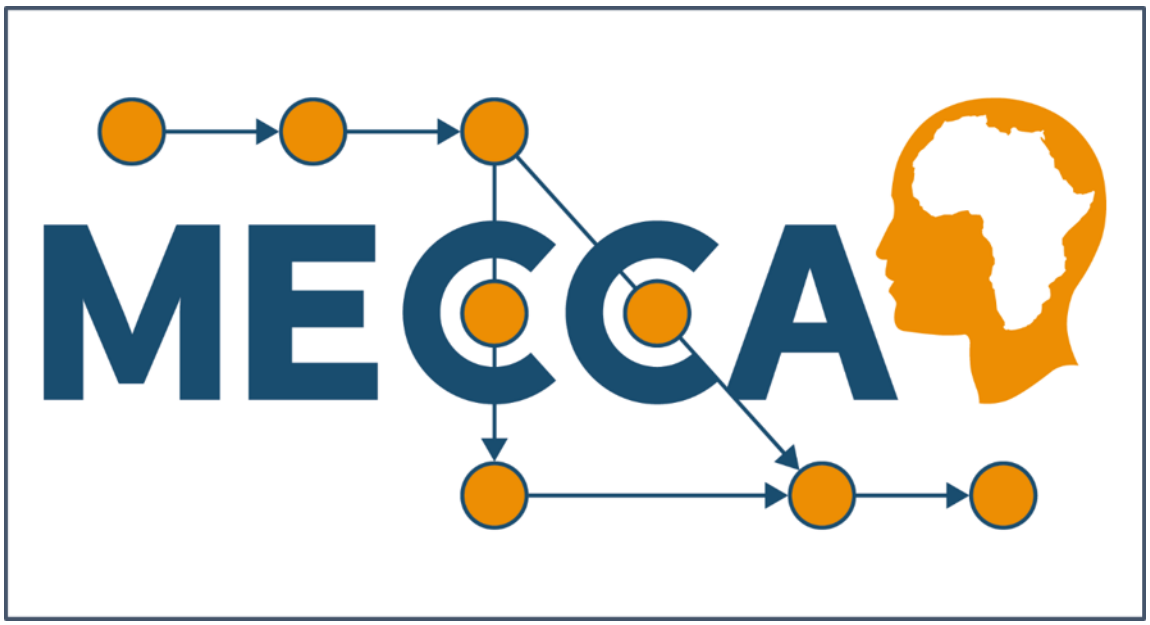
Targeting Mental models of Climate change risk to facilitate Climate Action (MECCA)

LAGOS DATA BRIEF



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Contents

Executive summary

This report summarises the background and topline findings from the Lagos case study of the Targeting Mental models of Climate change risk to facilitate Climate Action (MECCA) project. The research was conducted between 2019 and 2022 with the aim of integrating natural and social science expertise to develop an understanding of the bio-physical risks posed to Lagos by ongoing changes in the climate, how climate change and the associated risks are understood by Lagos residents, and how risk perceptions relate to people's actions.

- In line with prior studies, the current research found that climate change is increasing the risks of pluvial and fluvial floods in Lagos.
- Mental model mapping revealed a generally good understanding of the causes and consequences of climate change among Lagos residents who participated in the research. Participants correctly identified greenhouse gas emissions, deforestation, and urban development as important contributors to climate change, while temperature change, heatwaves, and flooding were commonly identified as key climate change consequences.
- More than half of people (52%) approached at random in different parts of Lagos to complete a questionnaire (N = 1,997) reported that they had never heard the term climate change before. Among those who had heard of climate change, only a minority (22%) judged themselves to be well informed about the issue.
- Most participants in the survey (62%) think climate change is likely to cause harm to Lagos residents, but a minority (49.7%) think they will be personally harmed.
- On average, most people think it is easier to take personal action on climate change than to act collectively. Most people are also confident that human action, and actions taken by the Lagos State government, can effectively address climate change.
- When asked how they feel about climate change, the answers spontaneously provided by Lagos residents largely reflect scepticism or indifference. When asked to rate their experience of pre-specified climate-related emotions, worry, fear, and sadness are rated as the emotions that people feel most strongly.
- Some of the actions people mentioned that they are taking in response to climate change include investing in flood protection, disposing of household waste properly, taking cold showers to reduce heat stress, and using fans and air conditioning.

Overall, this research reiterates existing evidence that climate change poses concrete and significant risks in Lagos, particularly with respect to increasing risks of severe flooding. However, awareness of climate change may only be limited to a part of the population, with many people perceiving climate change as a technical topic or primarily an issue of concern for Westerners. Such perceptions can pose a barrier to wider public engagement with climate change adaptation and mitigation policies. Consequently, concerted and creative climate change communication strategies are needed to enable meaningful public participation in ongoing efforts to build resilience to future climate change impacts in Lagos.

A knowledge exchange workshop was conducted in Lagos during the concluding phase of the MECCA project. This revealed that engaging younger Lagos residents – who constitute a majority of the population – with climate change through creative arts (e.g., comedy, Nollywood productions) and social media channels, as well as strengthening Lagosians' understanding of the connections between personal and community impacts of climate change, are considered by local experts and stakeholders to be potentially fruitful lines of action going forward.

Introduction

The combination of widespread poverty, low adaptive capacity and a vulnerable climate system has created high risks of exposure to negative climate change impacts in Africa. Many African communities are already experiencing these impacts in the form of rising temperatures, growing pressure from pests and diseases, increasing frequency of extreme weather events and declining agricultural productivity (Toulmin, 2009). Yet, public understanding of climate change as a concept is patchy (Godfrey et al., 2010). The distribution of climate literacy[1] rates across African countries and sub-national administrative units, such as states and regions, varies dramatically with awareness of the issue being extremely low in some areas compared with others (Simpson et al., 2021).

Given the complexity and uncertainties associated with climate change, decisionmakers need appropriate tools and resources to respond to the ongoing and projected impacts. Particularly important issues include bridging any gaps in public perceptions of climate change, widening shared recognition of the need for coordinated responses, providing incentives for action and strengthening local capacities for mitigation and adaptation (Collier et al., 2008; Ikeme, 2003). Potential solutions lie at the interface of science and society; especially in translating scientific knowledge about climate change into actionable information using communication strategies that are tailored to African audiences. The MECCA project took on this challenge in two African case-studies: Lake Victoria and Lagos.

MECCA is a collaborative project involving partners at Utrecht University, Netherlands; the Potsdam Institute for Climate Impact Research, Germany; and the University of Bergen, Norway. The project is funded by the European Union JPI-Climate programme for transnational collaborative research, and its primary purpose is to develop pathways for facilitating effective climate action among vulnerable communities with low capacities for adaptation and mitigation in East Africa (Lake Victoria) and West Africa (Lagos).

The project design is interdisciplinary. It integrates natural and social sciences expertise to:

1. Develop bio-physical models reflecting a baseline of how the climate is currently being affected by natural and anthropogenic (man-made) factors, as well as to simulate likely future scenarios.
2. Measure and evaluate the mental models of climate change risk that are commonly held among different stakeholder groups and determine the extent to which these mental models align with or diverge from the available scientific evidence
3. Assess how people think and feel about climate change risks, as well as how risk perceptions relate to people's actions.

Correspondingly, the empirical core of the project focus on three elements: **climate services (hydrological modelling)**, **mental models** and **risk perception**. The project aimed to generate accurate estimates and better quantified uncertainties about climate change impacts in Lake Victoria and Lagos, and to provide insights into climate change perceptions among key decision-makers. The hydrological modelling was led by Potsdam Institute for Climate Impact Research, mental models measurement and analysis were led by Utrecht University, and the risk perception assessment was led by University of Bergen.

This report details findings from Lagos, the West Africa case-study of the MECCA project. Fieldwork was conducted virtually and in-person with Lagos residents, policy makers, and other stakeholder groups between 2020 and 2022. Subsequent sections of the report outline the geographical context of the research, methodology and findings of each research element, and tentative conclusions.

[1] Climate literacy encompasses two knowledge facets: knowing that climate change is happening and knowing that it is caused by human activities.

Study context

Lagos is one of Africa's largest mega-cities and the foremost port city in West Africa. Due to its low-lying topography, coastal location, large population and high concentration of assets, it is extremely vulnerable to climatic impacts (Adelekan, 2016). In its most recent climate action plan, the Lagos State Government identifies heatwaves, soil erosion, tropical storms and the urban heat island effect among critical issues that are being exacerbated by climate change. However, the most prominent threat posed to Lagos residents by climate change is the risk of inundation due to sea level rise, sea surges, and heavy rainfall (Elias & Omojola, 2015). Lagos has suffered several major flooding disasters resulting in human fatalities, displacement and large-scale economic losses over the past decade (Adelekan, 2016). The threat of flooding is further aggravated by widespread subsidence in parts of the city. Researchers have estimated that Lagos is sinking at an annual rate of between 2 to 87 mm (Ikuemonisan & Ozebo, 2020), with subsidence rates being especially high around the coast and in places where heavy structures have been built on reclaimed land and landfills. The Lagos State Government assumes primary responsibility for climate change and flood risk management in Lagos (Adelekan, 2016) but its approach to these issues has previously been described as poorly coordinated, non-inclusive of local governments and vulnerable communities, and incommensurate with the challenges faced (Elias & Omojola, 2015). Conseuently, there is a need for coordinated activity across multiple levels to gather and increase accessibility to data required for decision-making; mobilise local resources for climate action and develop policies with a focus on equity and strengthening stakeholder participation.

Hydrological modelling of flooding risk in Lagos

Availability of hydrological data in West Africa, particularly Nigeria, is sparse. This limited the ability of the project team to analyse recent changes to precipitation and river discharge based on short time series or satellite data. The project team was also unable to engage the Nigerian Meteorological Agency to collaborate or share information and data.

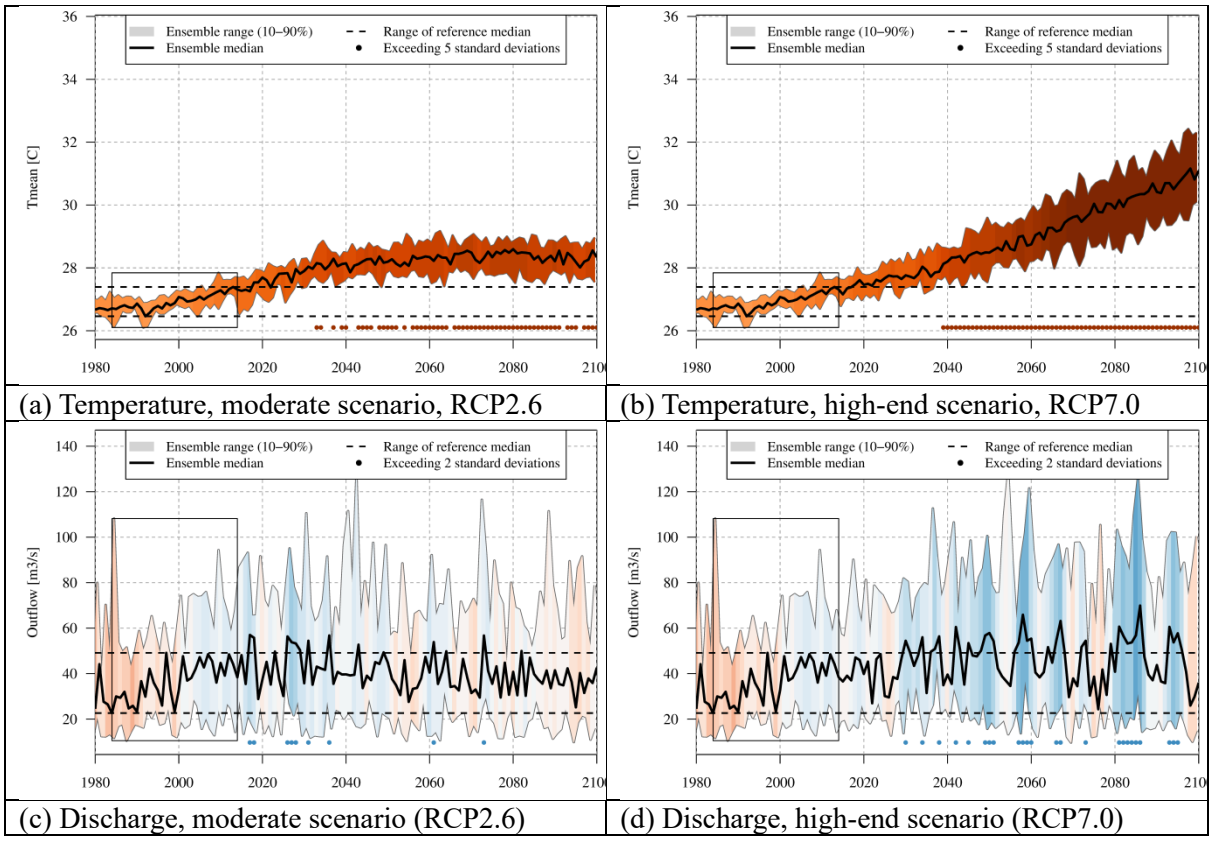
The city of Lagos is at risk of both pluvial and fluvial floods in the future due to its low elevation and proximity to the ocean. Pluvial floods occur when heavy rain overwhelms the drainage system and inundates the city. Fluvial floods arise when the rivers, streams and other waterways in the vicinity of Lagos overflow their banks and cause flooding. The risk of pluvial and fluvial flooding in Lagos is expected to increase in the future due to climate change. Rising sea levels and more frequent and intense storm events will result in higher water levels and more intense coastal flooding. Climate change is also likely to cause more extreme weather events, such as prolonged periods of heavy rain, which can lead to both pluvial and fluvial flooding. Additionally, population growth and urbanization are placing further strain on the city's infrastructure, increasing the risk of flooding in areas that were previously not at risk.

In the northern parts of the city of Lagos, the Ogun River streams into the Lagos Lagoon which is connected to the Atlantic Ocean. The Ogun River basin extents north of Lagos and comprises an area of about 22,500 km^2. It contains two major reservoirs, Ikere Gorge dam and Oyan dam that are used for water provision, irrigation, hydropower production, and flood protection. The northern parts of Lagos can be subject to river flooding by the Ogun River that has been partly attributed to poor reservoir management that may exacerbate inundations during heavy rainfall events.

To assess the future fluvial (river) flood risk due to climate change, a hydrological model was set up to the Ogun River basin. The hydrological model was driven by ten global climate models (GCMs) under two climate scenarios; a moderate scenario where global warming does not exceed 2.0°C (RCP2.6) and a high-end scenario with global warming of about 4°C (RCP7.0), see figure 1 (a) and (b), respectively.

Our research confirms the findings of other studies, indicating that climate change is leading to higher risks of pluvial and fluvial floods. Our data indicates that while the average number of rainy days per

year may decrease, the number of days with rainfall above certain thresholds, such as 30mm or 50mm, is expected to increase. The high-end scenario produces more distinct trends than the moderate one. The simulation of Oyan reservoir outflow (illustrated in figure 1 (c) and (d)) indicates a considerable rise under RCP7.0, with future annual discharges far exceeding the 1984-2014 reference period. This could lead to a substantial future risk in terms of fluvial flood risk in Lagos from the Ogun River.



(a) Temperature, moderate scenario, RCP2.6

(b) Temperature, high-end scenario, RCP7.0

(c) Discharge, moderate scenario (RCP2.6)

(d) Discharge, high-end scenario (RCP7.0)

Figure 1. Temperature and discharge developments at Oyan reservoir

To protect the city of Lagos from future pluvial and fluvial floods, it is essential to invest in flood management measures such as improved drainage systems, raised embankments and levees, and improved coastal defences. Additionally, city planners and policy makers should consider the implications of climate change when designing new infrastructure and buildings, and focus on developing resilient and sustainable urban areas. Moreover, the public must be educated about the risks associated with flooding and encouraged to take steps to protect themselves and their property. Only through a combination of these efforts can the city of Lagos effectively reduce its risk of pluvial and fluvial flooding in the future.

Mental models of climate change

Mental models refer to the way we represent external systems in our minds. They allow people to know, perceive, make inferences and act in various environments. Investigating mental models is an established strategy for understanding complex systems that feature multiple stakeholders and include interactions between individuals and potentially risky hazards. For example, the mental model approach has been used by researchers to assess what Tanzanian fishers know about fish stocks in Lake Victoria and how fishers' understanding of the of the lake ecosystem might be associated with their policy preferences or willingness to engage in collaborative conservation efforts (van den Broek et al., 2023). Regarding climate change, prior research conducted with Senegalese small holder farmers revealed a generally incomplete understanding of the complexity of the issue (Tschakert, 2007). Yet, considering that people's subjective understanding, rather than the objective risk posed, is more likely to determine

how people respond to climate change (Mayer et al., 2017), knowledge of people's mental models is necessary for identifying gaps in public understanding of climate risks and promoting appropriate responses to the issue.

With this rationale, we recruited 352 Lagos residents to show us what they think **causes climate change** and what they think the **consequences of climate change for Lagos** are, by drawing their mental models. The data were gathered using M-Tool, a standardised picture-based tool for capturing how different people perceive complex systems irrespective of the person's background or literacy level (Broek et al., 2021).

Through this process, we were able to derive the **average mental model of the causes of climate change** (Figure 2):

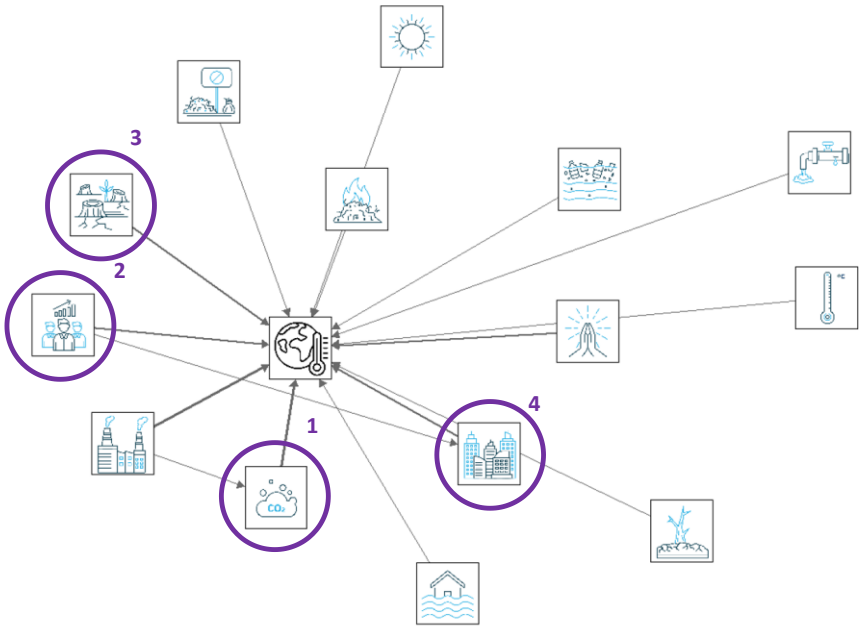


Figure 2. Average mental model of the causes of climate change in Lagos. Circles show the most important factors: 1 = greenhouse gas emissions, 2 = population growth, 3 = deforestation, and 4 = urban development. Thicker arrows indicate that more participants indicated this link as having a strong influence on climate change in their mental models.

We were also able to discover the **average mental model of the consequences of climate change** (Figure 3):

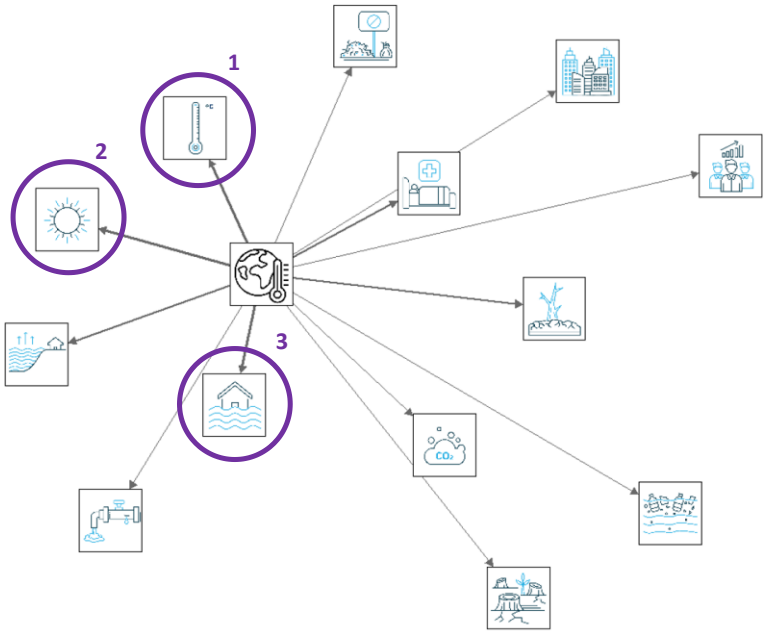


Figure 3. Average mental model of the consequences of climate change in Lagos. Circles show that most important factors: 1 = temperature change, 2 = heatwaves, 3 = flooding. Thicker arrows indicate that more participants indicated this link as being a strong consequence of climate change in their mental models.

In summary, findings from the mental model mapping indicate that the Lagos residents that participated in this study have a good understanding of the causes and consequences of climate change. They understand that climate change is caused by greenhouse gas emissions, population growth, deforestation and urban development. They also understand that climate change is likely to result in temperature change, heatwaves and flooding.

Risk perception

Risk perception is a sub-set of the broader mental representation of hazards that focuses on subjective evaluations of impacts and consequences. Naturally, people are motivated to address risks they see as a threat to themselves, other people or things they value. Consequently, the way people perceive the risks posed by climate change is an important determinant of their motivation to engage in mitigation and adaptation actions (Arbuckle et al., 2013). It should be noted that *risk* is a different concept than *perceived risk*. While risk is generally used to refer to the *objective* likelihood that an undesirable outcome might occur, perceived risk refers to the *subjective* judgment of the likelihood that the undesirable outcome will occur and how severe the impact would be. In other words, risk captures the actual likelihood of negative outcomes in the real world, while perceived risk captures what people believe about the likelihood of negative outcomes in the real world.

There is some evidence that climate change is perceived as an important risk in Africa (Regassa & Stoecker, 2014), especially among educated, high-status elites (Asiyanbi, 2015). However, perceptions of climate change risk in Nigeria may also be distorted by socio-cultural factors like fatalism and mystical beliefs (Abegunde, 2016). In the MECCA project, we were interested in getting an up-to-date assessment of how people perceive climate change risk in Lagos, as well as how these perceptions relate to people's actions.

We conducted a survey of 1,997 Lagos residents between February and March 2022. Participants were approached at random in their homes, places of work or business, and any other convenient location with the aim of recruiting approximately 100 people from each of Lagos' 20 local government areas (LGAs). A team of trained enumerators administered the survey in English language or Pidgin, depending on the preference of each participant. Our final sample of respondents had a roughly equal split of women (48%) and men (51%), and an average age of 38.6 years old (SD = 13.48 years). Most participants were educated to at least secondary school level or higher (82.7%).

Slightly more than half of people we spoke to (52%) reported that they had ever heard of the term climate change before taking part in the survey. Among those who had heard of climate change, only a minority (22.2%) judged themselves to be 'informed' or 'very informed' about climate change. The results presented in subsequent sections of this report are based on the proportion the sample are based on the proportion of respondents that indicated that they are aware of the term climate change (N = 1041).

How do people in Lagos perceive climate risk?

We asked respondents how serious a threat they consider climate change to be in a number of aspects including to themselves, to people in Lagos, to humanity as a whole, and to the natural environment (Figure 4). The responses were rated on a scale ranging from 1 to 5, where 1 = no serious threat at all and 5 = very serious threat. On average, people rated the threat posed to themselves as somewhat serious (below the mid-point of the response scale), while the rated the threat posed to people in Lagos, humanity as a whole and the natural environment more highly (moderate to seriously threatening). This pattern of responding is consistent with a common observation in risk perception research where people tend to rate personal risks as smaller than general risks (Sjöberg, 2003). This tendency, which has been likened to a form of 'unrealistic optimism' allows people to dismiss information about pertinent risks as only relevant to other people. Nonetheless, it does not necessarily constitute a barrier to people taking actions or supporting policy interventions aimed at addressing sources of risk like climate change.

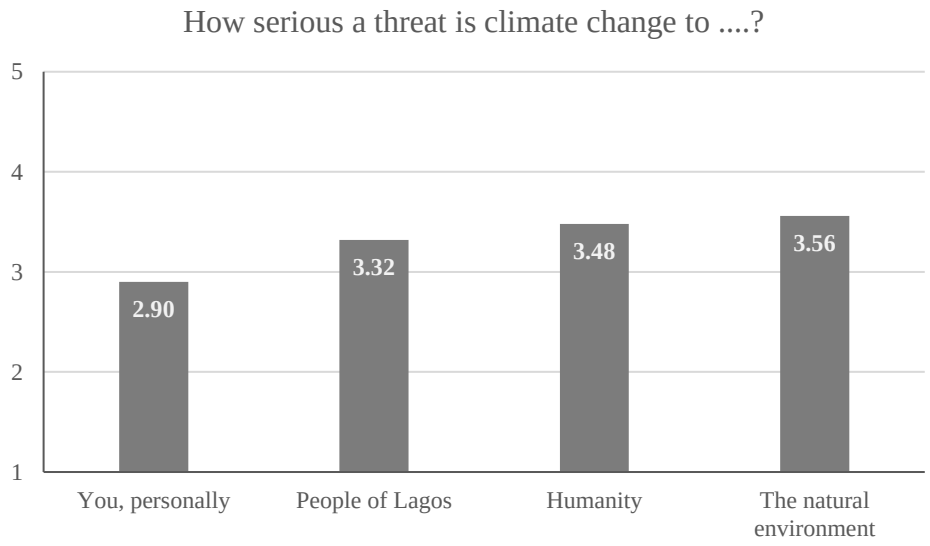


Figure 4. Perceived severity of climate change risk.

Next, we asked people how likely they think it is that people in Lagos might be harmed by climate change during their lifetime (Figure 5). The majority of participants (61.2%) indicated that they thought climate change is likely or very likely to generally cause harm to people in Lagos. The proportions change slightly when we asked people about the likelihood they would be personally harmed. Slightly

less than half of participants (49.7%) thought they would be harmed personally by climate change (Figure 6). When considered in combination with responses to the question about the perceived severity of the threat posed by climate change, our data suggests Lagosians have a moderate level of climate change risk perception, whereby they consider the likelihood of harm from climate change to be relatively high but the impact on individuals to be relatively low.

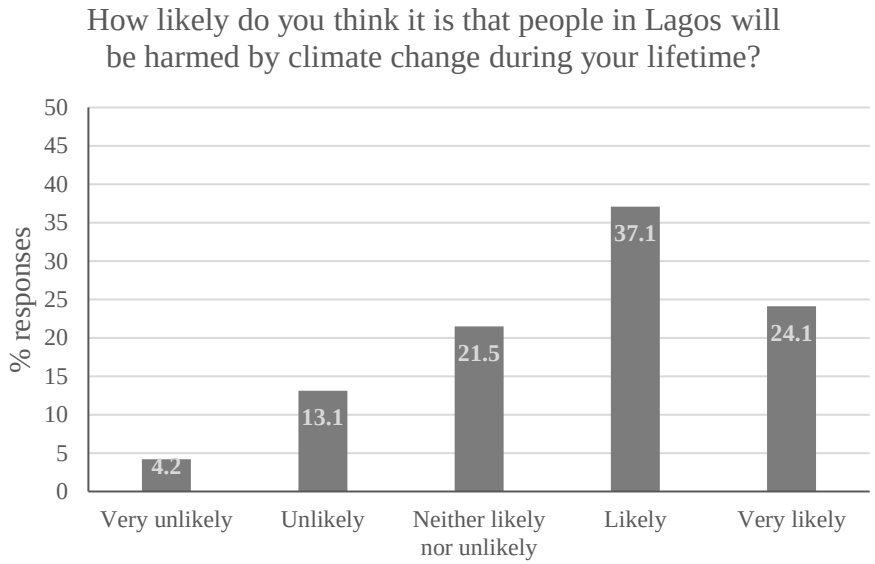


Figure 5. Perceived likelihood of Lagosians being harmed by climate change.

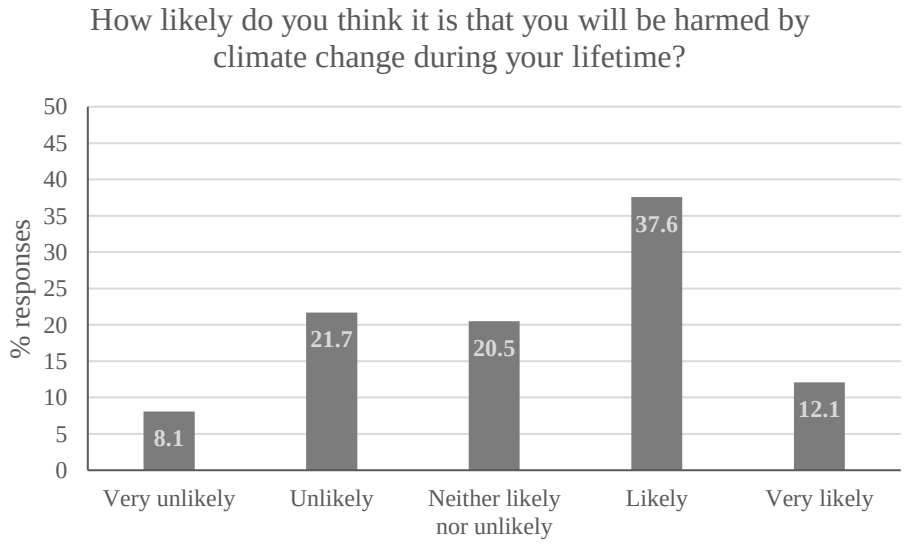


Figure 6. Perceived likelihood of being personally harmed by climate change.

What do people in Lagos think about the effectiveness of human action tackle climate risk?

While risk perception may be considered a core aspect of people's motivation to act on climate change, it is not the only factor that drives people's responses. At the very least, people also need to know that they have capacity to act and believe that their actions will be effective. On this basis, we asked people how easy they feel it is for them to take action personally and for people in Lagos to take action

collectively on climate change. The results indicate that around a third of people were undecided about whether it is easy or difficult to take individual and collection action (Figure 7). Further, there appears to be a tendency among people to think that it is easier to take personal action than for people in Lagos to act collectively. This understandably because collective action requires broad societal consensus on the need for action compared with individual action which mainly rests on the individual's decision.

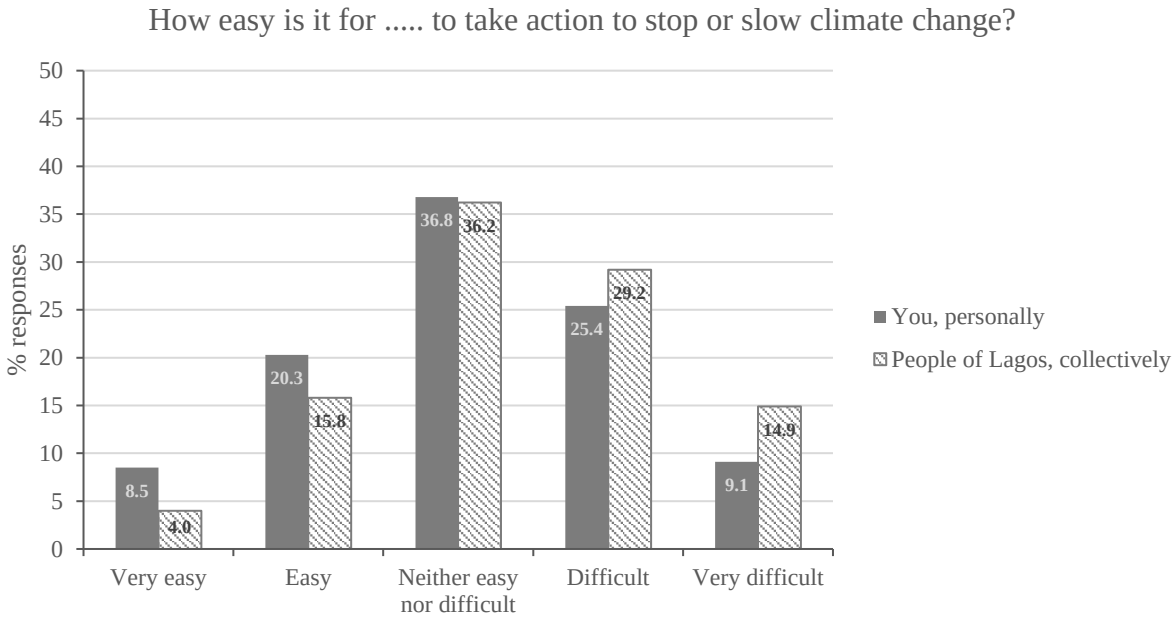


Figure 7. Perceived individual and collection efficacy to act on climate change among Lagosians

In addition to knowing whether people think they can act, we also wanted to know if they think human action is effective for addressing climate change (Figure 8). After all there would be little point to taking action if one does not believe that the action will make a difference to the risk that one is trying to address. We targeted the question at two referents – people in general and the Lagos State Government since the state government is main public actor. Overall, most respondents had some confidence that action by the Lagos Government (62%) or action by humanity in general (67%) can effectively address climate change.

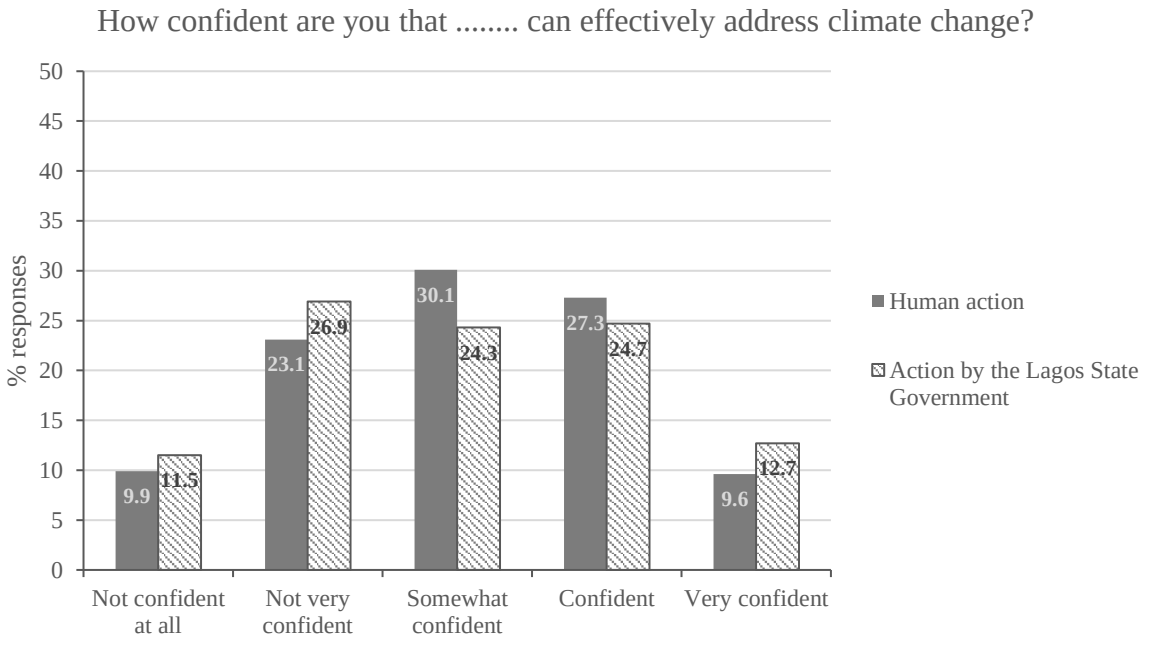


Figure 8. Perceived effectiveness of taking human and government action to tackle climate change

How do people in Lagos feel about climate change?

Feelings are also a crucial part of how people perceive and respond to risks including those relating to climate change. Negative emotions in particular have been described as the 'wellspring' of action (Weber, 2006). In other words, while recognising that a hazard or an issue poses a risk can be the start of being motivated to act. It is the feelings triggered by this awareness of the threat that accelerates action, guides the individual's choice of which specific action to take, and shapes what information they pay attention to.

In the MECCA project, we approached the assessment of people's feelings about climate change in two ways. First, we posed an open question asking people to briefly describe how they feel when they think about climate change. This question was posed very early on in the survey at a point where respondents had only been asked to provide their demographic details and indicate how much they know about climate change. Analysis of these open-ended responses showed that the feelings people spontaneously described largely fall into one of four categories, which we termed hostility, threat-related, sadness, and positive (Figure 9).

The categorisation of responses was based on a pre-existing taxonomy of climate emotions (Pihkala, 2022). The *hostility* category includes responses indicating scepticism or indifference about climate change (e.g., "I feel say na normal thing", "I am a spiritual person. I don't believe it"). The *threat-related* responses reflect what might be termed active negative emotions, such as alarm, anxiety, fear and worry. These are emotions that indicate that the individual recognises the threat posed by climate change and is showing an orientation towards acting to resolve the threat (e.g., "The thing don dey woski well-well for like 6 years. E dey fear person", "It is more alarming these years"). The sadness category on the other hand also indicates negative responses but these responses don't necessarily indicate a strong orientation toward action (e.g., feeling sad or feeling bad; "I feel bad for the environment", "climate change is not good at all"). Finally, the positive category includes feelings like calmness, happiness and hope (e.g., "sometimes I am happy especially when its hot as it is today and rain fell when we were not expecting it"). The content and valence of these responses tell us a lot about the way people understand climate change in Lagos.

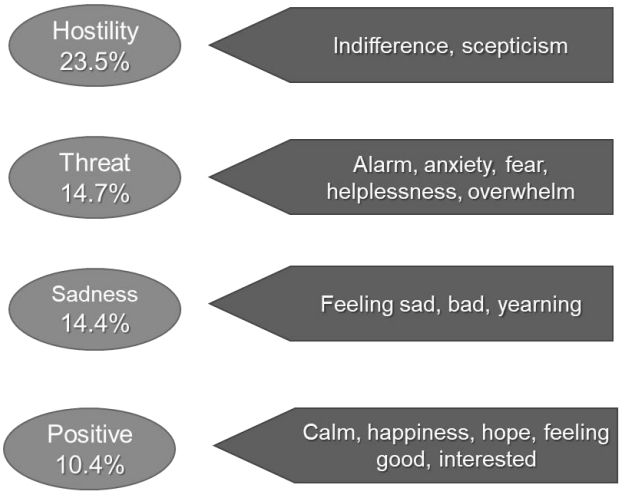


Figure 9. Categorisation of open-ended descriptions of how people are feeling about climate change in Lagos.

In a second, complementary, approach to measure how people in Lagos feel about climate change, we asked them to indicate how strongly they experience a set of pre-specified emotions when thinking about climate change (Figure 10). Some of the worries people rated as feeling most strongly are worry, fear and sadness. Many people also report feeling hopeful. The least strongly felt emotions were happiness and indifference.

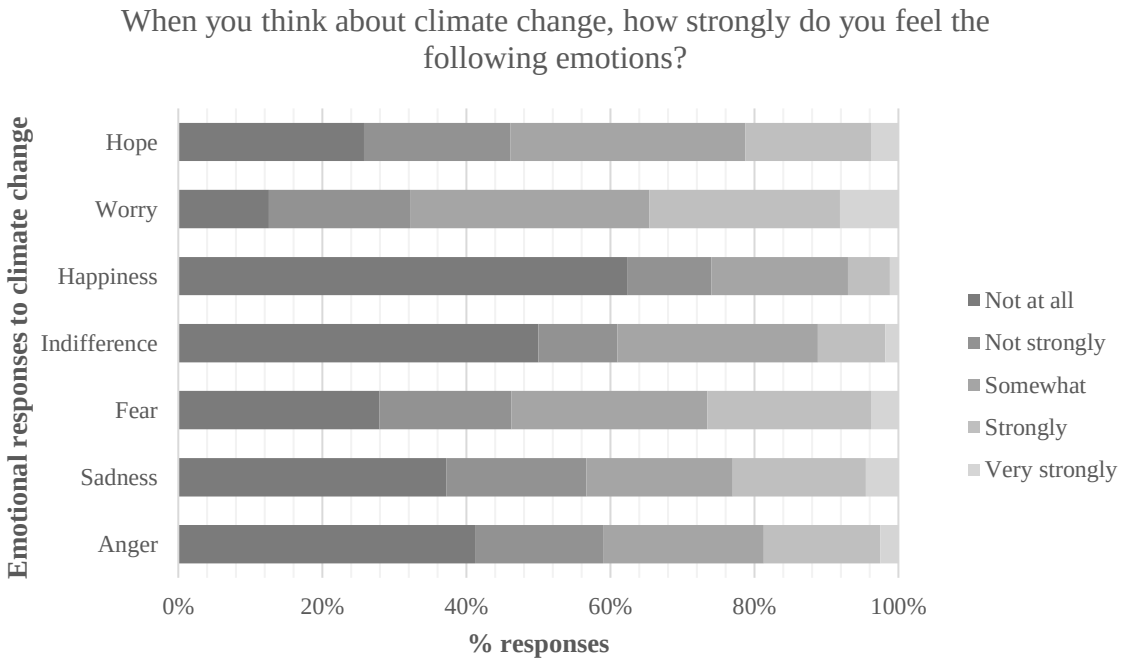


Figure 10. Emotional responses to climate change

What actions are people in Lagos taking to cope with climate change?

We explored actions that people are presently taking to address climate change. In environmental psychology, there are two key approaches to studying environmental or climate change-related behaviour. The first is to conceptualise relevant actions based on the environmental *impact* of the behaviour. The other approach is to conceptualise environmental actions from the perspective of the

actor's *intention*. Both approaches are vital for research, but the impact-oriented focus is more commonly used when the primary aim is to target behaviours that cause large changes in the environment while the intention-oriented focus is used when the primary aim is to understand people's motives and beliefs (Ogunbode, 2018a; Stern, 2000). This project took the intention-focused approach.

The selection of behaviours was informed by interviews conducted with scientists and stakeholders in Lagos at the beginning of the MECCA project in which we asked respondents to list actions they believe could be taken by people to adapt to climate change. Some of the actions they mentioned include:

1. Modifying houses to stay above water (flood protection)
2. Construction of new drainage systems by government (including building big water canals)
3. Regular refuse disposal by relevant agencies, using umbrellas and face caps to prevent sun burn
4. Taking regular cold showers to reduce heat stress
5. Use of fans and air conditioners
6. Raising public awareness through sponsored campaigns, etc.

Some of these actions were also mentioned by members of the general public who participated in our survey when asked to list 3 things they think people in Lagos can do to address climate change. Sanitation, waste disposal and general cleanliness were a strong theme in the data (Figure 11). People also mentioned raising public awareness, controlling pollution from vehicles and being prayerful.

Figure 11. Word cloud of common expressions in survey participants' suggestions for what people in Lagos can do to address climate change

Based on the data from the initial scoping exercise with scientists and stakeholders, we asked participants in our survey how often they engage in a set of 11 behaviours in relation to climate change (Figure 12). Overall, the most commonly enacted behaviours are what we term *cooling actions* (i.e., taking cold showers to manage heat, using fans and air conditioning). We also observed a high reported frequency of *household-level adaptation* actions like disposing waste properly, obeying state environmental regulations[2], clearing gutters and maintaining flood protection measures at home[3]. The least common actions are those linked to disaster response (i.e., relocating temporarily during period of

[2] We interpret people's responses to the 'obeying state environmental regulations' as relating to the monthly environmental sanitation day encouraged by the state government. This would explain the high frequency of self-reported engagement in this behaviour since compliance was historically forced through restriction of movement on environmental sanitation days.
[3] A factor analysis conducted on all the 11 behaviours showed that the four items we call household-level adaptation cluster together under one factor.

severe flooding) and those involving collective or communal effort (planting trees, participating in climate change awareness campaigns, and dredging canals).

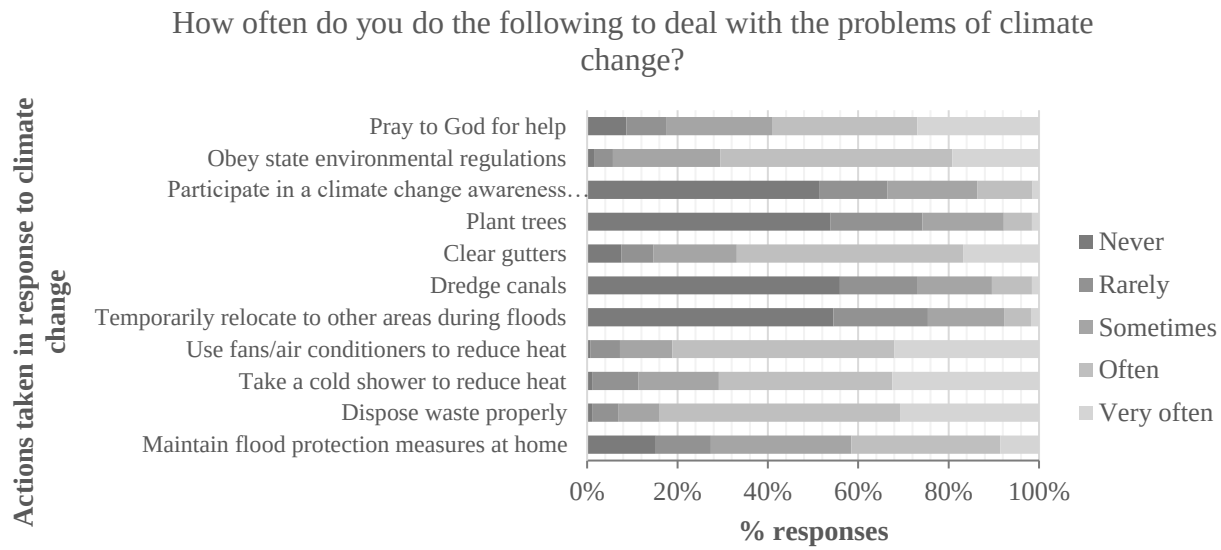


Figure 12. Actions taken by Lagos residents to adapt or cope with climate impacts

Summary and outlook for future research

Evidence from the hydrological modelling conducted by members of the MECCA project team indicates that climate change is increasing the risk of pluvial (overwhelm of drainage facilities by excessive rainfall) and fluvial (waterways overflowing their banks) flooding in Lagos, and that the frequency and intensity of flooding events is likely to worsen in the future. Concerted efforts by the government and members of the public are needed to reduce the negative socioeconomic and health effects of flooding, including designing urban areas in ways that promote resilience to extreme weather shocks; investing in flood management infrastructure like drainage, raised embankments and coastal defences; making the public more aware of the risks associated with flooding and encouraging people to invest in protecting themselves and their property.

Overall, people in Lagos who are aware of climate change appear to have a good basic understanding of its dynamics, especially as it relates to causes and consequences. The mental modelling research shows that people were able to correctly identify key factors contributing to global warming, particularly greenhouse gas emissions, population growth, deforestation and urban development. They were also able to identify some of the main consequences of climate change that are relevant to the region including temperature change, heatwaves and flooding.

The findings from the risk perceptions survey suggests, climate change awareness may only be limited to a fraction of the population considering that nearly half of people we randomly approached to participate in the study indicated that they have never heard of the term. We cannot rule out the possibility that they gave this response simply because they didn't want to participate in the study. Nonetheless, even among those who said they had heard of climate change, only about one in five judge themselves to be knowledgeable about the issue. Knowledge is a critical starting point for pro-environmental action, and has been shown to shape climate action intentions in Africa indirectly through its influence on risk perceptions and concern (Ogunbode, 2018b). In Lagos, climate change is

commonly seen as a technical topic or an issue for "Oyinbos"[4]. This perception can be a barrier to engaging the public on the issue.

People in Lagos appear to have a moderate level of climate change risk perception. On average they think that there is moderate to high likelihood that they will be individually or collectively harmed by climate change during their lifetime, but they do not consider the threat posed by climate change to be particularly severe. About a third of people are undecided about whether it is easy or difficult to take personal and collective action in response to climate change. Overall, a slightly greater proportion of people think it is difficult to act compared with those who think it is easy to act.

The onset of the COVID pandemic disrupted our plans to empirically investigate how the understanding we have achieved of climate change perceptions in Lagos can be used to facilitate more frequent engagement in actions that help minimise the risks posed to people's health, livelihoods and security. An additional key aspect that was not fully addressed in the MECCA project concerns how systemic constraints, cultural, and political factors also play a role in the opportunities that are available for people in Lagos to take effective action on climate change.

Further research involving participatory approaches and deliberation with communities and stakeholder groups across Lagos is needed to identify avenues for translating climate change perceptions and concerns into action. As reflected in the current research, most people in Lagos say they are unaware of climate change or feel they have little knowledge of the issue. A concerted public education campaign is needed to boost public understanding and informational efficacy (confidence in one's knowledge) in order to enable meaningful public participation in ongoing efforts by the state government to make the city more resilient to future climate change impacts.

A knowledge exchange workshop was conducted in Lagos with local experts and stakeholders in May 2022. Some of the insights that resulted from this include:

- Local knowledge needs to be leveraged to understand the complexity of climate change perceptions and engagement in Lagos.
- More effort should be directed at engaging young Lagosians with climate change using creative arts (e.g., comedy, Nollywood productions) and social media channels (e.g., TikTok).
- There is a need to further explore how climate change links with physical and mental health concerns in people's perceptions and experiences in Lagos. Bridging the climate change-health gap can help drive climate action because Nigerians respond strongly to information about survival and wellbeing.
- Religious leaders and local stakeholders need to be involved in research and associated outputs.

[4] This is a term used to describe white people.

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