Cross-Cultural Comparison of Climate Change Opinions, Beliefs, and Risk Perceptions in Morocco and the United States

by Isaac Conrad

As the climate crisis grows more severe, social science has emerged as a necessary tool to respond to climate change. More specifically, understanding human opinion and behavior is crucial for governments and institutions to adapt to climate change effectively. To better understand opinions, researchers have deployed various survey, audience segmentation, and qualitative typology strategies; however, much scholarly attention has been focused on industrialized, Western nations. Morocco has emerged as a leader on the international climate-policy stage, but the climate change opinions and beliefs of Moroccan citizens are unknown. In this study, I use the same survey, audience segmentation, and qualitative typology techniques to develop a greater understanding of Moroccan climate change opinions and subsequently compare them to American opinions. Findings indicate that Moroccans are more likely to believe in climate change, perceive risk from climate change, support bold climate policy, and discuss climate change with their immediate social circles. Double the percentage of Moroccans fall within the audience segment most concerned about climate change, and cultural differences likely play a large role in pro-climate motivations.

1.0 Introduction

Climate scientists (97%) have come to the consensus that global climate change is anthropogenic and a threat to society (Cook et al., 2016). If global greenhouse gas emissions (GHG) continue at their current rates, it is likely that the planet will exceed the 1.5° C temperature increase limit set by the 2015 Paris Climate Agreement (IPCC, 2022). Thus, bold climate policy targeted at reducing GHG is necessary. Understanding human opinion and behavior is crucial for governments and institutions to adapt to climate change effectively (Schipper, 2020; Shwom et al., 2017). To better understand climate change opinions, researchers have deployed various survey, audience segmentation, and qualitative typology strategies. In this study, I utilized the same methods to compare the climate change opinions, beliefs, and risk perceptions of Moroccans and Americans.

1.1 Climate Opinion Surveys

Public opinion, risk perception, and climate awareness are some of the biggest predictors of a nation's policy response to climate change (Gromet et al., 2013; Leiserowitz, 2006; Marx et al., 2007; O'Connor et al., 1999). Opinion related to climate change has been well documented in the United States (Ballew et al., 2019; Howe et al., 2015; Leiserowitz, 2006). Recent findings from surveys conducted by the Yale Program on Climate Change Communication (YPCCC) and the George Mason University Center for Climate Change Communication (CCCC) demonstrate 76% of Americans believe in global warming, whereas 12% deny its existence (Leiserowitz et al., 2021b). Common trends within these data demonstrate that beliefs, risk perceptions, and support for climate policies differ among political parties and generational gaps. Questions regarding communication behavior depart from these trends. Liberal-leaning Americans report discussing climate change more frequently than conservative-leaning Americans, but both liberal and conservative Americans report similar levels of media exposure to climate change (Lesierowitz et al., 2021b).

A similar climate opinion survey has been replicated in over thirty-one different nations, which has led to in depth cross-cultural comparisons of climate opinions throughout the world (Leiserowitz et al., 2021a). Of note, Americans were the least likely to say they needed more information about climate change, but of the 31 nations included, Americans ranked 26th in agreement that climate change is happening. Nigeria and Egypt, two of the three African nations represented and both near Morocco, ranked 28th and 30th, respectively. While

informational, the international survey was not as extensive as the opinion survey conducted in the United States. My study attempts to address this gap while investigating Moroccan opinions.

1.2 Audience Segmentation Strategies

Audience segmentation is a strategy used to identify different subgroups within a target audience. Using audience segmentation in the United Sates, researchers have identified six different subgroups or "interpretative communities" (Leiserowitz, 2005; Maibach et al., 2011; Roser-Renouf et al., 2014). Questions from the surveys mentioned above were used to help identify these communities. Also known as "Global Warming's Six Americas," The Alarmed, The Concerned, The Cautious, The Disengaged, The Doubtful, and The Dismissive constitute these six communities. Each possesses a unique set of beliefs in climate change, support toward policies, and behaviors regarding climate change. Identifying these communities allows messaging strategies aimed at shifting opinion or behavior to be tailored to specific audiences.

Two segments, The Alarmed and The Concerned, are considered pro-climate. Thus, climate messaging is not regularly tailored toward these groups. The Alarmed segment consists of those most convinced that climate change is happening; the issue is of much importance to them, and they tend to be the most informed of the "causes, consequences, and potential solutions" of climate change. This segment is most likely to view climate change as a threat to themselves and the United States. The Concerned segment consists of those that are less convinced of climate changed, yet they are still worried about the issue. They are somewhat informed about the issue, but they are less likely to view climate change as a threat to themselves and the United States.

Climate messages aimed at changing opinion and behavior are regularly tailored toward The Cautious and The Disengaged. The Cautious are only somewhat convinced of climate change; they are less informed about the issues, as only half believe climate change is human caused, and only a third are convinced of the scientific consensus. This segment does not perceive climate change as a threat to themselves, but they do view climate change as having somewhat of an impact on future generations. The Disengaged segment is not sure that climate change is happening; this group is most likely to change their minds regarding climate issues. They know little about the issue, and they are not convinced that climate change poses a threat to themselves or the United States.

Of the six communities, The Doubtful and The Dismissive are the least likely to change their mind about climate change, so climate messaging is not often tailored toward these communities. The Doubtful segment does not know if climate change is happening, and they issue is of little personal importance to them; they are equally uninformed and not worried about climate change. They are unlikely to change their mind, and they do not perceive climate change as a threat, to themselves and to the United States, for at least another 100 years. The Dismissive segment is the final segment. This group is sure that climate change is not happening; the issue is unimportant, and they are not worried. They are so certain of these views that they will not change their mind. They firmly hold ideas like that there is no scientific consensus of climate change, the issue is a natural phenomenon, and the issue will never impact themselves or the United States.

The international opinion survey outlined earlier (Leiserowitz et al., 2021a) also segmented the respondents in each nation. Of the African nations represented, South Africa had more respondents in the Alarmed category (47%) than the United States (34%). Nigeria (33%) was just under the United States, but Egypt (17%) had the lowest percentage of respondents in the Alarmed segment. Of all nations, the United States had the highest percentage of respondents in the Dismissive segment (11%). For comparison, South Africa (1%), Nigeria (4%), and Egypt (6%) had smaller percentages of respondents who were dismissive to climate change.

1.3 Qualitative Typology

To further aid in the development of effective climate messaging strategies, scholars have attempted to build an understanding of why an audience holds certain opinions (Gustafson et al., 2022). Qualitative work like this utilizes a typology to analyze free responses to help identify the motivations behind pro-environmental opinions. Surveys designed by the National Geographic Society have been deployed in eleven different nations around the world. These surveys utilize a typology to organize

pro-environmental motives into one of three categories: "ecocentric," "anthropocentric," and "other." Ecocentric values are centered on the nature's benefits to protecting nature; for example, protecting nature "protects animals." Anthropocentric values are centered on the human benefits to protecting nature; for example, protecting nature "protects natural resources." Other values focus on more abstract benefits of protecting nature; for example, we must protect nature out of "religious obligation." The ability to organize and understand motivations, beliefs, and values allows for the creation of better tailored campaigns that result in behavior or policy change (Hurst & Stern, 2020; Luong et al., 2019; Wolsko et al., 2016).

1.4 The Case for Morocco

While climate opinion surveys and audience segmentation strategies similar to "Global Warming's Six Americas" are increasingly being used to develop messaging strategies surrounding climate change and policy, much of the literature has not focused on African nations—a continent particularly at risk for negative climate change impacts like decreased freshwater availability, increased flooding probability, decreased ecosystem productivity, and decreased crop yield (Muller et al., 2014; Serdeczny at al., 2017; Zinyengere at al., 2017). For example, studies similar to the "Global Warming's Six Americas" have been conducted in Australia (Morrison et al., 2013), Germany (Metag et al., 2015), India (Leiserowitz et al., 2013), and Singapore (Detenber et al., 2016). Of the thirty-one nations surveyed for YPCCC's most recent international climate opinion study, only three were in Africa (Leiserowitz et al., 2021a). As the continent with the second highest population, Africa is poised to play a leading role in responding to the climate crisis (Okonjo-Iwelea, 2020); thus, the climate opinions of citizens in African nations should not be overlooked.

The Kingdom of Morocco (from hereon, Morocco), the furthest northwest nation in Africa, is projected to be one of the countries most severely impacted by global climate change. The nation has a projected temperature increase of 6°C, which will result in various negative impacts, including but not limited to droughts, severe weather events, decimation of the agriculture industry, rising sea levels, and biodiversity loss (Camargo et al., 2020; Schilling et al., 2012). While the country contributes little to global climate change, it is considered one of the world's leaders in climate policy. Morocco is ranked 8th on the international Climate Change Performance Index—an index that leaves the first three spots blank because no nation has done enough to reach their respective climate goals. The index ranks nations based on GHG emissions, energy use, and policy (CCPI, 2022). The United States is ranked 55th.

Unlike the United States, Morocco is a constitutional monarchy in which the King (currently King Muhammad VI) and a bicameral parliamentary body share power; however, the King still wields broad political authority. While not a full democracy, Moroccan citizens still participate in government by voting for representatives and petitioning for policies (Zaid, 2016). Civil society and non-governmental organizations play a heavy role in shaping policy, as they tend to have greater influence on members of the parliament. As the country becomes more democratic, petitioning is strengthening the citizens' role in government (Zaanoun, 2021). This suggests that, although perhaps less influential than in the United States, public opinion regarding climate change holds significance in policy implementation.

Morocco's national government has taken a different approach to global climate change than that of the United States. The new Moroccan constitution, passed in 2011, explicitly states "all citizens have the right to a healthy environment." Climate change education and communication have also been a policy priority for the Moroccan national government. The nation's 3rd National Communication with United Nations Framework Convention on Climate Change states, "the fight against climate change depends on everyone…it is necessary to intensify awareness-raising efforts by facilitating access to information, by organizing training workshops, [and] deploying a large-scale communication campaign (mass or social media)" (UNESCO, 2021).

The Moroccan government's bold stance on climate change is reflected in the youth of Morocco; in a survey of youth aged 18-29 across all the Middle East and North Africa (MENA) nations, identifying as Moroccan had the strongest effect size on predicting whether one values environmental quality (Dibeh et al., 2021). In 2021, the United Nations Resident Coordinator in Morocco recognized Morocco as

a key player in the fight against climate change: "Thanks to its climate policy for the past years, Morocco has become a key leader on initiatives for climate action and is one of a few countries with a nationally determined contribution in line with the global target of 1.5º C" (UNSDG, 2021). It is clear that the Moroccan government has positioned itself as a leader in the climate policy, and its policies have been strong enough to influence young Moroccans' views of environmental quality and gain recognition by the United Nations.

1.5 Moroccan Climate Opinions

Morocco's position as a leader in climate policy while a minimal contributor to climate change provides a stark contrast to the United States; however, the opinions, beliefs, and risk perceptions related to climate change have not been documented in Morocco as extensively as they have been in the United States (Afrobarometer, 2021; Najib, 1999), nor have they been documented in a way that is directly comparable to opinions of other nations. Comparison across country and culture may provide valuable insight into future message development. This study aims to address that gap in the extant research. To develop a better understanding of the Moroccan perspective toward global climate change and compare it to that of the United States, this study documents the opinions, beliefs, and risk perceptions of Moroccan citizens; segment the same population according to "Global Warming's Six Americas;" and gain an understanding of why Moroccans hold pro-environmental opinions. Specifically, I aimed to answer the following questions:

Q1: What are the climate change opinions, beliefs, and risk perceptions of Moroccan citizens, and how do they differ from American opinions?
Q2: How does a Moroccan audience fit into Global Warming's Six Americas?
Q3: Why do Moroccans hold pro-environmental or pro-climate opinions, and how do these motivations differ from American motivations?

2.0 Materials and Methods

To answer the questions outlined above, I conducted a single survey that combined the climate opinion surveys, audience segmentation analyses, and qualitative typology for motivations discussed above. This study utilized survey questions from previous studies conducted in the United States and internationally to ensure the validity of the comparison of the data across studies. The survey was implemented using Qualtrics research software from May 15 to June 25, 2022. I collected data from 327 participants via Facebook recruitment advertisements. Survey participants were asked for consent and a series of demographic questions. All participants were 18 years of age or older, and I provided surveys in three language options: English, French, and Arabic.

2.1 Demographics of Survey Population

I asked all survey participants (n=327) to answer a series of demographic questions including their age, gender, level of education, political affiliation, and city of origin. Participants aged 25-34 made up the largest portion of respondents (31.5%), while those aged 65 or older constituted the smallest percentage (2.75%). The age distribution of participants follows that of the national age distribution. Participants' gender distribution did not follow the national gender distribution; male respondents (77.46%) were heavily overrepresented. This difference may be attributed to the roles of men and women in Moroccan culture. Men have traditionally played bigger roles in civic life, making decisions about what is good for the community and country, whereas women have historically served in roles related to the home. This has created a societal norm that results in an expectation of men to participate in public discussion at a higher level than that of women. I found that a large portion of survey respondents hold a university level degree (47.2%) or a U.S. high school equivalent degree (42.5%); however, it is unclear if these data are nationally representative, as there are no publicly available statistics to compare to. Most participants (64%) preferred not to report their political affiliation, and this, too, may be motivated by cultural differences surrounding politics. Morocco lacked democratic representation in government until the constitutional reform in 2011; as a result, politics have been taboo for centuries. To oppose political decisions made by the King was an act of treason. Thus, Moroccans for centuries have refrained from discussing politics in public spaces. Due to a lack of information available to weight our survey population, I deemed the

population not nationally representative; however, results from this study may provide insights to future studies regarding Moroccans' opinions toward climate change.

2.2 Survey Design

After demographic and consent questions were answered, participants completed a series of 18 questions targeted at climate change opinions and audience segmentation. To answer *Q1*, sixteen questions, based on YPCCC and CCCC surveys, were used for the climate opinions portion of our survey (Ballew et al., 2019; Howe at al., 2015). The questions were broken down into four categories: *beliefs, risk perceptions, support for policies,* and *information acquisition/communication behaviors*. Four questions, used to determine the size of the six "interpretive communities" (Leiserowitz, 2005; Maibach et al., 2011; Roser-Renouf et al., 2014) in Morocco, were pulled from the "Six Americas Short Survey" (SASSY) audience segmentation analysis tool (Chryst et al., 2018) and used to address *Q2*. Three of the questions addressing *Q1* and *Q2* overlapped. For *Q3*, a single question adapted from the National Geographic Society's Valuing Nature project's international survey aimed at determining pro-environmental motives (Gustafson et al., 2022) was included. A complete list of survey questions is included in the supplemental information.

2.3 Data Analysis

Upon completion of data collection, I utilized Statistical Program for Social Sciences (SPSS) to calculate the mean percentage of support and opposition for statements to the 95% confidence level from Moroccan survey responses. I then compared these percentages to U.S. percentages of support and opposition for the same statements; American data (n>28,000) were made publicly available by YPCCC.

The questions used for the audience segmentation analysis were compiled and uploaded to the "SASSY Group Scoring Tool," a software made available by YPCCC. I was then able to compare the percentages of Moroccan participants (n=327) in each of the six communities to the percentages of Americans in each community via open access data provided by YPCCC.

To determine pro-environmental motives, responses to the question "what do you believe is the most important reason to protect nature?" were categorized using the typology outlined in Table 1 adapted from Gustafson et al. (2022). The typology was one of the first aimed at building an understanding of why pro-environmental opinions are held. I used the same typology so data from this study can be directly compared to data from Gustafson et al. (2022). Valid Moroccan responses (n=134) were coded into one of twelve themes outlined in Table 1, and each theme corresponded to a category consistent with those outlined above (ecocentric, anthropocentric, and other). Invalid responses were not included (invalid responses were either missing, vague, unclear, or policy solutions). Once coded within the typology, I compared the frequency of each theme in the Moroccan population to the frequency of each theme in the American population.

Table 1: Typology of reasons to protect nature adapted from Gustafson et al., 2022.

Reason/Theme	Description	Examples from Moroccan Data
Environmental Health	General health and quality of environment, atmosphere, outdoors.	"To preserve the blue planet," "To preserve the quality of the air we breathe"
Connected System	Everything is interconnected; Do not upset the balance, equilibrium, or harmony within nature.	"The ecosystem has its own balance," "If one element of the chain is harmed, others are in danger"
Protect Plants & Animals	The health of non-human animal and plant species (specifically)	"To preserve vegetation and biodiversity," "To conserve biological diversity and wetlands"
Climate & Disaster	To mitigate climate change and/or disasters (e.g., floods, droughts)	"To minimize the impacts of human activities and natural disasters"
Nature's Autonomy	Nature has its own rights, agency, takes precedence, or may retaliate	"Let nature do its work"
Human Resources	The resources that nature provides to humans are important to us.	"Protecting water and food sources," "To preserve nutrient resources"
Human Enjoyment	It's enjoyable, beautiful and helps quality of life and societal progress.	"To live better,"We need it to live peacefully"
Human Health & Survival	To promote the physical health or survival of humans (specifically)	"Protects human life," "For our survival"
Survival of All Life	To avoid cessation of all life on Earth	"It's all life that's in danger," "To ensure the continuity of humans and animals on earth"
Moral Imperative	Ethical principles or religious tenets hold it as important.	"No one has the right to exploit it for enrichment," "For the sole reason that plants, animals, and humans are the creation of God"
Future	For our future and/or for the sake of future generations	"For future generations," "For our children"
Irreplacability	Nature is irreplaceable and unique	"Because we have just one planet," "Earth is the only planet where we can live"

3.0 Results

3.1 Comparison of Moroccan and American Climate Opinions

Table 2: Percentage of survey population that supports or opposes the corresponding question's climate opinion, belief, or risk perception. Moroccan percentages were calculated to the 95% confidence level; exact American confidence intervals were not provided, but the average CI was ±3% (Leiserowitz et al., 2021b).

		Moroccans (MA)			Americans (US)		
Question	**Opinion/Statement**	**% Support**	**% Oppose**	**95% CI**	**% Support**	**% Oppose**	**95% CI**
Q1	Climate change is happening.	91.1	3.7	±3.1	71.8	14.5	±3.0
Q2	Climate change is human caused.	85.0	9.5	±3.9	56.5	30.4	±3.0
Q3	There's a scientific consensus that climate change is human caused.	79.8	11.5	±4.3	57.3	23.4	±3.0
Q4	I am worried about climate change.	81.6	16.6	±4.1	65.2	34.3	±3.0
Q5	Climate change is impacting Morocco now/within the next 10 years.	78.5	21.5	±4.5	59.2	40.3	±3.0
Q6	Climate change will harm me personally.	74.2	16.0	±3.9	46.8	44.6	±3.0
Q7	Climate change will harm Moroccans.	83.4	9.5	±3.1	64.5	26.6	±3.0
Q8	Climate change will harm people in developing countries.	85.5	8.9	±3.1	67.9	20.8	±3.0
Q9	Climate change will harm future generations.	85.5	7.1	±2.7	70.6	19.2	±3.0
Q10	Climate change will harm plants and animals.	92.0	5.2	±2.4	71.3	19.2	±3.0
Q11	The government should fund research into renewable energy sources,such as wind and solar.	96.9	3.1	±2.0	76.9	21.0	±3.0
Q12	The government should regulate carbon dioxide, the primary greenhouse gas, as a pollutant.	86.1	13.9	±3.7	71.9	25.6	±3.0
Q13	The government should set strict carbon dioxide limits on existing coal-fired powerplants.	94.7	5.3	±2.4	65.8	33.3	±3.0
Q14	The government should require electric utilities to produce at least 20% of their electricity from renewable sources.	97.5	2.5	±1.8	64.3	34.2	±3.0
Q15	I regularly discuss climate change with friends and family.	80.7	19.3	±4.3	35.4	64.0	±3.0
Q16	I regularly hear about climate change in the media.	35.0	65.0	±5.1	32.7	66.0	±3.0

Table 2 shows the percentage of Moroccans and Americans that reported an answer of support or opposition to the corresponding survey question. "Don't know" responses were not included in Table 2; however, they are visually represented in Figure 1. Overall, a higher percentage of Moroccans held opinions of support for most of the survey questions. Moroccans held stronger beliefs in climate change (Q1), its anthropogenic cause (Q2), and the scientific consensus of human cause (Q3) on average by 23.4 percentage points. The largest gap in climate change beliefs was the anthropogenic cause of climate change, with 85.0% of Moroccans holding that belief as compared to only 56.5% of Americans—a difference of 28.5 percentage points (see Q2 in Figure 1).

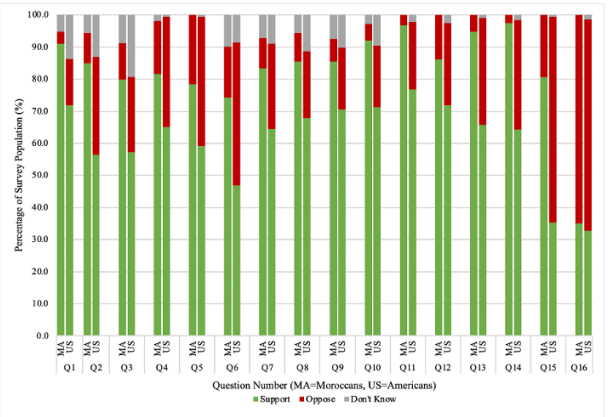

Figure 1: Visual comparison of the percentage of Moroccans and Americans that supported or opposed a corresponding climate opinion, belief, or risk perception.

There was a higher perception of risk regarding climate change among Moroccans (Q4-Q10). On average, Moroccans perceived risk 19.3% more than Americans. Both Moroccans and Americans are the least concerned about personal harm due to climate change (Q6); however, this was also the largest gap in risk perception between the two populations. 74.2% of Moroccans perceived potential personal harm due to climate change, but 46.8% of Americans reported the same risk perception—a difference of 27.4 percentage points. Both Moroccans (92.0%) and Americans (71.3%) report the most perceived risk for plants and animals.

Climate policy proposals (Q11-Q14) were supported by Moroccans on average 24.1% more than by Americans. The policy proposal outlining a requirement for utilities to produce at least 20% of their electricity from renewables (Q14) was most strongly supported by Moroccans at 97.5%; this same policy was least supported by Americans at 64.3%. We observed a 20-percentage point difference in support for the policy proposal outlining funding for research into renewable energy (Q11). Americans favored the policy more than any other policy with 76.9% indicating support, but Moroccans reported stronger support with 96.9% of responses indicating support.

The information acquisition/communication behaviors portion of the survey (Q15-16) resulted in both the largest and smallest gap of support between the two populations overall. There was a 45.3% difference between the number of Moroccans and Americans who reported regularly discussing climate change with friends and family (Q15); Moroccans indicated support at 80.7% while Americans indicated support at 35.4% (see Q15 in Figure 1). The frequency at which Moroccans and Americans reported regularly hearing about climate change in the media (Q16) only differed by 2.3%. In the lowest levels of support throughout the survey, only 35.0% of Moroccans and 32.7% of Americans reported hearing climate change-related stories at least once a week.

3.2 Audience Segmentation

Figure 2 shows the percentage of both survey populations in each of the "Six Americas" interpretive communities. Most Moroccans, 71%, fell within the Alarmed community; the highest percentage of Americans, 33%, also fell within the Alarmed community. Due to such a high percentage of Moroccans in the Alarmed community, the

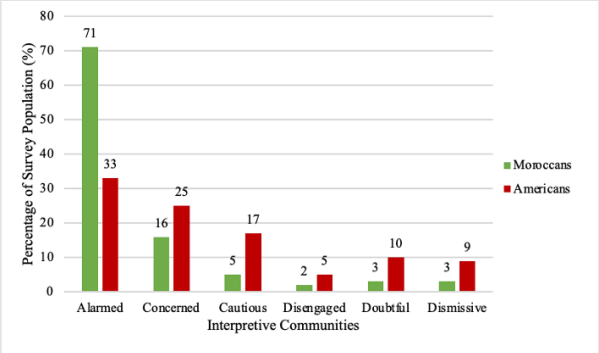

Figure 2: Percentage of Moroccans and Americans in each of the audience segmentation's six interpretive communities.

percentages of Moroccans in the other five communities were much smaller. The second largest segment of Moroccans was the Concerned community with 16% of the survey population. A larger percentage of Americans, 25%, made up the Concerned community for that population; the Concerned community was also the second largest segment of Americans. In descending order, the Cautious, Doubtful, and Dismissive were the next smallest segments for both Moroccans and Americans. Similar in percentage, the Disengaged community was the smallest for both populations; 2% of Moroccan participants and 5% of American participants were classified in this segment. The Dismissive segment made up 9% of the American population, but only 3% of Moroccans fell within the same segment.

To summarize the quantitative portion of this study, it is important to note that Moroccans demonstrated an average level of support for climate opinions, risk perceptions, and policies, 21.6% higher than that of Americans. Also of note, 80.7% of Moroccans discuss climate change regularly, and only 35.4% of Americans report the same communication behavior; however, the media coverage of climate change does not seem to be a viable explanation for this behavior, as Moroccans and Americans reported similar levels of regularly hearing about climate change in the media, 35.0% and 32.7% respectively.

The percentage of Moroccans in each segment of "Global Warming's Six Americas" is also consistent with Moroccans expressed support of climate opinions, risk perceptions, and policies. The Alarmed segment consists of those most aware of and concerned about climate change; in a population with such high levels of support for climate opinions, risk perceptions, and policies, it is to be expected that a large percentage will fall within the Alarmed segment.

3.3 Reasoning to Protect Nature

Here, I used the typology outlined in Table 1 to code responses to the question, "what do you believe is the most important reason to protect nature?" I then compared the frequency of each response to American data. Responses coded "Survival of All Life" constituted the highest percentage, 22%, of Moroccans' reasoning to protect nature. For Americans, "Human Health & Survival" was the largest percentage at 22%. The least frequent responses for Moroccans were those coded "protect Plants and Animals" at 3% and "Human Enjoyment" at 3%. "Survival of All Life" was the least frequent reasoning for Americans, as it was found in only 4% of responses included in analysis.

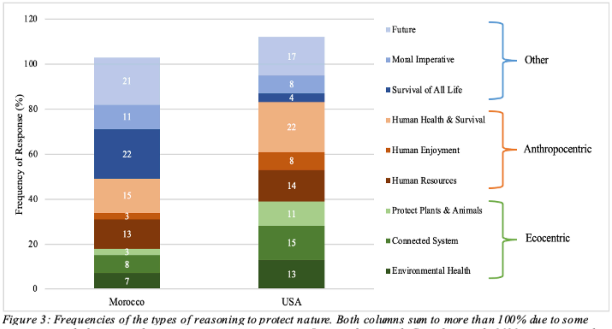

Figure 3: Frequencies of the types of reasoning to protect nature. Both columns sum to more than 100% due to some responses including more than one reason to protect nature. In accordance with Gustafson et al., 2022, responses with less than 4% frequency for both populations were not included (Climate & Disaster, Nature's Autonomy, and Irreplaceability). Responses are grouped into Ecocentric, Anthropocentric, and Other.

Anthropocentric reasons were the biggest motivators for Americans, as 44% of responses were coded this way. These reasons center on human benefits of protecting nature. Moroccans reported anthropocentric reasonings in 31% of answers—a difference of 13 percentage points when compared to Americans. Ecocentric responses were the smallest percentage of Moroccans' reasoning to protect nature at only 18% of responses; however, ecocentric responses were the second largest block of responses from Americans with 39%. These reasons centered nature's benefits from protecting nature. Ecocentric responses were reported with a 21% difference in frequency.

The largest gap in frequency (25%) was responses coded in the Other category; these include "Survival of All Life," "Moral Imperative," and "Future"

responses. 54% of Moroccan responses were classified in the Other category. Much of this was driven by responses coded "Survival of All Life" (22%) and "Future" (21%), the two largest frequencies for the Moroccan survey population. While "Future" was recorded at the second highest frequency (17%) for Americans, only 29% of all responses fell within the Other category.

4.0 Discussion

Moroccans believe in climate change, its anthropogenic cause, and the scientific consensus on climate change at higher rates than Americans (Figure 1; Table 2). This follows trends previously established by YPCCC; most other countries that deployed climate opinion surveys saw a higher level of belief in comparison to the United States (Leiserowitz et al., 2021a). American disbelief in climate change may be driven by both the politicization of climate change and climate change disinformation campaigns within the United States (Elsasser & Dunlap, 2013; Van der Linden et al., 2017). It's important to note that, as previously discussed, political conversations are taboo in Morocco. While climate change has been framed as a political issue in the United States, the willingness for Moroccans to discuss climate change suggests that climate change is not a political issue, or at the very least, not an issue of political division. Moroccan belief in climate change may be in part driven by support for the King. A main pillar of Moroccan identity is unwavering faith and trust in the King (Gozlan, 2011), so King Mohammad VI's outspoken support for climate policies and initiatives may play an important role in Moroccan opinion; however, future studies will need to be conducted to accurately determine the role of the King in shaping Moroccans' beliefs regarding climate change.

Perceived risk regarding climate change is also higher among Moroccans than Americans. Psychological distance has been offered by many scholars as an explanation for why Americans are reluctant to perceive risk from climate change (Akerlof et al., 2013; McDonald et al., 2015). With a country as large and populous as the United States, it may be easier for Americans to hold climate change at a further psychological distance; however, for Moroccans, impacts of climate change have become an everyday reality. Moroccans are facing more frequent heat waves (Kasraoui, 2022), record droughts have left dams at 25% capacity (Rahhou, 2022; Aamari, 2022b), and communities are fighting the worst wildfires in their history (Aamari, 2022a). That is not to say similar challenges are not being confronted in the United States; however, Morocco's population and land mass are both smaller than that of the United States, so the likelihood that a Moroccan will be directly impacted by climate change is much higher. While Moroccans perceive risk at a greater rate than Americans, it is important to note that both Moroccans and Americans are the least concerned about personal harm due to climate change. This finding offers some support to the claim that individuals view climate change as distant from themselves; however, future studies must be conducted to determine the difference in psychological distance from climate change between Moroccans and Americans.

Support for climate policy provisions was higher among Moroccans. This trend may be driven in part by the fact that Morocco has already adopted aggressive climate change policies (Kousksou et al., 2015). Renewable energy initiatives are not new to Moroccans, as Morocco is home to the world's largest solar power plant – the Noor Facility. Carbon free electricity has faced much higher levels of resistance in the United States (Susskind et al., 2022; Van de Grift & Cuppen, 2022); in light of resistance efforts, lower levels of American support for climate policies are logical.

Communication behaviors were perhaps the most interesting of the findings from the survey. By far, Moroccans discuss climate change more frequently (Figure 1; Table 2). Interestingly, media attention to climate change does not seem to be driving this discussion, as levels of media attention to climate change reported by Moroccans and Americans in this study were relatively the same. The high levels of discussion may perhaps again be driven by the lived reality of Moroccans facing severe climate impacts.

Audience segmentation shed light on a large majority, 71%, of Moroccans falling within the Alarmed community. With such high levels of support for the various climate opinions investigated, this high percentage was to be expected. It has been suggested that climate messaging strategies should be directed toward the Cautious and the Disengaged communities, but only 7% of Moroccans

fell within these audience segments. With 87% of Moroccans identifying with the Alarmed and Concerned community, the need for more bold climate communication campaigns in Morocco is not pressing. This suggests that future research, instead of focusing on opinion alone, should direct more attention to the messaging strategies that may have contributed to a large majority of Moroccans expressing concern for and willingness to address climate change.

The motivations for pro-environmental attitudes differed greatly between Moroccans and Americans. Americans demonstrated much higher levels of anthropocentric and ecocentric motivations; they were most motivated to protect nature for "Human Health and Survival." Moroccans were most motivated to protect nature for the "Survival of All Life" and "Future" generations. This study cannot provide exact explanations for why the motivations differ between the two nations, but one can speculate that cultural, religious, and political norms play a role in determining why individuals hold pro-environmental motives. For example, Americans live in a society that tends to focus more on individual success, whereas Moroccan society tends to place more influence on collective action. These cultural differences shed light on the prevalence of "anthropocentric" motivations in American responses and "other" responses—more consistent with collective action—in Moroccan responses. One motivation for a qualitative analysis like this is to provide climate communication campaigns with ideas of which values to utilize in messages. As previously stated, research into the efficacy of climate communication campaigns should be explored to demonstrate their role in Moroccans' climate opinions and risk perceptions; future research can utilize the pro-environmental motives found in this study to help identify any correlation between messages and these values.

5.0 Conclusion

Morocco is in a unique position as a climate policy leader that has contributed little to climate change to begin with. While Morocco may not have contributed much to climate change, the nation continues to confront the burdens of climate change head on. This study is one of the first in Morocco, and Africa, to use survey methods that have been deployed in Western, industrialized nations aimed at understanding climate opinions. Studies like these are conducted in hopes of guiding future messaging strategies regarding climate goals. Moroccans are overall more aware of and concerned about climate change. This trend follows previously established trends that populations in other nations have greater levels of awareness and concern than Americans. Communication behaviors regarding climate change in Morocco seem to provide an interesting area of future research due to the different levels of discussion, yet similar levels of reported media attention. Results from this survey supported the results of "Global Warming's Six Americas," as high levels of support for climate opinions, risk perceptions, and policies indicate a high level of Moroccans should fall within the Alarmed audience segment. While the factors that contribute to Moroccans' pro-environmental motives are unknown, this study suggests that "Survival of All Life" and "Future" generation values are the most common motives among Moroccans. In summary, results of this study suggest that future research in Morocco should be aimed at identifying the methods and theoretical explanations that have driven a large majority of the nation to support bold action on climate change.

Acknowledgements

This study was a labor of love, and I am grateful for everyone who helped this culmination of my undergraduate experience come to fruition. First and foremost, I want to thank Dr. Kathryn Haglin for taking me under her wing when I was lost and desperately searching for ways to combine my interests into one research project. Your mentorship and guidance are invaluable to me. Joelle McGovern, thank you for your relentless support and dedication to me and my fellow UHers. Your impact on this program and our academic careers does not go unnoticed, and I am forever grateful to call you a mentor, supporter, and friend. Dr. Ryan Goei, I don't know where I would be without you. You have continually pushed me to become the best student, researcher, and person I can be, and I can never thank you enough for the doors you have opened for me, the opportunities you have given me, and the belief you have in me. To the URSA Morocco 2022 cohort, all of you have left a lasting impact on the person I am today; thank you for the most unforgettable adventure of my life. Most importantly, Nora Griffin-Wiesner, thank you for willingness to walk with me

through some of the highest highs and lowest lows of my life. Whether it's wandering the streets of Rabat, challenging existing structures and societal norms, or pondering life's biggest questions, there is no other individual I would want by my side.

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7.0 Supplemental Information

Survey Questions

Answers colored blue are coded in support of a belief or opinion. Answers colored red are coded in opposition. Those left black remain coded as "don't know." Some responses are combined into a single response; for example, those who answer "strongly support" or "somewhat support" were coded as "support" and those who answer "somewhat oppose" and "strongly oppose" were coded "oppose." Questions colored purple were used for the SASSY audience segmentation methodology. Except for question 5 and 18, all other questions were also used for the climate opinion analysis. Question 18 was used to determine pro-environmental motives.

I. Beliefs

1. Do you think that global warming is happening?
   i. Yes; don't know; no
2. Assuming global warming is happening, do you think it is…?
   i. Caused mostly by human activities; caused mostly by natural changes in the environment; none of the above because global warming isn't happening; other; don't know
3. Which comes closest to your own view?
   i. Most scientists think global warming is happening; there is a lot of disagreement among scientists about whether or not global warming is happening; most scientists think global warming is not happening; don't know enough to say

II. Risk Perceptions

4. How worried are you about global warming?
   i. Not at all; only a little; a moderate amount; a great deal; don't know
5. How important is the issue of global warming to you personally?
   i. Extremely important; very important; somewhat important; not too important; not at all important.
6. When do you think global warming will start to harm people in Morocco?
   i. They are being harmed right now; in 10 years; in 25 years; in 50 years; in 100 years; never
7. How much do you think global warming will harm you personally?
   i. Not at all; only a little; a moderate amount; a great deal; don't know
8. How much do you think global warming will harm people in Morocco?
   i. Not at all; only a little; a moderate amount; a great deal; don't know
9. How much do you think global warming will harm people in developing countries?
   i. Not at all; only a little; a moderate amount; a great deal; don't know
10. How much do you think global warming will harm future generations of people?
    i. Not at all; only a little; a moderate amount; a great deal; don't know
11. How much do you think global warming will harm plants and animals?
    i. Not at all; only a little; a moderate amount; a great deal; don't know

III. Support for Policies:

12. How much do you support or oppose the following policy: fund more research into renewable energy sources, such as solar and wind power
    i. Strongly support; somewhat support; somewhat oppose; strongly oppose
13. How much do you support or oppose the following policy: regulate carbon dioxide (the primary greenhouse gas) as a pollutant
    i. Strongly support; somewhat support; somewhat oppose; strongly oppose
14. How much do you support or oppose the following policy: set strict carbon dioxide emission limits on existing coal-fired power plants to reduce global warming and improve public health. Power plants would have to reduce their emissions and/or invest in renewable energy and energy efficiency.
    i. Strongly support; somewhat support; somewhat oppose; strongly oppose
15. How much do you support or oppose the following policy: require electric utilities to produce at least 20% of their electricity from wind, solar, or other renewable energy sources.
    i. Strongly support; somewhat support; somewhat oppose; strongly oppose

IV. Information Acquisition/Communication Behaviors

16. How often do you discuss global warming with your friends and family?
    i. Often; occasionally; rarely; never
17. How often do you hear about global warming in the media?
    i. At least once a week; at least once a month several times a year; once a year or less often; never

V. Pro-Environmental Motives

18. What do you think is the most important reason we should protect nature?
    i. Free response