing us to isolate the causal effect of perceived credibility from individual characteristics like charisma.

This study also complements the growing body of research on climate policy framing (e.g., Drews and van den Bergh, 2016; Dechezleprêtre et al., 2025), religious messaging for nature conservation (Buccione, 2023), and the role of information provision in shaping environmental beliefs, norms, and behaviors (Andre et al., 2024; Fairweather et al., 2024; Metcalfe and Roth, 2025). Finally, we contribute to the growing literature on the role of religion in driving behavioral change (Bénabou and Tirole, 2016; Bassi and Rasul, 2017; Bursztyn et al., 2019; Buccione, 2023) by examining how religious narratives can be effectively incorporated into environmental communication. Our finding that a scientist delivering religious narrative is particularly effective at encouraging information sharing highlights potential complementarities between scientific expertise and cultural resonance. These insights are especially relevant for developing countries where religious institutions play significant roles in shaping public opinion.

# 2 Background

## 2.1 Land Subsidence in Jakarta

Jakarta faces a major existential threat as the world's fastest-sinking city, with areas projected to sink by 5 meters by 2050, exacerbated by 25 cm of sea level rise (Kulp and Strauss, 2019). This subsidence primarily stems from groundwater over-extraction, the city's main water source (Asian Development Bank, 2016; Saputra et al., 2017; Bagheri-Gavkosh et al., 2021). Figure A.2 shows the rate of land subsidence across Jakarta, indicating that northern areas are most vulnerable to its impacts. While the government has implemented various mitigation measures—including reduced water subscription fees and restricted groundwater extraction for large buildings—these efforts have shown limited success, with groundwater extraction remaining prevalent.

## 2.2 Religion and Science Landscape in Indonesia

**Islam and the environment.** Indonesia's environmental communication landscape is shaped by two key institutional forces: religious authority and scientific expertise. As a predominantly Muslim country (87% of the population), religious institutions significantly influence environmental attitudes and behaviors (Sumaktoyo, 2021). Islamic organizations actively engage in environmental protection through various initiatives, drawing on religious teachings that emphasize environmental stewardship. For instance, the Indonesian Council of Ulama (MUI) has declared environmental protection a religious duty, while major organizations like Muhammadiyah promote interfaith environmental programs.[9]

These environmental initiatives draw from Islamic scriptures—the Quran and Hadith—which emphasize environmental stewardship. The Quran contains numerous verses on this topic, including one fundamental principle: "and eat and drink, but be not excessive. Indeed, He likes not those who commit excess" (Quran, 7:31). Water conservation has also garnered particular attention in Islamic scriptures, with the Prophet prohibiting against extravagance in usage "even if you were

[9]Globally, religious authorities have increasingly engaged with climate change, as demonstrated by the 2015 Islamic Declaration on Climate Change and Pope Francis releasing encyclical Laudato Si, highlighting the moral significance of climate change in Catholic teaching (Jenkins et al., 2018).

on the banks of a flowing river" (Sunan Ibn Majah, 425). Similarly, the importance of planting trees is also emphasized: "If a Muslim plants a tree...and then a bird, or a person, or an animal eats from it, it is regarded as a charitable gift for him [in perpetuity]" (Sahih Bukhari, Vol 3, Book 39, No. 513). Numerous other jurisprudential rulings have established environmental protection as a religious duty for Muslims.

**Religious and scientific authority.** Despite abundant scientific evidence on climate change, many Indonesians remain skeptical, with only 36% viewing climate change as urgent and 18% denying human-caused global warming (Bland et al., 2022).[10] While trust in scientific evidence appears low, Indonesians maintain high trust in scientific experts. For instance, healthcare workers rank as the most trusted sources for COVID-19 vaccination information (SMRC, 2021), and the public places strong confidence in scientists overall (Cologna et al., 2025). However, despite their general trust in scientists, adult Muslims place even greater confidence in Islamic religious leaders when seeking information about environmental issues, ranking them above both environmental activists and scientists (UIN, 2024).

This unique institutional context, where both religious and scientific authorities command significant public trust but face distinct challenges in promoting environmental action, provides an ideal setting for examining how messenger identity and narrative framing can be optimally combined to enhance environmental communication effectiveness.

# 3 Research Design

## 3.1 Sampling Frame and Survey Data

Our target population comprises residents of Jakarta and its surrounding areas—Bogor, Depok, Tangerang, and Bekasi (Bodetabek).[11] We focus on this metropolitan area due to both immediate

[10]This scepticism extends to other controversial issues, such as COVID-19, with 80% of adults in West Java expressing vaccine hesitancy (KIC, 2021).

[11]Approximately 1.25 million people from Bodetabek commute to Jakarta daily, accounting for around 11% of Jakarta's population (Statistics Indonesia, 2019), highlighting the economic interdependence.

and indirect impacts of land subsidence. Our intervention was conducted between July and August 2023 with 2,827 adults (aged 18+) in the Jakarta metropolitan area through Qualtrics. To ensure data quality, we excluded participants who provided straight-line answers, exhibited speedy or inconsistent response patterns, and reported technical difficulties or other reasons in watching the video. Our stratified sampling approach ensures that the sample represents Indonesian population demographics for gender and age, while capturing diversity in education, income, and religious backgrounds.

The survey modules collect information on socio-economic characteristics (e.g., age, income, employment status), neighborhood types (density), climate change risk perception, main water sources (drinking and non-drinking), and groundwater usage. The measurement of our main outcomes is detailed in the following subsection.

## 3.2 Outcomes

We specified the outcomes measured in the survey in a pre-analysis plan. Each question used to construct our outcomes is asked after treatment is delivered. We constructed standardized indices (mean of zero, standard deviation of one among control group) for outcome variables comprising multiple related items following Anderson (2008). Complete variable definitions appear in Table C.1.

**Beliefs.** To assess treatment effectiveness in shifting beliefs about land subsidence and its cause (groundwater extraction), we measure participants' beliefs through two key questions: "*In your opinion, do you believe that land subsidence would result in completely submerging Jakarta?*" and "*To what extent do you think groundwater well extraction drives land subsidence in Jakarta?*"

**Environmental Perception.** Given the contentious nature of environmental issues in Indonesia, we assess individuals' perceptions about environmental threats through several measures: beliefs about divine intervention in natural disasters and Jakarta's predicted submergence, trust in scientific explanations of environmental events, and confidence in subsidence crisis prevention

efforts.

**Actions.** We examine whether shift in beliefs translates into behavioral change through five Likert-scale questions assessing participants' likelihood to reduce water consumption, spread information about the harmful impacts of groundwater extraction, vote for politicians who prioritize subsidence issues, install PDAM (municipal piped water), and relocate to neighborhoods with PDAM access.

**Trust.** Given the importance of public trust in addressing environmental issues, we evaluate participants' confidence in various stakeholders' ability to address land subsidence including individuals (self and others), businesses, government institutions, religious leaders/groups, and scientists.

**Policy support.** We collect data on individual willingness to adopt mitigating behaviors and support for real and hypothetical policy scenarios to mitigate land subsidence impact, some of which were taken from Asian Development Bank (2016). We propose ten policies, including removing the Indonesian capital city status away from Jakarta and imposing restrictions on groundwater use and new wells restriction toward large businesses.

## 3.3 Treatments

A novel feature of this study is to employ the same trained actor to portray the role of both an Imam and a scientist. By using this approach, we maintain consistency in the actor's subconscious body language across all treatments, regardless of their role or the narrative style. We manipulate the perceived identity by altering his appearance and greeting. When portraying an Imam, he wears a white shirt, a short rounded skullcap and a scarf, using common Islamic greetings. In the scientist role, he wears a casual shirt and glasses, using a secular greeting, free from any religious attributes. Figure A.3 summarizes the study design. To minimize potential biases, we omitted any references or affiliations from the video.[12] The actor delivers a scripted message, which was

[12]All videos can be found at https://bit.ly/scireligexperiment.

written in collaboration with a professional copywriter to ensure clarity and effectiveness.[13]

Participants in each treatment group were exposed to a 3.5-minute video message consisting of a 2.5-minute environmental message followed by a 1-minute narrative. The control group was exposed to a placebo video message of similar duration about the history of Jakarta, narrated by the same actor.

**Environmental message.** To effectively illustrate the scale of the problem, the environmental message combines facts with clear visuals on the primary cause (e.g., groundwater extraction) and the consequences of groundwater extraction in Jakarta (e.g., flooding and significant sinking ground). This approach addresses gaps in knowledge and misconceptions, aligning with guidelines on effective science communication (Bruine de Bruin and Bostrom, 2013).

**Narratives.** The religious narrative uses Islamic principles and scripture to emphasize the religious obligation to protect the Earth and Jakarta from man-made destruction, promoting environmental awareness and collaboration between Muslims and the government. The scientific narrative uses findings from academic research to convince participants about Jakarta's critical vulnerability to land subsidence.

# 4 Data and Empirical Strategy

## 4.1 Descriptive Statistics and Balance Tests

Appendix Table A.1 presents summary statistics and balance tests. The sample is slightly skewed towards females, with most participants identifying as Muslim. More than 50% of participants have either attended or graduated from university. Although about 80% have access to piped water, less than 20% use it for drinking. Balance tests across treatment groups indicate successful randomization, with joint significance tests showing that only 2 of 36 tests are significant at the 10% level and 3 at the 5% level. Appendix Table A.2 shows that standardized differences for

[13]The scripts for each message and narrative are shown in the Appendix B.

each covariate across groups do not exceed the 0.25 SD cutoff (Imbens and Rubin, 2015), further confirming successful randomization.

## 4.2 Empirical Strategy

To test the impacts of exposure to different environmental video messages, each with a different presenter and narrative, we estimate the following regression specification:

$$y_i = \beta_0 + \beta_1 \text{Imam}_i \times \text{Religious}_i + \beta_2 \text{Imam}_i \times \text{Scientific}_i + \beta_3 \text{Scientist}_i \times \text{Religious}_i + \beta_4 \text{Scientist}_i \times \text{Scientific}_i + \mathbf{X}_i'\gamma + \varepsilon_i \quad (1)$$

where $y_i$ is the outcome of participant $i$, $\text{Imam}_i$ and $\text{Scientist}_i$ are indicators for whether a participant was exposed to a video message presented by an Imam or a scientist. $\text{Religious}_i$ and $\text{Scientific}_i$ are indicators for whether a participant was exposed to a video message with embedded religious or scientific narratives. $X_i$ is a vector of socio-economic control variables shown in Table A.1. We do not cluster standard errors, $\varepsilon_i$, because randomization is at the individual level (Abadie et al., 2023).

Each coefficient of interest, $\beta_1$, $\beta_2$, $\beta_3$, and $\beta_4$ compares a treatment arm to the control group—participants exposed to a placebo video—representing average treatment effects of exposure to an environment-related informational video with a particular combination of message and messenger. $\beta_1$ and $\beta_2$ capture the effects of an Imam presenting environmental messages embedded with a religious and a scientific narrative, respectively. Similarly, $\beta_3$ and $\beta_4$ measure the impacts of a scientist delivering environmental messages with a religious and a scientific narrative, respectively.

We anticipate that exposure to a video message about environmental issues would enhance participants' understanding and awareness, influence their beliefs, and increase their engagement and support for policies aimed at addressing such issues. This expectation is based on two factors: (i) the video clearly outlines the causes and consequences of the environmental issues; and (ii) our respondents demonstrated relatively low baseline familiarity with the issue, with only 47 %

reported being familiar with it.[14]

While the above will identify the effect of the intervention in each arm, one of the main aims of this study is to go beyond this and study the interplay between religious and scientific narratives across messenger identity.

**Effectiveness of presenter identity.** To examine the importance of the presenter's identity, we compare their impact when delivering different narratives. The differential impact of the presenter identity (Imam vs. scientist) when presenting *a religious narrative*, *Religious* $\times$ (*Imam - Scientist*), is captured by $(\beta_1 - \beta_3)$. Similarly, the effect of the presenter identity when presenting *a scientific narrative*, *Scientific* $\times$ (*Imam - Scientist*), is captured by $(\beta_2 - \beta_4)$.

**Effectiveness of narrative.** To examine the importance of the narrative, we compare its impact when delivered by different presenters. The differential impact of a narrative when presented by *an Imam*, *Imam* $\times$ (*Religious - Scientific*), is captured by $(\beta_1 - \beta_2)$, while *Scientist* $\times$ (*Religious - Scientific*), given by $(\beta_3 - \beta_4)$, captures the differential impact when presented by *a scientist.*

# 5 Results

## 5.1 Effects on Beliefs

Table 1 shows that even though around 79% of participants in the control group were aware of Jakarta's submergence risk, all treatment arms manage to further increase awareness of this phenomenon and its link to groundwater extraction.

Column 1 in Panel A shows significant positive impacts on the belief that Jakarta will ultimately be submerged, but the effect varies substantially by messenger identity. The effects are particularly large when the message—either scientific or religious narrative—is delivered by the scientist. Treatment 3 (*Scientist* $\times$ *Scientific*) and Treatment 4 (*Scientist* $\times$ *Religion*) have the largest effects—12.2 percentage points (pp) or 15.5 % relative to the control mean and 13.5 pp or 17.2 % relative to

[14]About 31 % and 16 % answered "Knowledgeable" and "Extremely knowledgeable".

the control mean, respectively—nearly twice as large as the effects of the message presented by the Imam (Treatments 1 and 2). In Panel B, we report the difference in the relevant coefficients of interest: the religious narrative is 5.6 pp points more effective when delivered by the scientist, while the scientific one is 4.7 pp more effective.

While groundwater extraction is the primary driver of land subsidence, only 66% of the control group was aware of it. Column 2 reports substantial effects on increasing awareness in this domain, with increases ranging from 8.0 to 11.6 pp, or 12-17.5% relative to the control mean. In Panel B, we again document that the scientist successfully increases beliefs about the role of groundwater extraction by 3.2 pp relative to the Imam, while delivering a religious message. We uncover no statistically significant differences for other comparisons.

The scientist's influence on beliefs about land subsidence and its link to groundwater extraction can be better explained by examining participants' perception of environmental threats. Table A.3 shows that only 28% of the control group attributes environmental degradation to divine intervention, while over 80% accept scientific explanations. None of our treatment arms significantly alter these perceptions, suggesting that these are not malleable. Thus, the scientist effectively influences beliefs by leveraging participants' trust in science rather than changing their general attitudes toward scientific evidence. Overall, these findings highlight the potential to leverage the interplay between religion and science to raise environmental awareness in a society characterized by both strong religiosity and high confidence in scientific authority.

## 5.2 Effects on Environmental Mitigation Attitudes

To induce behavioral changes and policy responses, it is essential to first ensure that individuals are aware of the existence of environmental degradation and how human actions contribute to it. Having established that our intervention successfully increases awareness regarding the land subsidence threat facing Jakarta, we next explore three outcomes in the domains of trust, action, and policy support that may help in managing this issue.

**Trust.** We first examine whether treatments affect participants' trust in various stakeholders in addressing the land subsidence issue in Jakarta. Column 1 of Table 2 reports that the treatments increase trust (index) by 0.09 to 0.15 SD across specifications. This result is most pronounced when an Imam delivers a religious narrative (0.151 SD, $p < 0.01$), although it does not differ significantly from other treatments.

We further analyze the trust index by disaggregating it into its components. In column 2, we establish that the trust of treated participants in Imams to help effectively address the issue increases by around 4 pp (around 7% relative to the control mean) when the messenger himself is an Imam, regardless of message content. However, we estimate null effects for the scientist arms. On the other hand, all treatment arms increase trust in scientists to help address this environmental issue by 3-4 pp (around 5% of the control mean). Thus, religious leaders can play an important role in fostering broad-based trust across the religion-science domains. In contrast, scientists' expertise tends to enhance credibility primarily within their own domain. This highlights the strategic value of engaging religious authorities to facilitate public divides and effective policy implementation in multi-stakeholder contexts.

Columns 4 to 7 document effects on trust for entities beyond Imams and scientists. Column 4 shows that all treatment arms increase trust in participants' own ability to address land subsidence issue by 3.5-5.1 pp (5.8-8.5 %), which aligns with the effects on beliefs presented in Table 1. However, there are no differential impacts either across messenger identity or narrative. For columns 5 to 7, we document mostly null effects for impacting trust in others, businesses, and the government, in dealing with the land subsidence issue. This is not surprising since the intervention was agnostic in highlighting the roles these entities can play for mitigation efforts.

**Action.** Having demonstrated that our intervention boosts individuals' confidence in their ability to contribute to mitigation efforts, we examine whether this leads to the adoption of specific mitigation actions in Table 3. Column 1 indicates that action index increases by 0.123 to 0.201 SD across treatments (all $p < 0.05$, $q$-values $< 0.1$), with the largest point estimates observed when a scientist delivers a religious narrative (0.201 SD). While the differential impacts across treatment

again do not differ statistically from zero, this is at least in part, driven by statistical noise. For instance, Panel B, column 1 reports a high point estimate of 0.078 SD for a scientist delivering a religious narrative relative to an Imam albeit with a high standard error as well.

In columns 2 and 3, we show that the above is driven by stronger intentions to reduce water consumption and spreading awareness about harmful impacts of groundwater extraction on land subsidence. We find that a scientist delivering religious narrative appears particularly effective in promoting water conservation (7.2 pp or 13% relative to control mean) and encouraging information sharing about groundwater impacts (5 pp or 7%). Interestingly, the impact on information sharing exceeds both the impact of the same religious narrative when delivered by the Imam and that of scientific narrative delivered by the scientist (Column 3, Panel B). Given the particular salience of water conservation in Islam, as highlighted in section 2.2, appropriate coupling of religious and scientific domains, can effectively bridge practical and technical solutions with local values, making environmental messages more persuasive.

Similarly, columns 4 and 5 show that participants are willing to connect to municipal water system (PDAM) or relocate to areas with PDAM, i.e., those that avoid groundwater extraction. However, there is no a priori expectation for these outcomes to exhibit complementarities between messenger identity and content, and Panel B documents precisely that pattern.

**Policy support** In Table A.4, we also explore whether our intervention helps influence support for some potential policy initiatives. While we uncover some positive impacts for imposing taxes on groundwater use, these results are not robust to the multiple hypothesis adjustment (sharpened $q$ value > 0.1). We find similar null effects for other policy options that we explore. This is perhaps not surprising given that our video message primarily focuses on problem awareness rather than specific policy solutions. This finding aligns with Dechezleprêtre et al. (2025) who find significant impacts of video messages only when the message explains how climate policies work and its distributional implications.

**Summary.** Our analysis reveals four patterns in the impact of environmental video messaging on attitudes and behaviors. First, all treatments increase beliefs about Jakarta's submergence risk and its connection to groundwater extraction, with scientist-delivered messages with a religious narrative proving to be the most effective. Second, interventions enhance trust in Imams and scientists for addressing land subsidence, with the former only salient when an Imam delivers the message. Third, this increased trust appears to drive greater willingness to take mitigating actions across treatments, particularly when scientists deliver religious narratives, especially regarding water use and information sharing. Finally, despite positive effects on trust and individual actions, interventions show limited impact on policy support.

## 5.3 Effects on Perception

The results suggest that the presenter's perceived expertise in explaining land subsidence issues may be more influential than the alignment between their identity and narrative style. Figure 1 supports this conclusion. Even though the same actor portrayed both roles, the scientist was considered more persuasive than the Imam when delivering both the religious ($p$=0.000) and scientific ($p$=0.025) narratives. This pattern is consistent with participants' high trust in scientists (Table 2). Column 3 shows increased trust in scientists across all treatment arms, whereas column 2 reveals that increased trust in Imams is only observed when participants were exposed to an Imam delivering the message.

On the other hand, the alignment between identity and narrative style appears to be considered slightly more effective for the scientist than the Imam. The scientist is perceived as more convincing when delivering a scientific narrative, although the difference is not statistically significant ($p$=0.800). We find the opposite pattern for the Imam. Due to data limitations, however, we cannot further explore the reasons for these differences.

## 5.4 Social Desirability Bias

One concern in studies measuring stated preferences is whether responses reflect genuine attitudes and behaviors rather than being influenced by participants' desire to please experimenters (Epper et al., 2020; Tannenbaum et al., 2022). Although existing studies indicate that experimenter demand effects have limited implications in anonymous online surveys (de Quidt et al., 2018; Andre et al., 2024), we nevertheless address this concern through two approaches.[15] First, we ensure participant anonymity and explicitly communicate that researchers are unable to uncover individual responses. Second, we use the Marlowe-Crowne scale (Crowne and Marlowe, 1960) to assess social desirability bias on outcomes that are prone to it, such as willingness to adopt mitigating actions, trust, and policy support (Dechezleprêtre et al., 2025). Table A.6 shows that high social desirability score (SDS) has no significant differential impacts on these outcomes, suggesting that social desirability bias has minimal impact on our main findings.

## 5.5 Treatment Effect Heterogeneity

In this subsection, we analyze heterogeneous treatment effects across four pre-specified baseline characteristics to identify which specific subgroups are most responsive to our intervention.[16] We focus on two outcome categories with direct policy implications: beliefs about land subsidence and its connection to groundwater extraction, and willingness to take mitigating actions.

Table 4, Panel A shows that treatment effect on belief about the severity of land subsidence is significantly stronger among participants with low baseline knowledge (below median)—23.3% of participants reported limited knowledge about the issue.[17] This effect is particularly pronounced when the scientist delivers the message, with interaction coefficients of 0.122 and 0.140 for scientific and religious narratives, respectively. Indeed, when the scientist, as opposed to the Imam, delivers the religious narrative message, the treatment effectiveness increases by approximately 8.2 pp

[15] One possible way to verify genuine responses is by providing financial incentives in beliefs elicitation, but the influence of incentives differs across contexts—responses are less biased when survey questions address non-political subjects (Allcott et al., 2020; Roth and Wohlfart, 2020).

[16] For brevity, we omit secondary heterogeneity analyses.

[17] In our survey, 3.4% reported having no knowledge about land subsidence in Jakarta, while 19.90% were slightly knowledgeable.

(=0.140-0.058 or 10.4% relative to the control mean), with a $p$-value of 0.07.

We document similar patterns in heterogeneous effects on the belief that groundwater extraction contributes to land subsidence (Panel B). The treatment effects are concentrated among participants with low prior knowledge, with the largest effect observed when the scientist delivers scientific narrative message. Interestingly, Panel C highlights a divergence in treatment effects on beliefs versus actions based on participants' prior knowledge. While the effects on beliefs about issue severity are more pronounced for those with low prior knowledge, the willingness to take action is higher among those with greater initial understanding of the problem, albeit with only marginal significance. This finding suggests that increasing awareness about the severity of the issue is critical for those with limited prior knowledge, but translating this awareness into action may require a different intervention approach.

We also find positive point estimates for treatment effects among participants with higher trust levels, although these are not statistically significant across treatment arms. However, participants who rely on bottled drinking water (67.9% of our sample) responded more positively to the treatments, with effects ranging from 8.7 to 10.2 pp. This suggests that those less dependent on groundwater are more receptive to the message. Finally, we find only modestly larger effects for Muslim participants (69.4% of our sample), which are not always statistically significant. This highlights that participants' prior knowledge about the issue is a more salient characteristic for treatment efficacy than simple religious alignment between them and the messenger or message content.

# 6 Conclusion

This study experimentally investigates the relative importance of the messenger's identity and narrative style in environmental video messages on shaping environmental attitudes and behaviors in Jakarta, Indonesia—a city grappling with the catastrophic consequences of land subsidence.

We find three main results. First, exposure to an environmental video message, compared to a placebo video, significantly influences environmental beliefs, attitudes, and behaviors. Second,

the *perceived* expertise of the messenger seems to matter more than identity-narrative alignment. Scientist-delivered messages have nearly twice the impact on beliefs compared to those delivered by religious leaders, regardless of the narrative style used. However, the largest impacts arise when a scientist delivers messages embedded with religious narrative.

Third, our analysis documents heterogeneous treatment effects on individuals' beliefs and actions, underscoring the importance of tailoring communication approaches. Individuals with high initial knowledge are less receptive to updating their beliefs when the message comes from a scientist, while trust in authorities and personal circumstances, such as reliance on bottled water, also shape individuals' responsiveness. The presenter's identity is crucial in determining responses from specific religious groups. However, we find limited heterogeneous treatment responses on actions, suggesting that translating awareness into action may require different types of interventions.

Our results offer important policy implications. Environmental video messages offer a low-cost, scalable tool for influencing beliefs and behaviors, which can be applied in different contexts. Social markers of scientific expertise can significantly impact beliefs and attitudes, making this intervention promising for scale-up. The perceived expertise of the presenter is more important than identity-narrative alignment. Policymakers should employ credible scientists andemphasize scientific credibility in their messaging while strategically integrating culturally resonant narratives. By leveraging these insights, policymakers can foster greater understanding and drive positive change at scale, especially in countries with polarized views on environmental issues.

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# Main Tables and Figures

Table 1: Effects on Environmental Awareness and Belief

| | (1) | (2) |
|---|---|---|
| | Belief about land subsidence | Belief about harmful groundwater extraction impact |
| **Panel A** | | |
| Imam × Religious | 0.079*** | 0.080*** |
| | (0.022) | (0.014) |
| | [0.001] | [0.001] |
| Imam × Scientific | 0.075*** | 0.096*** |
| | (0.022) | (0.014) |
| | [0.001] | [0.001] |
| Scientist × Scientific | 0.122*** | 0.116*** |
| | (0.021) | (0.014) |
| | [0.001] | [0.001] |
| Scientist × Religious | 0.135*** | 0.112*** |
| | (0.021) | (0.014) |
| | [0.001] | [0.001] |
| **Panel B** | | |
| Imam × (Religious - Scientific) | 0.004 | −0.016 |
| | (0.020) | (0.013) |
| Religious × (Imam - Scientist) | −0.056*** | −0.032** |
| | (0.018) | (0.013) |
| Scientific × (Imam - Scientist) | −0.047** | −0.020 |
| | (0.019) | (0.013) |
| Scientist × (Religious - Scientific) | 0.013 | −0.004 |
| | (0.017) | (0.013) |
| (Imam - Scientist) × (Religious - Scientific) | −0.009 | −0.012 |
| | (0.027) | (0.019) |
| N | 2,827 | 2,827 |
| $R^2$ | 0.074 | 0.137 |
| Control mean | 0.786 | 0.664 |
| Test of equality ($p$-value) | | |
| Imam × Religious = Imam × Scientific | 0.853 | 0.216 |
| Scientist × Religious = Scientist × Scientific | 0.453 | 0.739 |

Notes: Dependent variables in column 1-2 are indicators for belief on land subsidence and well extraction impact—measured using Likert scale and is normalized to have response between 0 and 1. All regressions include control variables such as age group, female, college education, employed, private sector work, source drinking water (PDAM), installed PDAM, religion, income level, household size, residence and home ownership, and low density neighborhood. Standard errors are robust to heteroskedasticity. Anderson's Sharpened q-value in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Effects on Trust in Capacities to Address Land Subsidence Issue

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | Trust index | Trust Imams | Trust scientists | Trust themselves | Trust others | Trust businesses | Trust government |
| **Panel A** | | | | | | | |
| Imam × Religious | 0.151*** | 0.040** | 0.036** | 0.035** | 0.015 | 0.012 | 0.044** |
| | (0.054) | (0.016) | (0.014) | (0.015) | (0.014) | (0.017) | (0.017) |
| | | [0.034] | [0.040] | [0.040] | [0.251] | [0.353] | [0.031] |
| Imam × Scientific | 0.103* | 0.042*** | 0.036** | 0.025 | 0.013 | −0.011 | 0.024 |
| | (0.055) | (0.016) | (0.014) | (0.015) | (0.014) | (0.017) | (0.017) |
| | | [0.031] | [0.031] | [0.112] | [0.263] | [0.353] | [0.180] |
| Scientist × Scientific | 0.117** | −0.001 | 0.039*** | 0.048*** | 0.015 | −0.007 | 0.028 |
| | (0.055) | (0.016) | (0.014) | (0.015) | (0.014) | (0.017) | (0.018) |
| | | [0.670] | [0.031] | [0.013] | [0.251] | [0.377] | [0.112] |
| Scientist × Religious | 0.097* | 0.007 | 0.035** | 0.051*** | 0.009 | −0.025 | 0.019 |
| | (0.055) | (0.016) | (0.014) | (0.016) | (0.014) | (0.017) | (0.018) |
| | | [0.442] | [0.040] | [0.013] | [0.366] | [0.166] | [0.251] |
| **Panel B** | | | | | | | |
| Imam × (Religious - Scientific) | 0.047 | −0.002 | 0.000 | 0.011 | 0.002 | 0.023 | 0.021 |
| | (0.054) | (0.016) | (0.014) | (0.015) | (0.014) | (0.017) | (0.017) |
| Religious × (Imam - Scientist) | 0.054 | 0.033** | 0.002 | −0.015 | 0.006 | 0.036** | 0.025 |
| | (0.054) | (0.016) | (0.014) | (0.015) | (0.015) | (0.017) | (0.018) |
| Scientific × (Imam - Scientist) | −0.014 | 0.043*** | −0.003 | −0.024 | −0.002 | −0.004 | −0.004 |
| | (0.056) | (0.016) | (0.015) | (0.015) | (0.015) | (0.018) | (0.017) |
| Scientist × (Religious - Scientific) | −0.021 | 0.008 | −0.004 | 0.002 | −0.006 | −0.017 | −0.009 |
| | (0.055) | (0.017) | (0.015) | (0.015) | (0.015) | (0.018) | (0.018) |
| (Imam - Scientist) × (Religious - Scientific) | 0.068 | −0.010 | 0.005 | 0.009 | 0.008 | 0.040 | 0.029 |
| | (0.078) | (0.023) | (0.020) | (0.022) | (0.021) | (0.025) | (0.025) |
| N | 2,827 | 2,827 | 2,827 | 2,827 | 2,827 | 2,827 | 2,827 |
| $R^2$ | 0.175 | 0.123 | 0.165 | 0.163 | 0.088 | 0.077 | 0.078 |
| Control mean | 0.000 | 0.535 | 0.685 | 0.601 | 0.496 | 0.454 | 0.499 |
| Test of equality ($p$-value) | | | | | | | |
| Imam × Religious = Imam × Scientific | 0.383 | 0.887 | 0.978 | 0.478 | 0.905 | 0.178 | 0.228 |
| Scientist × Religious = Scientist × Scientific | 0.707 | 0.644 | 0.772 | 0.883 | 0.674 | 0.328 | 0.631 |

Notes: Dependent variable in Column 1 is an index variable that is standardized with control as the reference group. Columns 2-7 present the components of the index variable in Column 1—measured using a Likert scale and normalized to have responses between 0 and 1. All regressions include control variables such as age group, female, college education, employed, private sector work, source drinking water (PDAM), installed PDAM, religion, income level, household size, residence and home ownership, and low density neighborhood. Standard errors are robust to heteroskedasticity. Anderson's Sharpened q-value in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Effects on Willingness to Adopt Mitigating Actions

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Action index | Water consumption reduction | Spreading info on harmful groundwater extraction impact | Install PDAM | Relocate for access to PDAM | Vote for governor addressing land subsidence |
| **Panel A** | | | | | | |
| Imam × Religious | 0.123** | 0.047*** | 0.011 | 0.018 | 0.032* | 0.010 |
| | (0.055) | (0.017) | (0.014) | (0.015) | (0.019) | (0.015) |
| | | [0.016] | [0.269] | [0.144] | [0.105] | [0.281] |
| Imam × Scientific | 0.155*** | 0.040** | 0.029** | 0.039*** | 0.042** | 0.004 |
| | (0.053) | (0.017) | (0.014) | (0.015) | (0.019) | (0.015) |
| | | [0.031] | [0.053] | [0.015] | [0.024] | [0.387] |
| Scientist × Scientific | 0.167*** | 0.049*** | 0.017 | 0.039** | 0.059*** | 0.002 |
| | (0.056) | (0.017) | (0.015) | (0.016) | (0.019) | (0.016) |
| | | [0.014] | [0.154] | [0.014] | [0.007] | [0.387] |
| Scientist × Religious | 0.201*** | 0.072*** | 0.050*** | 0.038** | 0.034* | 0.009 |
| | (0.054) | (0.018) | (0.015) | (0.015) | (0.019) | (0.015) |
| | | [0.001] | [0.007] | [0.015] | [0.072] | [0.281] |
| **Panel B** | | | | | | |
| Imam × (Religious - Scientific) | −0.032 | 0.007 | −0.018 | −0.021 | −0.010 | 0.006 |
| | (0.054) | (0.017) | (0.014) | (0.014) | (0.019) | (0.015) |
| Religious × (Imam - Scientist) | −0.078 | −0.025 | −0.040*** | −0.020 | −0.003 | 0.001 |
| | (0.054) | (0.017) | (0.014) | (0.015) | (0.019) | (0.015) |
| Scientific × (Imam - Scientist) | −0.012 | −0.009 | 0.012 | 0.000 | −0.017 | 0.002 |
| | (0.055) | (0.017) | (0.015) | (0.015) | (0.019) | (0.016) |
| Scientist × (Religious - Scientific) | 0.034 | 0.022 | 0.033** | −0.001 | −0.024 | 0.006 |
| | (0.056) | (0.017) | (0.015) | (0.015) | (0.019) | (0.015) |
| (Imam - Scientist) × (Religious - Scientific) | −0.066 | −0.016 | −0.051** | −0.020 | 0.014 | −0.000 |
| | (0.077) | (0.024) | (0.021) | (0.021) | (0.027) | (0.021) |
| N | 2,827 | 2,827 | 2,827 | 2,493 | 2,493 | 2,827 |
| $R^2$ | 0.198 | 0.100 | 0.167 | 0.118 | 0.086 | 0.106 |
| Control mean | 0.000 | 0.541 | 0.693 | 0.745 | 0.612 | 0.733 |
| Test of equality ($p$-value) | | | | | | |
| Imam × Religious = Imam × Scientific | 0.555 | 0.697 | 0.206 | 0.145 | 0.585 | 0.689 |
| Scientist × Religious = Scientist × Scientific | 0.539 | 0.193 | 0.029 | 0.959 | 0.196 | 0.686 |

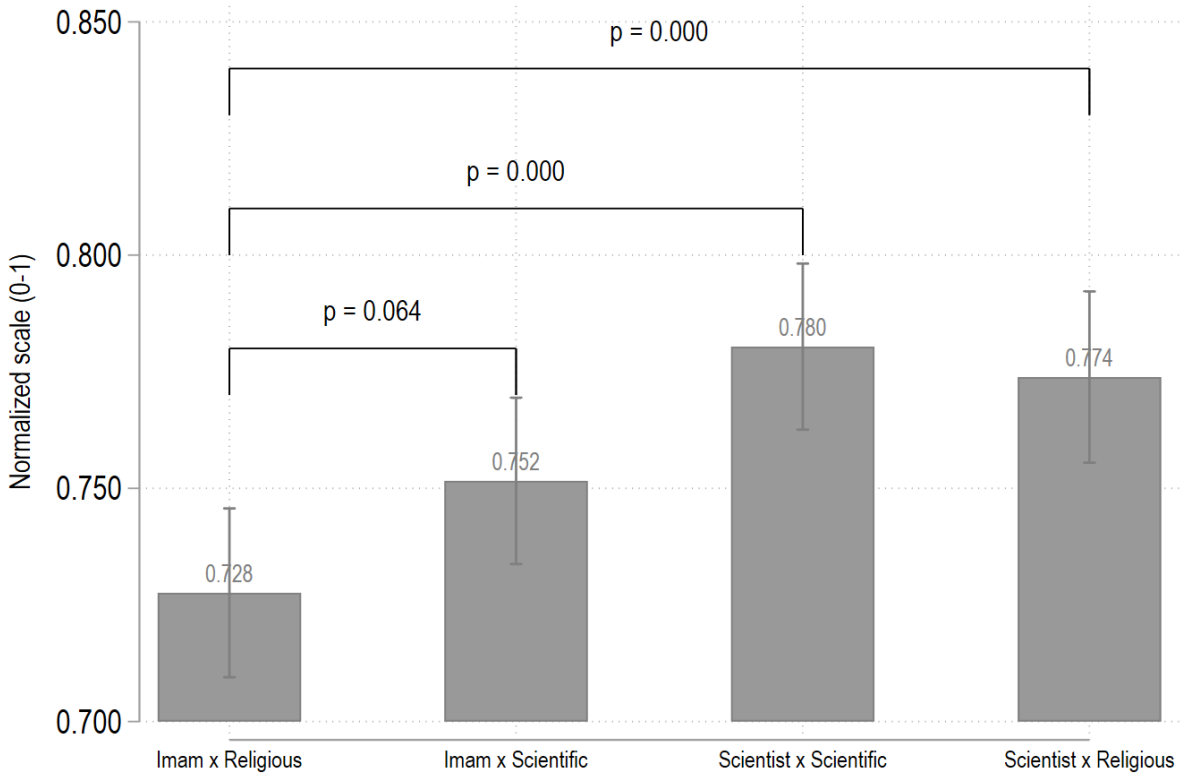
Notes: Dependent variable in Column 1 is an index variable that is standardized with control as the reference group. Columns 2-6 present the components of the index variable in Column 1—measured using a Likert scale and normalized to have responses between 0 and 1. Columns 4 and 5 capture participants who, prior to intervention, met at least one of these criteria: lacked access to PDAM water service, did not use PDAM as their primary drinking water source, or did not use PDAM as their primary water source for non-drinking purposes. All regressions include control variables such as age group, female, college education, employed, private sector work, source drinking water (PDAM), installed PDAM, religion, income level, household size, residence and home ownership, and low density neighborhood. Standard errors are robust to heteroskedasticity. Anderson's Sharpened q-value in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Heterogeneous Treatment Effects on Beliefs and Willingness to Adopt Mitigating Actions

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Baseline [...] | | | |
| | Low knowledge | High trust | Reliance on bottled water | Islam |
| **Panel A: Belief on existence of land subsidence** | | | | |
| Imam × Religious × [...] | 0.058 | 0.054 | 0.036 | 0.092* |
| | (0.058) | (0.044) | (0.043) | (0.048) |
| Imam × Scientific × [...] | 0.098* | 0.069 | 0.087* | 0.073 |
| | (0.057) | (0.044) | (0.045) | (0.048) |
| Scientist × Scientific × [...] | 0.122** | 0.041 | 0.102** | 0.032 |
| | (0.056) | (0.042) | (0.042) | (0.044) |
| Scientist × Religious × [...] | 0.140*** | 0.057 | 0.095** | 0.042 |
| | (0.052) | (0.041) | (0.041) | (0.043) |
| **Panel B: Belief on impact of groundwater extraction** | | | | |
| Imam × Religious × [...] | 0.089** | −0.009 | 0.084*** | 0.029 |
| | (0.035) | (0.027) | (0.030) | (0.030) |
| Imam × Scientific × [...] | 0.093*** | −0.019 | 0.079*** | 0.072** |
| | (0.033) | (0.027) | (0.030) | (0.030) |
| Scientist × Scientific × [...] | 0.148*** | −0.076*** | 0.081*** | 0.064** |
| | (0.035) | (0.027) | (0.029) | (0.029) |
| Scientist × Religious × [...] | 0.077** | −0.030 | 0.104*** | 0.036 |
| | (0.034) | (0.027) | (0.029) | (0.030) |
| **Panel C: Willingness to adopt mitigating actions** | | | | |
| Imam × Religious × [...] | −0.236* | 0.016 | 0.070 | −0.096 |
| | (0.135) | (0.107) | (0.121) | (0.120) |
| Imam × Scientific × [...] | −0.226* | 0.055 | 0.022 | 0.027 |
| | (0.131) | (0.103) | (0.121) | (0.121) |
| Scientist × Scientific × [...] | −0.134 | −0.030 | 0.183 | 0.110 |
| | (0.142) | (0.108) | (0.118) | (0.117) |
| Scientist × Religious × [...] | −0.197 | 0.184* | 0.104 | −0.112 |
| | (0.131) | (0.103) | (0.116) | (0.119) |
| N | 2,827 | 2,827 | 2,827 | 2,827 |

Notes: This table reports heterogeneous effects for participants with low (below median) initial knowledge on land subsidence in Jakarta, high trust (above median) in various stakeholders, indicator for relying on bottled water as the main source for drinking, and indicator for being Muslim. Each panel reports separate sets of regressions with different dependent variable. All regressions include control variables such as age group, female, college education, employed, private sector work, source drinking water (PDAM), installed PDAM, religion, income level, household size, residence and home ownership, and low density neighborhood. Standard errors are robust to heteroskedasticity. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 1: Perceived Persuasiveness Ability of Presenters



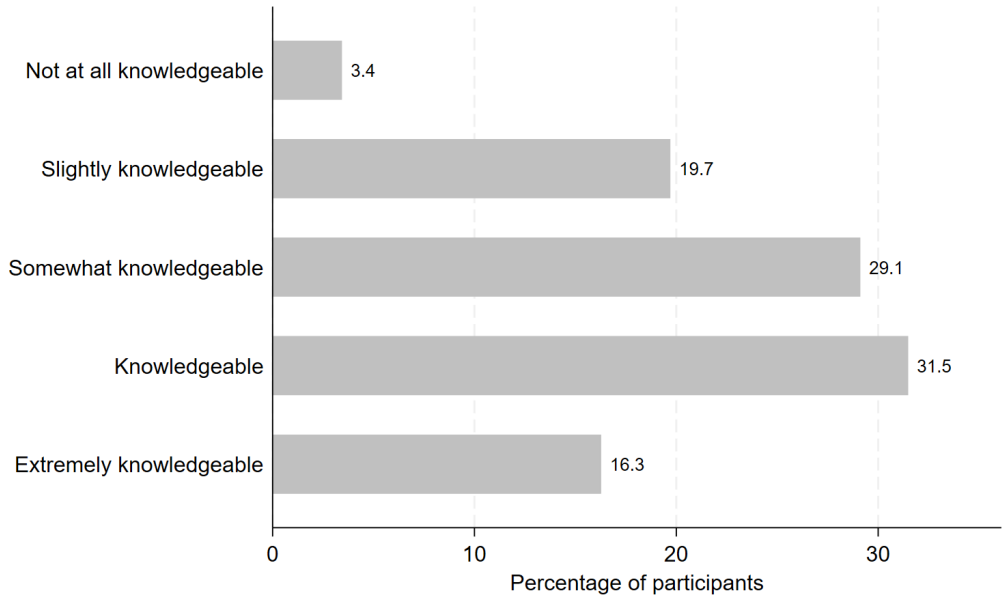

Note: The figure displays the raw mean values and 95% confidence intervals for the persuasiveness ability of presenters delivering an environmental message. The persuasiveness ability is derived from Likert scale responses evaluating how effectively the presenters convey the environmental message and influence opinions on land subsidence. The Likert scale is normalized to have support between 0 and 1. The p-values above the connecting lines indicate statistical significance for mean comparisons between treatment groups: 0.064 for "Imam × Religious" vs. "Imam × Scientific"; 0.000 for "Imam × Religious" vs. "Scientist × Scientific"; 0.000 for "Imam × Religious" vs. "Scientist × Religious"; 0.025 for "Imam × Scientific" vs. "Scientist × Scientific"; 0.087 for "Imam × Scientific" vs. "Scientist × Religious"; and 0.800 for "Scientist × Scientific" vs "Scientist × Religious".

# ONLINE APPENDIX

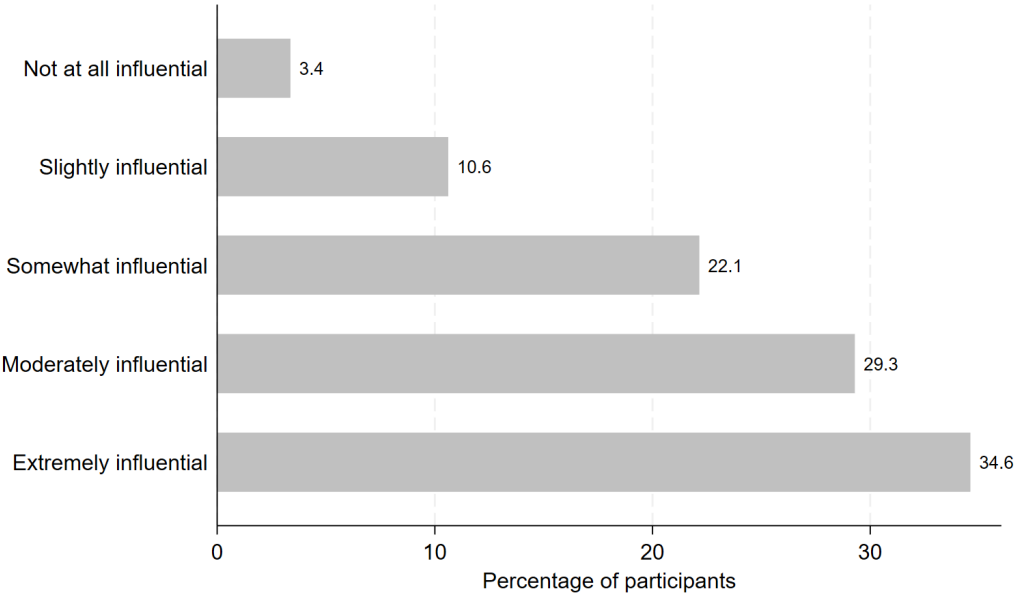
## A Additional Figures and Tables

Figure A.1: Familiarity with Land Subsidence and Groundwater Extraction as Its Main Cause

(a) Land Subsidence Issue in Jakarta

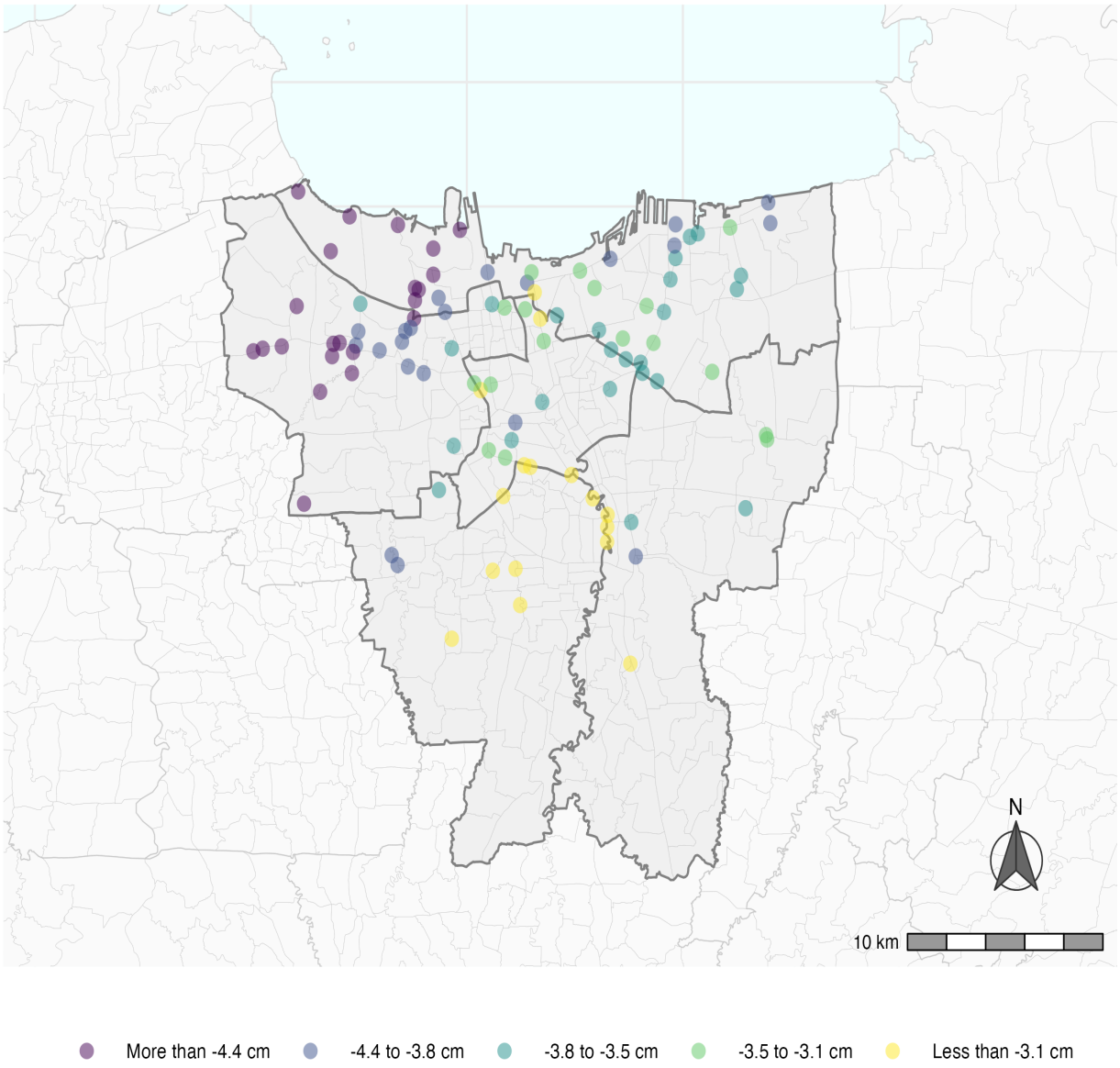



(b) Groundwater Extraction



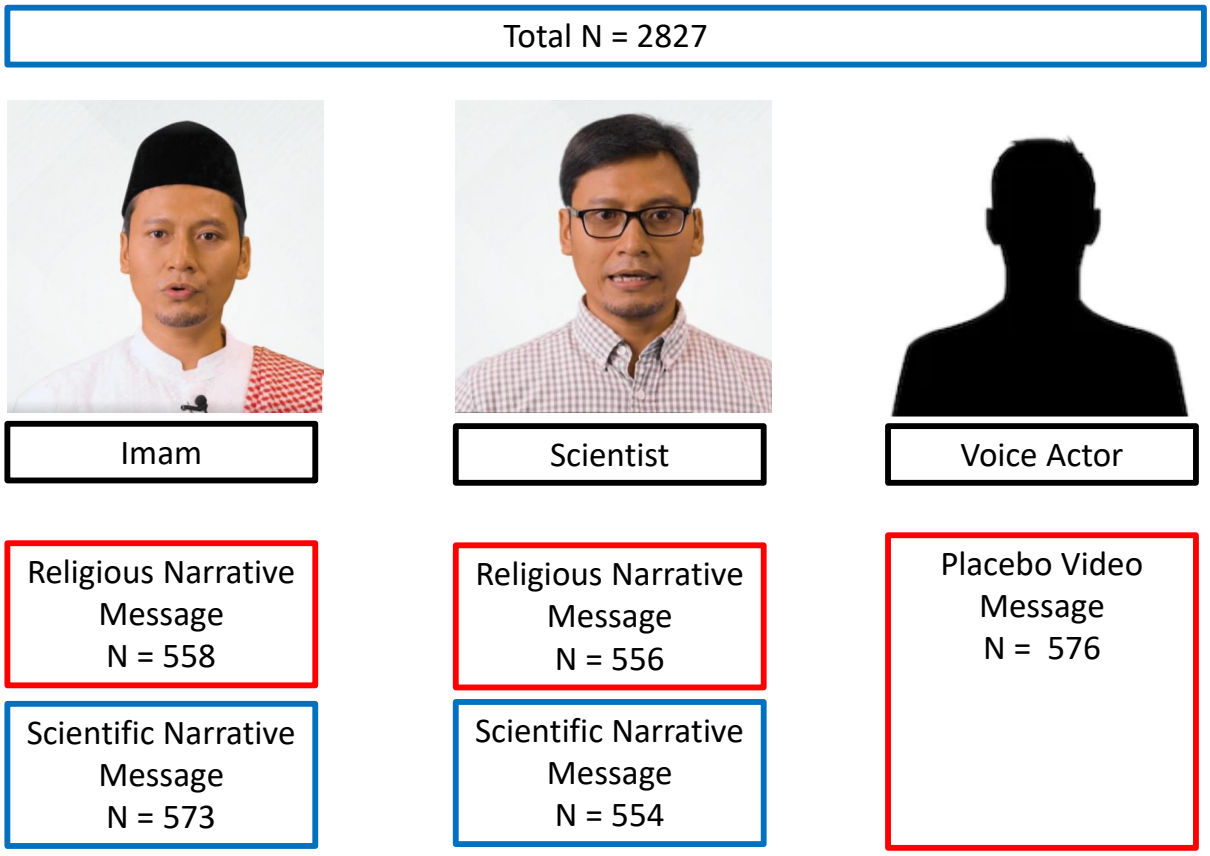

Note: This figure presents survey responses from 2,827 Jakarta residents. Panel (a) shows respondents' self-reported knowledge about land subsidence in Jakarta, ranging from not at all to extremely knowledgeable. Panel (b) illustrates their perception of groundwater extraction's influence on land subsidence over the past decade, ranging from not at all to extremely influential.

Figure A.2: Land subsidence rate in 2022




Note: This figure depicts land subsidence rate in Jakarta in 2022. Source: Authors' analyses derived from Open Data Jakarta.

Figure A.3: Study Design




Note: The figure shows the design of the experiment. Total sample size is 2,827 individuals distributed into five groups: Treatment 1 (Imam × Religious), Treatment 2 (Imam × Scientific), Treatment 3 (Scientist × Scientific), Treatment 4 (Scientist × Religious), and Control. Participants in Treatment 1 watched an environmental message delivered by an Imam using a religious narrative, while those in Treatment 2 watched an Imam presenting the message with a scientific narrative. Participants in Treatment 3 watched a scientist presenting an environmental message using a scientific narrative, while those in Treatment 4 watched a scientist presenting the message with a religious narrative. Participants in the control group watched a video message about history of Jakarta voiced by the same actor.

Table A.1: Summary Statistics and Balance Test

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | | Mean | | | | | |
| | N | C | T1 | T2 | T3 | T4 | $p$-value |
| Aged 18–24 | 2,827 | 0.259 | 0.253 | 0.236 | 0.170 | 0.239 | 0.002 |
| Aged 25–34 | 2,827 | 0.220 | 0.163 | 0.218 | 0.188 | 0.203 | 0.102 |
| Aged 35–44 | 2,827 | 0.177 | 0.240 | 0.230 | 0.200 | 0.210 | 0.357 |
| Aged 45–64 | 2,827 | 0.326 | 0.330 | 0.307 | 0.421 | 0.329 | 0.000 |
| Aged 65+ | 2,827 | 0.017 | 0.014 | 0.009 | 0.022 | 0.019 | 0.236 |
| Female | 2,827 | 0.491 | 0.534 | 0.550 | 0.509 | 0.539 | 0.572 |
| College or more | 2,827 | 0.517 | 0.538 | 0.560 | 0.507 | 0.537 | 0.362 |
| Employed | 2,827 | 0.840 | 0.824 | 0.829 | 0.850 | 0.850 | 0.514 |
| Private sector work | 2,827 | 0.455 | 0.464 | 0.462 | 0.412 | 0.433 | 0.224 |
| Main drinking water: piped water | 2,827 | 0.208 | 0.158 | 0.164 | 0.175 | 0.191 | 0.486 |
| Installed piped water | 2,827 | 0.828 | 0.783 | 0.794 | 0.814 | 0.804 | 0.610 |
| Islam | 2,827 | 0.710 | 0.715 | 0.716 | 0.634 | 0.698 | 0.011 |
| Christian Catholic | 2,827 | 0.073 | 0.066 | 0.068 | 0.079 | 0.076 | 0.807 |
| Christian Protestant | 2,827 | 0.122 | 0.122 | 0.120 | 0.153 | 0.125 | 0.352 |
| Other religion | 2,827 | 0.095 | 0.097 | 0.096 | 0.134 | 0.101 | 0.173 |
| Income: $<$ IDR 5 mil. | 2,827 | 0.238 | 0.222 | 0.192 | 0.197 | 0.191 | 0.537 |
| Income: IDR 5 - 9.99 mil | 2,827 | 0.354 | 0.389 | 0.410 | 0.412 | 0.429 | 0.591 |
| Income: $>$ 10 mil. | 2,827 | 0.408 | 0.389 | 0.398 | 0.392 | 0.380 | 0.939 |
| Own current house | 2,827 | 0.764 | 0.780 | 0.771 | 0.726 | 0.786 | 0.087 |
| HH size: small(1–2) | 2,827 | 0.132 | 0.154 | 0.113 | 0.132 | 0.129 | 0.255 |
| HH size: medium(3–4) | 2,827 | 0.641 | 0.581 | 0.625 | 0.632 | 0.624 | 0.287 |
| HH size: big(5+) | 2,827 | 0.227 | 0.265 | 0.262 | 0.236 | 0.247 | 0.662 |
| Bekasi, regency | 2,827 | 0.033 | 0.057 | 0.051 | 0.045 | 0.042 | 0.678 |
| Bekasi, city | 2,827 | 0.057 | 0.065 | 0.061 | 0.072 | 0.067 | 0.899 |
| Bogor, regency | 2,827 | 0.056 | 0.047 | 0.056 | 0.043 | 0.048 | 0.805 |
| Bogor, city | 2,827 | 0.036 | 0.039 | 0.037 | 0.047 | 0.051 | 0.611 |
| Depok | 2,827 | 0.042 | 0.048 | 0.059 | 0.047 | 0.067 | 0.417 |
| West Jakarta | 2,827 | 0.161 | 0.156 | 0.168 | 0.175 | 0.155 | 0.777 |
| Central Jakarta | 2,827 | 0.196 | 0.165 | 0.157 | 0.168 | 0.155 | 0.931 |
| South Jakarta | 2,827 | 0.116 | 0.133 | 0.134 | 0.137 | 0.136 | 0.996 |
| East Jakarta | 2,827 | 0.134 | 0.138 | 0.131 | 0.137 | 0.127 | 0.942 |
| North Jakarta | 2,827 | 0.075 | 0.066 | 0.063 | 0.058 | 0.042 | 0.261 |
| Tangerang, regency | 2,827 | 0.035 | 0.032 | 0.037 | 0.018 | 0.034 | 0.160 |
| Tangerang, city | 2,827 | 0.035 | 0.025 | 0.030 | 0.029 | 0.030 | 0.953 |
| South Tangerang, city | 2,827 | 0.024 | 0.029 | 0.017 | 0.023 | 0.044 | 0.068 |
| Low density kampung | 2,827 | 0.170 | 0.190 | 0.180 | 0.215 | 0.189 | 0.507 |

Notes: The table reports summary statistics of demographic characteristics. Balance test was conducted by regressing each characteristics on the full set of treatment group indicators. Columns 2 to 6 report mean of baseline covariates—variables constructed from questions asked prior to intervention—of C (Control), T1 (Imam $\times$ Religious), T2 (Imam $\times$ Scientific), T3 (Scientist $\times$ Scientific), and T4 (Scientist $\times$ Religious) groups, respectively. Column 7 reports $p$-values of $F$-tests of joint significance of treatment assignment. Standard errors are robust to heteroskedasticity. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.2: Balance Test: Standardized Mean Difference

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | | Standardized Mean Difference | | | |
| | N | T1 - C | T2 - C | T3 - C | T4 - C |
| Aged 18–24 | 2827 | 0.014 | 0.053 | 0.218 | 0.047 |
| Aged 25–34 | 2827 | 0.146 | 0.006 | 0.081 | 0.042 |
| Aged 35–44 | 2827 | 0.156 | 0.132 | 0.059 | 0.084 |
| Aged 45–64 | 2827 | 0.007 | 0.041 | 0.195 | 0.005 |
| Aged 65+ | 2827 | 0.024 | 0.076 | 0.031 | 0.015 |
| Female | 2827 | 0.085 | 0.117 | 0.035 | 0.095 |
| College or more | 2827 | 0.041 | 0.086 | 0.020 | 0.040 |
| Employed | 2827 | 0.043 | 0.030 | 0.027 | 0.026 |
| Private sector work | 2827 | 0.019 | 0.015 | 0.087 | 0.044 |
| Main drinking water: piped water | 2827 | 0.131 | 0.114 | 0.084 | 0.044 |
| Installed piped water | 2827 | 0.114 | 0.087 | 0.037 | 0.063 |
| Islam | 2827 | 0.011 | 0.012 | 0.163 | 0.027 |
| Christian Catholic | 2827 | 0.026 | 0.019 | 0.025 | 0.012 |
| Christian Protestant | 2827 | 0.001 | 0.003 | 0.093 | 0.012 |
| Other religion | 2827 | 0.004 | 0.002 | 0.120 | 0.018 |
| Income: $<$ IDR 5 mil. | 2827 | 0.037 | 0.112 | 0.100 | 0.115 |
| Income: IDR 5 - 9.99 mil | 2827 | 0.072 | 0.115 | 0.118 | 0.154 |
| Income: $>$ 10 mil. | 2827 | 0.039 | 0.021 | 0.033 | 0.058 |
| HH size: small(1–2) | 2827 | 0.063 | 0.056 | 0.001 | 0.009 |
| HH size: medium(3–4) | 2827 | 0.123 | 0.033 | 0.018 | 0.035 |
| HH size: big(5+) | 2827 | 0.088 | 0.080 | 0.021 | 0.047 |
| Bekasi, regency | 2827 | 0.117 | 0.088 | 0.063 | 0.049 |
| Bekasi, city | 2827 | 0.030 | 0.016 | 0.061 | 0.041 |
| Bogor, regency | 2827 | 0.041 | 0.001 | 0.056 | 0.035 |
| Bogor, city | 2827 | 0.016 | 0.001 | 0.052 | 0.072 |
| Depok | 2827 | 0.032 | 0.081 | 0.026 | 0.112 |
| West Jakarta | 2827 | 0.015 | 0.016 | 0.036 | 0.016 |
| Central Jakarta | 2827 | 0.081 | 0.103 | 0.073 | 0.107 |
| South Jakarta | 2827 | 0.049 | 0.055 | 0.063 | 0.059 |
| East Jakarta | 2827 | 0.013 | 0.008 | 0.010 | 0.019 |
| Own current house | 2827 | 0.037 | 0.018 | 0.088 | 0.053 |
| North Jakarta | 2827 | 0.033 | 0.047 | 0.068 | 0.138 |
| Tangerang, regency | 2827 | 0.014 | 0.010 | 0.104 | 0.006 |
| Tangerang, city | 2827 | 0.057 | 0.029 | 0.033 | 0.026 |
| South Tangerang, city | 2827 | 0.027 | 0.048 | 0.005 | 0.109 |
| Low density kampung | 2827 | 0.052 | 0.025 | 0.113 | 0.049 |

Notes: The table reports standardized difference in mean between each treatment and control group. C (Control), T1 (Imam $\times$ Religion), T2 (Imam $\times$ Science), T3 (Scientist $\times$ Science), and T4 (Scientist $\times$ Religion) groups, respectively. Difference in each covariate between each treatment and control group is considered significant when the magnitude exceeds 0.25 SD (Imbens and Rubin, 2015)

Table A.3: Effects on Perception of Environmental Threats and Solutions

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Perception index | Perception of environmental issues as divine intervention | Perception of scientific explanations for environmental events | Perception of optimism in land subsidence prevention |
| **Panel A** | | | | |
| Imam × Religious | −0.018 | −0.005 | 0.001 | −0.003 |
| | (0.058) | (0.017) | (0.013) | (0.014) |
| | | [1.000] | [1.000] | [1.000] |
| Imam × Scientific | 0.014 | −0.010 | 0.013 | 0.006 |
| | (0.057) | (0.017) | (0.012) | (0.014) |
| | | [1.000] | [1.000] | [1.000] |
| Scientist × Scientific | 0.038 | −0.009 | 0.011 | 0.018 |
| | (0.057) | (0.017) | (0.013) | (0.014) |
| | | [1.000] | [1.000] | [1.000] |
| Scientist × Religious | 0.038 | −0.018 | 0.023* | 0.018 |
| | (0.056) | (0.017) | (0.012) | (0.014) |
| | | [1.000] | [1.000] | [1.000] |
| **Panel B** | | | | |
| Imam × (Religious - Scientific) | −0.032 | 0.005 | −0.012 | −0.009 |
| | (0.056) | (0.017) | (0.012) | (0.014) |
| Religious × (Imam - Scientist) | −0.056 | 0.013 | −0.022* | −0.021 |
| | (0.056) | (0.017) | (0.012) | (0.014) |
| Scientific × (Imam - Scientist) | −0.024 | −0.001 | 0.001 | −0.012 |
| | (0.056) | (0.017) | (0.012) | (0.014) |
| Scientist × (Religious - Scientific) | 0.000 | −0.009 | 0.011 | −0.000 |
| | (0.055) | (0.017) | (0.012) | (0.014) |
| (Imam - Scientist) × (Religious - Scientific) | −0.032 | 0.013 | −0.023 | −0.009 |
| | (0.079) | (0.024) | (0.017) | (0.020) |
| N | 2,827 | 2,827 | 2,827 | 2,827 |
| $R^2$ | 0.069 | 0.116 | 0.200 | 0.149 |
| Control mean | 0.000 | 0.277 | 0.804 | 0.748 |
| Test of equality ($p$-value) | | | | |
| Imam × Religious = Imam × Scientific | 0.570 | 0.789 | 0.327 | 0.535 |
| Scientist × Religious = Scientist × Scientific | 0.994 | 0.599 | 0.351 | 0.998 |

Notes: Dependent variable in Column 1 is an index variable that is standardized with control as the reference group. Columns 2-4 present the components of the index variable in Column 1—measured using a Likert scale and normalized to have responses between 0 and 1. All regressions include control variables such as age group, female, college education, employed, private sector work, source drinking water (PDAM), installed PDAM, religion, income level, household size, residence and home ownership, and low density neighborhood. Standard errors are robust to heteroskedasticity. Anderson's Sharpened q-value in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.4: Effects on Support for Policies to Address Land Subsidence Issue (1)

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Policy support index | Tax ground-water extraction | Restrict households groundwa-ter use | Restrict business groundwa-ter use | Reduce PDAM tariff | Mandate infiltration wells |
| **Panel A** | | | | | | |
| Imam × Religious | 0.058 | 0.041** | 0.019 | 0.013 | 0.006 | −0.023 |
| | (0.054) | (0.017) | (0.015) | (0.014) | (0.014) | (0.015) |
| | | [0.471] | [0.667] | [0.795] | [0.933] | [0.539] |
| Imam × Scientific | 0.068 | 0.034** | 0.036** | 0.012 | 0.017 | −0.008 |
| | (0.052) | (0.017) | (0.014) | (0.014) | (0.014) | (0.014) |
| | | [0.499] | [0.471] | [0.795] | [0.667] | [0.876] |
| Scientist × Scientific | 0.073 | 0.044** | 0.019 | 0.017 | 0.017 | −0.004 |
| | (0.055) | (0.017) | (0.015) | (0.015) | (0.014) | (0.015) |
| | | [0.471] | [0.549] | [0.549] | [0.539] | [1.000] |
| Scientist × Religious | 0.092* | 0.033* | 0.029** | 0.021 | 0.012 | 0.006 |
| | (0.054) | (0.017) | (0.015) | (0.014) | (0.014) | (0.014) |
| | | [0.499] | [0.499] | [0.549] | [0.795] | [0.933] |
| **Panel B** | | | | | | |
| Imam × (Religious - Scientific) | −0.010 | 0.007 | −0.017 | 0.000 | −0.011 | −0.015 |
| | (0.052) | (0.016) | (0.014) | (0.014) | (0.014) | (0.014) |
| Religious × (Imam - Scientist) | −0.034 | 0.008 | −0.010 | −0.008 | −0.006 | −0.029** |
| | (0.054) | (0.017) | (0.015) | (0.014) | (0.014) | (0.014) |
| Scientific × (Imam - Scientist) | −0.005 | −0.010 | 0.017 | −0.004 | −0.000 | −0.004 |
| | (0.053) | (0.017) | (0.015) | (0.014) | (0.014) | (0.014) |
| Scientist × (Religious - Scientific) | 0.019 | −0.011 | 0.010 | 0.004 | −0.005 | 0.010 |
| | (0.055) | (0.017) | (0.015) | (0.014) | (0.014) | (0.014) |
| (Imam - Scientist) × (Religious - Scientific) | −0.029 | 0.018 | −0.027 | −0.003 | −0.006 | −0.025 |
| | (0.075) | (0.024) | (0.021) | (0.020) | (0.019) | (0.020) |
| N | 2,827 | 2,827 | 2,827 | 2,827 | 2,827 | 2,827 |
| $R^2$ | 0.261 | 0.123 | 0.159 | 0.195 | 0.183 | 0.189 |
| Control mean | 0.000 | 0.630 | 0.714 | 0.783 | 0.795 | 0.755 |
| Test of equality ($p$-value) | | | | | | |
| Imam × Religious = Imam × Scientific | 0.852 | 0.662 | 0.228 | 0.979 | 0.424 | 0.291 |
| Scientist × Religious = Scientist × Scientific | 0.723 | 0.530 | 0.513 | 0.791 | 0.737 | 0.462 |

Notes: Dependent variable in Column 1 is an index variable that is standardized with control as the reference group. Columns 2-6 present the components of the index variable in Column 1—measured using a Likert scale and normalized to have responses between 0 and 1. All regressions include control variables such as age group, female, college education, employed, private sector work, source drinking water (PDAM), installed PDAM, religion, income level, household size, residence and home ownership, and low density neighborhood. Standard errors are robust to heteroskedasticity. Anderson's Sharpened q-value in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.5: Effects on Support for Policies to Address Land Subsidence Issue (2)

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Expand PDAM coverage area | Educate community | Subsidize new PDAM installation | Build sea walls and flood controls | No pushing Jakarta econ growth |
| **Panel A** | | | | | |
| Imam × Religious | 0.008 | 0.006 | 0.004 | −0.015 | 0.019 |
| | (0.013) | (0.013) | (0.014) | (0.014) | (0.015) |
| | [0.876] | [0.933] | [1.000] | [0.667] | [0.739] |
| Imam × Scientific | 0.011 | 0.005 | 0.023* | −0.015 | 0.008 |
| | (0.013) | (0.013) | (0.014) | (0.014) | (0.016) |
| | [0.795] | [0.933] | [0.499] | [0.739] | [0.933] |
| Scientist × Scientific | −0.003 | −0.000 | 0.016 | −0.013 | 0.008 |
| | (0.014) | (0.014) | (0.015) | (0.014) | (0.016) |
| | [1.000] | [1.000] | [0.549] | [0.876] | [0.876] |
| Scientist × Religious | 0.007 | 0.026** | 0.023 | −0.008 | 0.017 |
| | (0.013) | (0.013) | (0.014) | (0.014) | (0.016) |
| | [0.876] | [0.499] | [0.539] | [0.876] | [0.770] |
| **Panel B** | | | | | |
| Imam × (Religious - Scientific) | −0.003 | 0.000 | −0.019 | −0.000 | 0.010 |
| | (0.013) | (0.013) | (0.014) | (0.014) | (0.015) |
| Religious × (Imam - Scientist) | 0.001 | −0.020 | −0.019 | −0.007 | 0.002 |
| | (0.013) | (0.013) | (0.014) | (0.014) | (0.015) |
| Scientific × (Imam - Scientist) | 0.014 | 0.006 | 0.007 | −0.002 | 0.001 |
| | (0.013) | (0.014) | (0.014) | (0.014) | (0.016) |
| Scientist × (Religious - Scientific) | 0.010 | 0.026* | 0.007 | 0.005 | 0.010 |
| | (0.014) | (0.014) | (0.014) | (0.015) | (0.016) |
| (Imam - Scientist) × (Religious - Scientific) | −0.013 | −0.026 | −0.026 | −0.006 | 0.001 |
| | (0.019) | (0.019) | (0.020) | (0.020) | (0.022) |
| N | 2,827 | 2,827 | 2,827 | 2,827 | 2,827 |
| $R^2$ | 0.224 | 0.179 | 0.174 | 0.166 | 0.108 |
| Control mean | 0.816 | 0.804 | 0.778 | 0.783 | 0.685 |
| Test of equality ($p$-value) | | | | | |
| Imam × Religious = Imam × Scientific | 0.809 | 0.988 | 0.164 | 0.972 | 0.495 |
| Scientist × Religious = Scientist × Scientific | 0.474 | 0.063 | 0.635 | 0.725 | 0.546 |

Notes: Columns 1-5 present the components of the index variable in Table A.4. Column 1—measured using a Likert scale and normalized to have responses between 0 and 1. All regressions include control variables such as age group, female, college education, employed, private sector work, source drinking water (PDAM), installed PDAM, religion, income level, household size, residence and home ownership, and low density neighborhood. Standard errors are robust to heteroskedasticity. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Anderson's Sharpened q-value in brackets.

Table A.6: Social Desirability Bias

| | (1) | (2) | (3) |
|---|---|---|---|
| | Trust index | Action index | Policy Support index |
| Imam × Religious × High SDS | 0.042 | −0.004 | 0.042 |
| | (0.108) | (0.109) | (0.109) |
| Imam × Scientific × High SDS | 0.074 | −0.141 | −0.100 |
| | (0.109) | (0.106) | (0.105) |
| Scientist × Scientific × High SDS | 0.153 | 0.007 | 0.037 |
| | (0.110) | (0.111) | (0.110) |
| Scientist × Religious × High SDS | 0.098 | 0.002 | −0.088 |
| | (0.110) | (0.108) | (0.109) |
| N | 2,827 | 2,827 | 2,827 |
| $R^2$ | 0.186 | 0.209 | 0.275 |
| Control mean | 0.000 | 0.000 | 0.000 |
| Test of equality ($p$-value) | | | |
| Imam × Religious × High SDS = Imam × Science × High SDS | 0.769 | 0.200 | 0.177 |
| Imam × Religious × High SDS = Scientist × Religion × High SDS | 0.612 | 0.957 | 0.235 |
| Imam × Scientific × High SDS = Scientist × Scientific × High SDS | 0.478 | 0.177 | 0.196 |
| Scientist × Religious × High SDS = Scientist × Scientific × High SDS | 0.620 | 0.968 | 0.256 |

Notes: This table reports robustness check for social desirability bias. High SDS refers to having a social desirability score that is above median for the sample. Dependent variables in column 1-3 are index variables of trust in capacities to address land subsidence issue, willingness to take concrete actions, and support for mitigating policies, respectively—constructed using multiple components and standardized with control as the reference group. All regressions include control variables such as age group, female, college education, employed, private sector work, source drinking water (PDAM), installed PDAM, religion, income level, household size, residence and home ownership, and low density neighborhood. Standard errors are robust to heteroskedasticity. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

# B Intervention Scripts

The actor read the script for each message and narrative in the Indonesian language. The script is translated into English as follows:

**Environmental message** *Jakarta is facing a severe issue of land subsidence, where the ground surface is dropping below sea level. Jakarta is the fastest-sinking city in the world. Half of Jakarta's land is already underwater and could sink by another 1 to 15 centimeters every year. This is very concerning because if this continues to happen, by 2050, a quarter of Jakarta could be completely sunk. One clear example is the Wal Adhuna Mosque in North Jakarta; half of it is now underwater. In the last 10 years, North Jakarta has already sunk by 2.5 meters. A small increase in rainfall could immediately lead to floods. This adversely affects the economy and disturbs people's daily activities. Climate change causes an increase in sea level, but do you know the most significant factor causing land subsidence in Jakarta? Excessive soil drilling and groundwater extraction. People in Jakarta are heavily dependent on groundwater for daily needs in residential areas, office buildings, hotels and shopping malls. On average, groundwater contributes 60% to Jakarta's total annual water consumption level. I understand that not all of us have access to cheap and safe PDAM (regional drinking water companies), but we cannot continue using groundwater that is harming the environment. Our government has taken some steps to reduce our dependence on groundwater by improving access to PDAM, providing subsidies and imposing limits on groundwater use.*

**Religious narrative** *God, may He be praised and exalted, said in Surah Al-A'raf verse 56: "Do not damage the Earth after it has been set in order. And call upon Him with hope and fear. Indeed, Allah's mercy is always close to the good-doers." As believers, we are responsible for caring for the Earth that God has given us. Fellow believers have started by working together with the Ministry of Environment and Forestry to spread messages on preserving nature and the environment. I hope that what I talked about today could enlighten all of us about the threat of sinking Jakarta. If God wills, we can save Jakarta together. May God give us success and guidance. Peace be upon you, and mercy and blessings of God.*

**Scientific narrative** *In a well-known scientific journal, a team of scientists from around the world reported that Indonesia has one of the highest population densities in areas prone to land subsidence. This poses a serious threat to people living in Jakarta. According to the Professor of Meteorology in BRIN (National Research and Innovation Agency), some parts of Jakarta are especially vulnerable to land subsidence because they were originally swamps that have been drained. Coastal flooding could reach 1 meter per second if land subsidence continues at the current rate. Therefore, we must immediately seek preventive measures. I hope what I discussed today could increase our awareness of the threat of sinking Jakarta. We can save Jakarta together.*

# C Variable Description

Table C.1: Variable description

| Variable | Description |
|---|---|
| Aged 18-24 | Indicator variable for participants aged between 18 and 24 years old. |
| Aged 25-34 | Indicator variable for participants aged between 25 and 34 years old. |
| Aged 35-44 | Indicator variable for participants aged between 35 and 44 years old. |
| Aged 45-64 | Indicator variable for participants aged between 45 and 64 years old. |
| Aged 65+ | Indicator variable for participants aged 65 years old and older. |
| Female | Indicator variable for female. |
| College or more | Indicator variable for having college or more education status (current or completed). |
| Employed | Indicator variable for being employed. |
| Private sector work | Indicator variable for working in private sector. |
| Main drinking water: piped water | Indicator variable for having piped water as main source of drinking water. |
| Installed PDAM | Indicator variable for participants who installed PDAM in their premise. |
| Islam | Indicator variable for having Islam as religion. |
| Christian Catholic | Indicator variable for having Christian Catholic as religion. |
| Christian Protestant | Indicator variable for having Christian Protestant as religion. |
| Other religion | Indicator variable for having other religion. |
| Income: $<$ IDR 5 mil. | Indicator variable for having income less than IDR 5 millions. |
| Income: IDR 5-9.99 mil. | Indicator variable for having income between IDR 5 and 9.99 millions. |
| Income: $>$ IDR 10 mil. | Indicator variable for having income more than IDR 10 millions. |

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Table C.1: Variable description (Continued)

| | |
|---|---|
| HH size: small(1-2) | Indicator variable for respondent's household member numbers are between 1 and 2. |
| HH size: medium(3-4) | Indicator variable for respondent's household member numbers are between 3 and 4. |
| HH size: big(5+) | Indicator variable for respondent's household member numbers are 5 or more. |
| Own current house | Indicator variable for owning current house. |
| Bekasi, regency | Indicator variable for participants who live in Bekasi regency. |
| Bekasi, city | Indicator variable for participants who live in Bekasi city. |
| Bogor, regency | Indicator variable for participants who live in Bekasi regency. |
| Bogor, city | Indicator variable for participants who live in Bogor regency. |
| Depok, city | Indicator variable for participants who live in Bogor city. |
| West Jakarta | Indicator variable for participants who live in West Jakarta. |
| Central Jakarta | Indicator variable for participants who live in Central Jakarta. |
| South Jakarta | Indicator variable for participants who live in South Jakarta. |
| East Jakarta | Indicator variable for participants who live in East Jakarta. |
| North Jakarta | Indicator variable for participants who live in North Jakarta. |
| Tangerang, regency | Indicator variable for participants who live in Tangerang regency. |
| Tangerang, city | Indicator variable for participants who live in Tangerang city. |
| South Tangerang, city | Indicator variable for participants who live in South Tangerang city. |
| Low density kampung | Indicator variable for living in a low-density neighborhood. |
| **Outcome** | |
| *Primary* | |

Continued on next page

Table C.1: Variable description (Continued)

| | |
|---|---|
| Belief on land subsidence | Indicator variable for whether respondent believe that land subsidence would submerged Jakarta. |
| Belief on harmful groundwater extraction impact | Re-scaled variable (between 0 and 1) from a Likert scale variable where 0 refers to weak belief of impact on groundwater extraction and 4 otherwise. |
| Trust index | Index variable constructed from responses to questions regarding trust in themselves, others, businesses, government, imams, and scientists. These questions are elicited on a 5-point Likert scale, where 0 refers to not confident at all and 4 refers to completely confident. This index is standardized with control as reference group. |
| Action index | Index variable constructed from responses to questions regarding likelihood of water consumption reduction, spreading info on harmful groundwater extraction impact, vote for governor addresing land subsidence, install PDAM, and relocate for access to PDAM. These questions are elicited on a 5-point Likert scale, where 0 refers to extremely unlikely and 4 refers to extremely likely. This index is standardized with control as reference group. |
| Policy support index | Index variable constructed from responses to questions regarding favoring of some policy scenarios such as tax groundwater extraction, restrict households and businesses groundwater use, reduce PDAM tariff, mandate infiltration wells, expand PDAM coverage, educate community, subsidize new PDAM installation, build sea walls and flood controls, and restrict Jakarta economic growth. These questions are elicited on a 5-point Likert scale, where 0 refers to strongly oppose and 4 refers to strongly support. This index is standardized with control as reference group. |

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Table C.1: Variable description (Continued)

| | |
|---|---|
| Perception index | Index variable constructed from responses to questions regarding perception on environmental issues as divine intervention, scientific explanations for environmental events, and optimism in land subsidence prevention. These questions are elicited on a 5-point Likert scale, where 0 refers to strongly disagree and 4 refers to strongly agree. This index is standardized with control as reference group. |
| *Robustness* | |
| Social desirability bias score | Variable constructed from various socially desirable answers such as hard to continue work without incentive, feel dissapointed when do not get what they want, given up on something due to underestimated their abilities, felt rebelling against authority even though they were right, always a good listener, take advantage of someone, willing to admit mistakes, retaliate rather than forgive and forget, always polite, never get upset when someone express different ideas, put too much pressure on others, pretending to be sick, and get annoyed by people asking for favors. |
| **Heterogeneous** | |
| High knowledge | Re-scaled variable (between 0 and 1) from a Likert scale variable where 0 refers to not at all knowledgeable and 4 otherwise. This variable is constructed as binary where 0 refers to below median and 1 refers to above median. |

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Table C.1: Variable description (Continued)

| | |
|---|---|
| High trust | Index variable that constructed from responses to questions regarding the trustworthiness of corporate sectors, municipal and government officials, imams, academic researchers, healthcare workers, and regional and national legislators. These questions are elicited on a 4-point Likert scale, where 0 refers to not trustworthy at all and 3 refers to completely trustworthy. This index variable is standardized with control as reference group then constructed as binary where 0 refers to below median and 1 refers to above median. |
| High experience with environmental issues | Index variable that constructed from responses to questions regarding experience with environmental issues such as flooding, water shortage, poor air quality, sea-level rise, hot weather/heatwaves, and windstorm. This index variable is standardized with control as reference group then constructed as binary where 0 refers to below median and 1 refers to above median. |
| Bottled water for drinking | Binary variable indicating whether participants have bottled water as main drinking water. |
| Islam | Binary variable indicating whether participants are Muslim. |
| Female | Binary variable indicating whether participants are female. |