

# VU Research Portal

## Public preferences towards climate change adaptation in Aruba: a national survey

Robinson, Peter John; Peterson, Ryan R; van Beukering, Pieter; Carvalhal, Juliet; Kelder, Timo; Boon, Eva; Acevedo, Diego; Mettes, Christie; Sevold, Tony; van der Velden, Miguel

2026

### DOI (link to publisher)

[10.71881/e43e53b2-2d2a-4250-9a40-0c5153d31f81](https://doi.org/10.71881/e43e53b2-2d2a-4250-9a40-0c5153d31f81)

### document version

Publisher's PDF, also known as Version of record

### document license

CC BY

### [Link to publication in VU Research Portal](#)

### **citation for published version (APA)**

Robinson, P. J., Peterson, R. R., van Beukering, P., Carvalhal, J., Kelder, T., Boon, E., Acevedo, D., Mettes, C., Sevold, T., & van der Velden, M. (2026). *Public preferences towards climate change adaptation in Aruba: a national survey*. (IVM reports; Vol. R-26, No. 03). Institute for Environmental Studies (IVM).  
<https://doi.org/10.71881/e43e53b2-2d2a-4250-9a40-0c5153d31f81>

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

### Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

### E-mail address:

[vuresearchportal.ub@vu.nl](mailto:vuresearchportal.ub@vu.nl)

IVM Institute for Environmental Studies

---

**Public preferences towards climate change adaptation in Aruba: a national survey**

Peter J. Robinson, Ryan R. Peterson, Pieter van Beukering, Juliet Carvalhal, Timo Kelder, Eva Boon, Diego Acevedo, Christie Mettes, Tony Sevold, Miguel van der Velden

---

---

This report is released by: Peter J. Robinson  
Institute for Environmental Studies, Vrije Universiteit  
Amsterdam



This report was prepared as part of the project *Supporting Aruba in developing a National Adaptation Strategy* of the International Panel on Deltas and Coastal Areas (IPDC) Dutch Caribbean. The study contributes to the evidence base for the development of Aruba's National Climate Adaptation Strategy.

#### **IVM**

Institute for Environmental Studies  
Vrije Universiteit Amsterdam  
De Boelelaan 1111  
1081 HV AMSTERDAM  
The Netherlands  
T +31-20-598 2862  
E [info.ivm@vu.nl](mailto:info.ivm@vu.nl)

#### **Copyright © 2026, Institute for Environmental Studies (IVM), Vrije Universiteit Amsterdam**

This work was produced with public funding as part of the International Panel on Deltas and Coastal Areas (IPDC) programme in support of the National Adaptation Strategy of Aruba. This report is licensed under the Creative Commons Attribution 4.0 International License (CC BY 4.0). This means that the work may be shared, copied, redistributed, adapted, and reused for any purpose, including commercial purposes, provided appropriate credit is given to the authors and the source, and any changes are indicated. The authors retain moral rights. Proper citation of this report is required in all forms of reuse.



### **Acknowledgements**

We sincerely thank all respondents for their willingness to share their time, experiences, and perspectives by participating in the survey. Their contribution was essential to the success of this study.

### **Citation**

Robinson, P. J., Peterson, R., van Beukering, P., Carvalhal, J., Kelder, T., Boon, E., Acevedo, D., Mettes, C., Sebold, T., & van der Velden, M. (2026). Public preferences towards climate change adaptation in Aruba: a national survey. (IVM Reports; Vol. R-26/, No. 03). Institute for Environmental Studies (IVM) report for the International Panel on Deltas and Coastal Zones (IPDC).

## Contents

<b>Executive summary</b>	<b>5</b>
<b>1 Introduction</b>	<b>8</b>
<b>2 Methods</b>	<b>10</b>
2.1 Survey implementation	10
2.2 Questionnaire	11
2.3 Quantitative data analysis	13
2.4 Qualitative data analysis	14
<b>3 Results</b>	<b>16</b>
3.1 Sample characteristics	16
3.2 Climate change experiences and attitudes	19
3.3 Attitudes towards climate change adaptation	21
3.4 Predictors of climate beliefs, awareness, perceptions and economic impacts	31
3.5 Predictors of climate themes and adaptation options viewed as most important	35
3.6 Qualitative insights	39
<b>4 Discussion of key insights</b>	<b>41</b>
4.1 Societal mandate for climate adaptation	41
4.2 Addressing rising temperatures as the primary climate concern	41
4.3 Addressing economic impacts as the most commonly experienced climate effects	42
4.4 Strong public support for nature-based policies alongside support for technical and infrastructure-based adaptation	43
4.5 Role of education in shaping climate perceptions and preferences	44
4.6 Implications of other sociodemographic differences in climate perceptions and preferences	45
4.7 Expected leadership on climate adaptation	46
4.8 Equity considerations in adaptation policies	46
4.9 Survey limitations and caveats	47
<b>5 Conclusion</b>	<b>48</b>
<b>References</b>	<b>50</b>
<b>Appendix A Questionnaire</b>	<b>52</b>

## Executive summary

This report presents the results of a nationwide survey examining how residents of Aruba perceive climate change, the impacts they are already experiencing, and which adaptation measures they consider most important for the future. The survey was conducted between 29 October and 19 December 2025 as part of the National Adaptation Strategy for Aruba 2050 (NAS-A) process. To reach a broad cross-section of the population, the survey was implemented through a combination of online and in-person outreach methods. After applying data quality filters, a total of 556 completed responses were included in the quantitative analysis. In addition, qualitative insights were derived from a subset of 173 open-ended responses, using an inductive thematic approach to capture community-driven perspectives and locally grounded concerns.

Overall, the findings reveal a strong societal awareness of climate change and a broad mandate for climate adaptation policies. The vast majority of respondents believe that climate change is occurring, and most attribute it primarily to human activity. Climate change is also a relatively salient issue in daily life, with many respondents reporting that they think about it regularly and express concern about its potential future impacts. Nearly nine out of ten respondents indicated that adapting to climate change should be either a critical urgency or a top policy priority for Aruba in the coming decade. In addition, most expect that climate change will require them to change aspects of their daily lives in the near future. Taken together, these findings suggest that policymakers have a strong foundation of public support for advancing ambitious adaptation strategies. At the same time, qualitative responses indicate that this support is shaped by concerns about the current balance between economic development and environmental protection, particularly in relation to tourism, suggesting that future policies may need to explicitly address these perceived trade-offs to maintain public trust and legitimacy.

Among the six climate themes considered in the survey, rising temperatures clearly emerged as the most pressing concern from the perspective of residents, ahead of issues such as sea level rise, oceanic changes, drought, storms, and changing wind patterns. This prioritization is consistent with respondents' reported experiences over the past five years, where large shares indicated that higher average temperatures and more extreme heat have already affected their everyday lives, and resulted in behavioral changes like reduced outdoor activities. Adaptation measures addressing heat that were strongly supported in the survey include those related to expanding renewable energy for cooling, increasing urban trees and greening, as well as improving building materials and designs and building codes to maintain cooler environments. Qualitative insights further highlight that residents often link rising temperatures to local land-use changes, such as reduced vegetation and increased urbanization, indicating that climate adaptation is closely connected to spatial planning and urban design in the public perception. This also suggests value in developing district-specific green maps to guide targeted urban greening interventions.

Moreover, the most experienced impacts of climate change reported by respondents relate to cost-of-living pressures on households. Higher food prices and increased expenses for energy, water, and fuel were the impacts most frequently cited by respondents. Other commonly experienced impacts include power cuts or energy supply issues and degradation of natural environments. Direct physical damages or

impacts were less commonly experienced. These findings demonstrate the value of linking climate adaptation strategies with policies that strengthen economic resilience and reduce household vulnerability to rising costs, e.g., through improved energy and water-use efficiency, and resilient food production systems. Furthermore, qualitative responses raise concerns about the distribution of these costs, with some residents perceiving that households may bear a disproportionate burden compared to larger commercial actors, underscoring the importance of equitable policy design.

Across different climate themes, the survey also reveals strong support for nature-based solutions alongside technical and infrastructure-based adaptation measures. Many respondents favored measures such as protecting coral reefs, mangroves, seagrass and wetland ecosystems, restoring coastal vegetation, and expanding urban green spaces. These options were often selected as top priorities within their respective climate themes. Respondents also supported engineered and infrastructural measures, including improvements to drainage systems, strengthening critical infrastructure, coastal defenses, and upgrades to wastewater treatment systems. Therefore, the findings suggest that residents broadly support integrated adaptation approaches that combine nature-based solutions with technical and infrastructural investments. Qualitative responses reinforce this integrated approach. Concern is expressed about ongoing environmental degradation, loss of natural spaces, and pressure from tourism development, which highlights the importance of stronger environmental regulation enforcement and sustainable land-use practices.

Education emerges as one of the most consistent factors associated with climate perceptions and preferences. More highly educated respondents were more likely to attribute climate change to human causes and to report thinking about climate change more frequently. Education is also associated with certain adaptation preferences, including a greater likelihood of prioritizing rising temperatures and selecting nature-based adaptation options. It is suggested that policymakers tailor communication and awareness strategies to ensure sufficient uptake by subgroups with lower education, e.g., using simple and outcome-orientated messaging rather than complex technical or scientific language, and by drawing on locally relevant examples and practical guidance. In addition, the finding that older respondents report higher levels of climate awareness suggests that outreach and communication efforts could also focus on engaging younger citizens, e.g., via social media and incorporating the Aruba Climate Impact Atlas into the national school curriculum, in order to maintain balanced societal awareness and engagement. Qualitative findings further reveal a small but vocal group expressing climate skepticism, emphasizing the need for localized and relatable communication that clearly explains how climate change is already affecting Aruba and how these impacts are expected to develop in the future, using accessible language and concrete examples.

In contrast, geographic location within Aruba is not significantly associated with climate beliefs, levels of awareness, perceived future impacts, or experienced economic impacts. This suggests that climate change is widely perceived as a shared island-wide challenge rather than an issue affecting only specific districts. However, qualitative insights suggest that lived experiences of environmental change, such as reduced access to natural spaces or localized degradation, may still vary.

The survey further provides insights into how residents believe climate adaptation should be managed. Many respondents indicated that adaptation should be managed

primarily at the national level, while a similarly large share favored shared responsibility across multiple governance levels, including local, regional Caribbean, Kingdom, and international levels. These responses indicate that many residents expect the national government to play a central coordinating role in adaptation, while a large proportion also recognize the importance of cooperation and meaningful engagement in decision-making across different management levels. This would require a clear roadmap to align responsibilities and resources. Furthermore, qualitative responses highlight the importance of transparency, accountability, and follow-through, with some residents expressing concern about “survey fatigue” and calling for visible, tangible action, and public sharing of outcomes.

Finally, the results highlight the importance of equity considerations in climate adaptation. While half of respondents indicated that adaptation support should be provided equally to everyone, meaningful shares also identified specific groups as deserving additional assistance. Respondents frequently identify elderly people, residents living in high-risk areas, and low-income households. These responses suggest that while universal adaptation measures are broadly endorsed, there is also recognition that certain groups may face greater exposure to climate risks or have fewer resources to cope with them. Supporting measures for adaptation may be beneficial in overcoming the multiple aforementioned dimensions of social vulnerability. This may take the form of financial assistance for climate-resilient housing and/or provision of low-interest, means-tested adaptation loans via the creation of a National Adaptation Fund, as well as small-scale community grants to support locally driven adaptation measures, improved access to clear, understandable information on climate risk and adaptation, as well as practical support to ensure effective participation in adaptation planning and response. Ensuring that adaptation policies are perceived as fair and inclusive, particularly in terms of how costs and benefits are distributed across society, will be critical for maintaining long-term public trust and effectiveness.

## 1 Introduction

Like many small islands, Aruba faces a fundamental tension: the very features that drive its economic success, including its beautiful coastlines, valuable marine ecosystems, and pleasant climate, are also those most susceptible to climate-related risks. Unlike larger nations that can absorb shocks through economic diversification and geographic scale, Aruba's vulnerability is systemic. Its prosperity is deeply intertwined with climate-sensitive sectors such as tourism, and its adaptive capacity is constrained by fiscal limitations, institutional scale, and the concentration of people and assets in coastal zones (Mycoo et al., 2019; Palacios et al., 2021). Given the role of tourism in Aruba's economy, climate-related disruptions to this sector, and the ways in which tourism development interacts with environmental pressures, may also have direct implications for employment stability, income security, and overall social resilience among residents. For Aruba, climate change is not a distant or hypothetical threat; it is an immediate multiplier of existing risks, amplifying pressures on water security, energy demand, public health, and the very livability that defines the island's character.<sup>1</sup>

This systemic vulnerability manifests in the island's acute and multifaceted exposure to various climate hazards. Rising sea levels, for instance, threaten not only coastal infrastructure and the tourism product but also the freshwater lens that supplies drinking water, placing additional strain on an already energy-intensive desalination system. Ocean warming and acidification progressively undermine the coral reefs that serve as natural breakwaters and support marine biodiversity, weakening a first line of defense against storm surges and coastal erosion (Nurse et al., 2014). Concurrently, climate projections point toward more frequent and intense heatwaves, prolonged droughts, and altered wind patterns, each with cascading consequences for energy consumption, water availability, agricultural viability, and resident well-being (Gruber et al., 2025).

These interconnected hazards, when combined with Aruba's structural constraints, transform climate change into a fundamental risk multiplier. For Aruba and its Caribbean neighbors, climate change therefore functions not as a straightforward challenge but as a force that intensifies environmental pressures and socioeconomic inequalities, demanding urgent, strategic, and context-sensitive adaptation planning (Thomas and Benjamin, 2018). The urgency of such planning is further underscored by broader regional developments: a recent Dutch court ruling concerning Aruba's sister-island Bonaire specifically addressed the Netherlands' responsibilities within its Kingdom, finding that the Dutch state failed to provide adequate protection against climate risks for its residents. While this ruling directly concerns Bonaire, its underlying principle – that island residents are entitled to adequate protection against climate risks – resonates across the Dutch Caribbean, including Aruba. The ruling emphasizes the heightened vulnerability of these islands and reinforces the imperative for proactive, well-resourced, and locally grounded adaptation strategies.

---

<sup>1</sup> Livability on the island may be understood through measurable dimensions such as thermal comfort, access to shaded public spaces, and the affordability of essential services like energy and water.

Yet, the formulation of a technically sound adaptation strategy, while necessary, is insufficient on its own. A growing body of evidence demonstrates that adaptation effectiveness is fundamentally mediated by social factors: how risks are perceived, whose values are reflected in policy choices, and whether communities see themselves as subjects rather than objects of adaptation efforts (Adger et al., 2013). When adaptation plans are designed without considering local experiences and values, they often meet public resistance and ultimately do not work (Latai-Niusulu et al., 2020). This is especially true on small islands, where community ties are strong, cultural connections to place run deep, and knowledge about the local environment is handed down through generations. Effective adaptation, therefore, requires not only engineering and ecological expertise but also a nuanced understanding of the social and political dynamics that shape how communities understand, experience, and respond to climate risks (Nalau et al., 2018).

This study was designed as part of Aruba's National Adaptation Strategy (NAS-A) process. The survey systematically captures what Aruban residents think about climate change, how they have already been affected by it, and which adaptation measures they prefer. It provides input for the prioritization and action phase, complementing scientific data and expert assessments. Its findings are intended to inform the National Climate Resilience Council (NCRC) and to ensure that the eventual strategy reflects not only technical and financial considerations but also the values, concerns, and aspirations of the population it will ultimately serve.

This report proceeds as follows. Section 2 describes the survey methodology, including the hybrid online and in-person data collection approach designed to reach a broad cross-section of Aruba's population. Section 3 presents the survey results, beginning with sample characteristics and moving through descriptive findings on climate experiences, beliefs, and adaptation preferences, followed by econometric analyses examining sociodemographic predictors of perceptions and priorities. Section 4 discusses the key implications of these findings for policy development, highlighting areas of strong societal consensus, points of divergence, and considerations for equitable and effective implementation. Section 5 concludes with reflections on how the survey findings can anchor the NAS-A in the lived realities of Aruban residents, strengthening its legitimacy and long-term durability.

## 2 Methods

### 2.1 Survey implementation

The survey was designed to capture perspectives from residents across Aruba on climate change, experiences with climate risks and adaptation preferences. The survey was conducted over a 52-day period, from 29 October to 19 December 2025, relying primarily on online participation, but complemented by in-person outreach to improve inclusion of groups less likely to respond through digital channels. The data collection strategy aimed to reach a broad cross-section of the population and to work toward a minimum sample size consistent with the survey design target described in the NAS-A workplan (minimum 387 respondents).

The survey targeted all adult residents of Aruba aged 16 years and older. Ethics approval for the survey was also obtained prior to data collection from the research ethics review committee of the Faculty of Science of Vrije Universiteit (VU) Amsterdam (BETHCIE). To support accessibility, the survey was available in four languages: Papiamentu, Dutch, English and Spanish, and could be completed on a mobile device. All translations were verified by native speakers to ensure linguistic precision and cultural appropriateness.

Data were collected through the Qualtrics online survey platform hosted on servers operated by VU Amsterdam, following the university's data protection policies. The data collection utilized a combination of the following survey modes: (1) online survey accessed through a direct web link (distributed digitally); (2) online survey accessed via QR codes placed on printed flyers in public locations; and (3) in-person recruitment and support to complete the same online survey (including targeted outreach for underrepresented groups). A phased approach was applied to maximize reach while improving balance across sociodemographic groups. Throughout the data collection period, responses were monitored to identify gaps in participation by age, district, and gender. The outreach plan was continuously adjusted to address these gaps and to reduce barriers to participation by offering the multiple aforementioned survey modes.

In the first phase, the survey was shared online via social media platforms (Instagram and Facebook pages e.g., of Impact Blue Foundation<sup>2</sup> and Brenchie's Lab<sup>3</sup>) and digital news outlets.<sup>4</sup> Boosted social media advertisements were used to increase visibility thereby reaching a broad audience. In the second phase, flyers containing a QR code that linked directly to the survey were distributed, allowing respondents to fill in the survey at their own convenience. Flyers were handed out at physical locations, such as

---

<sup>2</sup> <https://www.facebook.com/impactbluefoundation/>

<sup>3</sup> <https://www.facebook.com/brenchieslab/>

<sup>4</sup> A small number of public comments posted in response to social media posts sharing the survey link expressed climate skepticism. While the questionnaire itself aimed to be as neutral as possible regarding study objectives, the use of the word "climate" in the survey name and outreach messaging was sufficient to elicit strong reactions from some individuals. Comments ranged from "climate hoax/agenda" framing and broader distrust in institutions, to constructive local observations (e.g., land use, water scarcity and environmental management). These comments are not treated as survey data; they are documented here only as contextual information that may have influenced willingness to participate for a subset of the audience.

doctors' offices, other public and work-related offices, and at public events (e.g., the University of Aruba (UA) Open Day). Distribution was prioritized in districts where response numbers remained low. In the fourth phase, based on reviewed response patterns at the time, students from the Sustainable Island Solutions through Science, Technology, Engineering and Mathematics (SISSTEM) program at the UA conducted outreach in-person as part of academic assignments. This effort helped increase participation in districts and among sociodemographic groups that were underrepresented in initial online responses. In the fourth and final phase, in-person surveys focused on increasing responses from individuals aged 70 years and above. This approach was especially useful for engaging groups that were less likely to respond through online channels or QR codes. Importantly, the same questionnaire and response options were used across all survey modes.

The survey design, data collection, and reporting phases were collaboratively managed within the broader NAS-A workplan. To ensure an efficient workflow, specific responsibilities were distributed among the participating partners: UA managed the on-the-ground data collection, led targeted outreach initiatives, and provided logistical support for field implementation. VU Amsterdam led the initial survey design, oversaw the overarching data collection methodology, conducted the final data analysis, and managed the reporting of the results. NCRC (overall NAS-A Lead) governed the overarching NAS-A project, ensuring that all survey activities aligned with the broader NAS-A processes and specific stakeholder needs. The International Panel on Deltas and Coastal Areas (IPDC: Climate Adaptation Services (CAS) and Impact Blue) delivered technical support and facilitated coordination across the wider IPDC NAS-A activity framework.

## 2.2 Questionnaire

The survey questionnaire was developed based on overarching project objectives, i.e., to support delivery of the NAS-A, under the authority of the NCRC. It does so by identifying and prioritizing climate adaptation options across several climate themes. As a starting point, questions were adapted from large, established cross-country surveys with the aims of assessing citizens' attitudes towards climate change and adaptation (EIB, 2024; Flynn et al., 2024). Further refinement tailored questions to the specific climate threats and impacts, as well as the socioeconomic and governance conditions on the island.

The questionnaire began with language selection (English, Papiamentu, Dutch or Spanish) and an informed consent section. The consent form provided information on the study objectives, the organizations responsible for implementing the survey, the voluntary nature of participation, eligibility criteria (respondents needed to be at least 16 years of age to participate), the expected completion time, data confidentiality, and contact details for further inquiries.

The first questions focused on attitudes towards climate change as well as experiences with specific impacts and problems caused by climate change. This was followed by questions on climate adaptation, i.e., taking action to adjust to present and future climate impacts. Respondents were asked in particular about: (1) which of six climate themes they consider to be the most important to adapt to in the next 10 years in Aruba (*It is getting warmer, It is getting drier, Storms, rains & hurricanes, Warmer &*

*more acidic sea, The sea level is rising and The wind is changing*); (2) their five most preferred adaptation options from a list of nine or ten relevant options based on the climate theme respondents ranked as most important; (3) the relevance of different criteria in their choice of adaptation options; (4) perceived importance of adapting to climate change in Aruba in the next ten years; (5) at what level they think adaptation would be best managed; (6) whether they think the impact of climate change on their life in the next ten years would require them to change and adapt the way they live; and (7) which subgroups of the population should be prioritized for help when adapting. Questions whose answer options had no natural ordering were presented to respondents in a random order. By contrast, questions with naturally ordered answer options (e.g., Likert-scale responses) were presented in their original order.

The adaptation actions were identified in a stakeholder workshop (technical input for survey), where over 400 actions were identified. These were then translated into 58 high-level adaptation options across the six climate themes. The climate adaptation criteria included in the survey were developed through a structured, three-step process combining literature review and expert consensus. First, a broad set of criteria were identified based on international panels and platforms (e.g., Intergovernmental Panel on Climate Change (IPCC), as well as Climate-ADAPT and their Regional Adaptation Support Tool (RAST)). The criteria were then localized through a review of Aruban policy and research documents to ensure relevance across environmental, social, and economic dimensions, which resulted in 14. This initial list was then refined via an online three-round Delphi study with 20 local experts: in round one, experts assessed relevance and selected a shortlist of seven criteria; in round two, they ranked the top criteria, narrowing these to five; and in round three, they scored these on importance (from 1 (no importance) to 10 (paramount importance)), with consensus and weight measured using an agreement index. This iterative process resulted in four final, high-priority criteria to be included in the survey: (1) effectiveness in addressing key vulnerabilities for long-term resilience, (2) alignment with nature-inclusive vision and ecosystem-based adaptation for shared prosperity, (3) social equity, inclusivity, and intergenerational justice, and (4) cost-effectiveness and financial feasibility for societal benefit.

The survey concluded with several standard sociodemographic questions, i.e., age, gender, income, education, employment, and place of residence. Moreover, one open question was asked on whether respondents have any further comments to share. The final page provided additional information and resources on climate change in Aruba.<sup>5</sup> The full questionnaire is included in Appendix A.

In total, the survey consists of 1,045 respondents, of which 446 did not complete the entire survey. Of the remaining respondents, 11 did not provide informed consent. A further 28 respondents either *don't think that climate change is happening* (10) or *have no idea whether climate change is happening or not* (18). These respondents are removed from the quantitative analysis<sup>6</sup> because their responses are either likely to reflect protest votes or arbitrary / weakly held preferences towards climate adaptation. Moreover, a close review of responses to the final open-ended question (*Is there anything else you would like to add?*) showed that a small number of entries were

---

<sup>5</sup> Respondents were directed to the NCRC Aruba website and Aruba's Climate Impact Atlas.

<sup>6</sup> Qualitative analysis included the 28 respondent responses.

either test responses, reflected conspiracy-style views on climate change, or explicitly stated that they did not represent the respondent's true opinion (4). These responses are removed as well. The quantitative analysis is based on 556 completed responses.

To capture the nuanced community perspectives on climate adaptation, a qualitative research design was employed for the final open-ended segment of the survey. The analytical framework was grounded in the principles of community-based research, prioritizing the lived experiences, local ecological knowledge, and socio-economic realities of the respondents. Given the context of a Small Island Tourism Economy (SITE), the approach intentionally sought to understand how environmental changes intersect with localized economic pressures, spatial planning, and community resilience.

### 2.3 Quantitative data analysis

Survey responses with categorical answer options are presented descriptively as the proportions of respondents selecting each option, shown in bar charts (section 3.2 and sector 3.3). Inferential statistical analysis is also used to examine the relationship between respondents' sociodemographic characteristics and (1) climate beliefs and perceptions (section 3.4); (2) felt economic impacts (section 3.4); (3) the climate change theme they ranked as most important to adapt to (section 3.5); and (4) the adaptation options they selected within the highest-ranked climate theme (*it is getting warmer*, section 3.5).

Climate beliefs and perceptions, felt economic impacts, the highest ranked climate theme, and chosen adaptation options are specified as dependent variables. Climate beliefs and perceptions are either specified as binary outcomes (i.e., variables with two possible categories, such as one belief versus another; *I think that climate change is happening, and I think that humans are largely causing it* versus *I think that climate change is happening, but it's just a natural fluctuation (variation) in Earth's temperatures*), or ordered outcomes (for Likert-scale response questions). Felt economic impacts are specified as binary outcomes (i.e., indicating whether a respondent did or did not experience a given impact) for the two most commonly reported negative financial experiences due to climate change (*higher food prices* and *increased financial expenses from energy, water and/or fuel*). Moreover, the climate theme is specified as a single categorical variable representing each respondent's top-ranked theme, and the adaptation options as multiple binary variables indicating whether each option was selected (yes or no).

The relationships are estimated using ordinal logit models for ordered outcomes, logit models for binary responses,<sup>7</sup> and a multinomial logit regression model for the climate

---

<sup>7</sup> A multivariate probit model was also considered for modelling adaptation option selections. This accounts for potential correlations among answer options, i.e., a respondent may be more likely to select adaptation options they perceive to be complementary. However, convergence problems occurred when running this more complex regression model, which is why we favor a simple logit model. Furthermore, note that the logit analysis is conducted only for the adaptation options within the highest-ranked climate theme, rather than across all themes. Because respondents only selected adaptation choices for their top-ranked theme, including other themes would result in very small sample sizes for some themes (N = 18 – 76), which leads to unstable estimates or (more commonly) inestimable models. By focusing on the top-ranked theme (*it is*

themes; this accounts for the fact that the top-ranked theme is a mutually exclusive choice among the different themes. Apart from models with ordered outcomes as dependent variables, average marginal effects are computed for interpretation.

## 2.4 Qualitative data analysis

The primary data source for qualitative analysis consisted of responses to the final open-ended question of the community survey, which invited participants to share additional thoughts, concerns, or comments regarding climate change and adaptation strategies. From the initial dataset, a total of 299 raw text entries were extracted. A systematic data cleaning protocol was applied to ensure the integrity and relevance of the analytical process:

- **Exclusion of Non-Substantive Data:** Entries that were blank, test inputs (e.g., "Remove this entry, it is just a test"), or constituted single-word negations/non-answers (e.g., "no," "none," "nope," "no danki," "-") were filtered out.
- **Final Sample:** Following this refinement, a robust qualitative corpus of 173 substantive, meaning-rich comments was established.
- **Linguistic Processing:** The dataset exhibited significant linguistic diversity, containing responses in Papiamentu, Dutch, English, and Spanish. To preserve the cultural and contextual integrity of the responses, such as specific local colloquialisms (e.g., *rosa tereno*, *handhaving*), the data was analyzed in its original languages rather than relying on automated homogenization, ensuring that indigenous and local expressions of ecological concern were accurately interpreted.

The qualitative data was subjected to a rigorous, inductive Thematic Analysis (following the foundational phases of Grounded Theory). This method was selected for its flexibility and efficacy in identifying, analyzing, and reporting patterns (themes) within rich qualitative datasets. The process was executed in iterative phases:

**Phase 1: Data Familiarization:** The entire corpus of 173 comments was read and re-read iteratively to establish a deep familiarity with the breadth and depth of the community's narratives.

**Phase 2: Initial Open Coding:** Transcripts were systematically coded line-by-line. Codes were generated inductively, meaning they were derived directly from the data rather than mapped onto a pre-existing theoretical framework. This allowed community-driven priorities, such as concerns over specific infrastructure bottlenecks (e.g., waiting times for solar panels) or localized environmental degradation (e.g., off-road vehicle (UTV) damage), to organically emerge.

**Phase 3: Searching for and Reviewing Themes:** Initial codes were collated into broader, potential themes. These themes were iteratively reviewed against the coded extracts and the entire dataset to ensure they accurately reflected the sentiments of the community.

---

*getting warmer*), the number of observations (N = 291) is sufficient for stable estimation of the logit model and manageable standard errors.

Phase 4: Defining and Naming Themes: The refined themes were clearly defined to capture the essence of the public discourse. The finalized thematic categories included:

- Overdevelopment and Tourism Pressures
- Nature-Based Solutions, Greening, and Biodiversity
- Waste Management and Local Pollution
- Infrastructure, Resources, and Government Action
- Education and Community Awareness
- Climate Skepticism and Methodological Feedback

To ensure the validity of the findings, several methodological safeguards were integrated:

- **Negative Case Analysis:** The analysis actively sought out and incorporated divergent or dissenting voices. By intentionally analyzing and including comments reflecting climate skepticism and denialism, the findings maintain an authentic representation of the entire community spectrum, avoiding the artificial homogenization of public opinion.
- **Contextual Grounding:** The coding process deliberately maintained the connection between the stated environmental concerns and the structural realities of island economies. By interpreting the data through this lens, the analysis successfully bridged the gap between macro-level climate discourse and micro-level community priorities, ensuring the resulting conclusions are both scientifically sound and contextually actionable for policymakers.

## 3 Results

### 3.1 Sample characteristics

Table 3-1 displays the individual sample sociodemographic characteristics. The table notes also show comparable general population statistics based on census data from the Central Bureau of Statistics (CBS) of Aruba.<sup>8</sup> The majority of our sample can be categorized as either aged 40 years and above (57%), living in a household that earns Afl. 7,000 or less per month after tax (51%), a full-time employee (53%), or having at least graduated from university/college (WO/HBO) (>50%). Furthermore, 41% are male and 58% are female, with the remaining respondents listing *other* or *prefer not to say* as their gender category (both <1%). The sample is located across eight districts, i.e., Noord/Tanki Leendert (31%), Oranjestad West (12%), Oranjestad Oost (6%), Paradera (13%), Santa Cruz (19%), Savaneta (9%), San Nicolaas Noord (4%), and San Nicolaas Zuid (4%). 2% preferred not to disclose their location.

Although the sample achieved a good level of diversity across the various sociodemographic variables, it is important to mention that it is not exactly representative of the general population. Namely, older (60+ years) age groups are under-represented, while middle-aged and younger respondents are over-represented. Moreover, women are slightly over-represented compared to males. The sample also likely over-represents higher-income households compared with the population.<sup>9</sup> Note that a notable share (19%) of respondents did not report their income, which limits examination of representativeness for this variable. Furthermore, lowly educated individuals (primary or less) are strongly under-represented, while tertiary-educated respondents are over-represented. The sample also over-represents working individuals and under-represents those who are economically inactive (e.g., students, retirees, and homemakers) as well as the unemployed. Lastly, the sample over-represents residents of Noord/Tanki Leendert and Santa Cruz, and under-represents residents of Oranjestad Oost and San Nicolaas Noord. Other districts, including Paradera, Oranjestad West, San Nicolaas Zuid and Savaneta are represented roughly in line with the population.

---

<sup>8</sup> <https://cbs.aw/>

<sup>9</sup> The population benchmark is gross monthly income, while the sample reports after-tax income; this further indicates that lower-income households are under-represented.

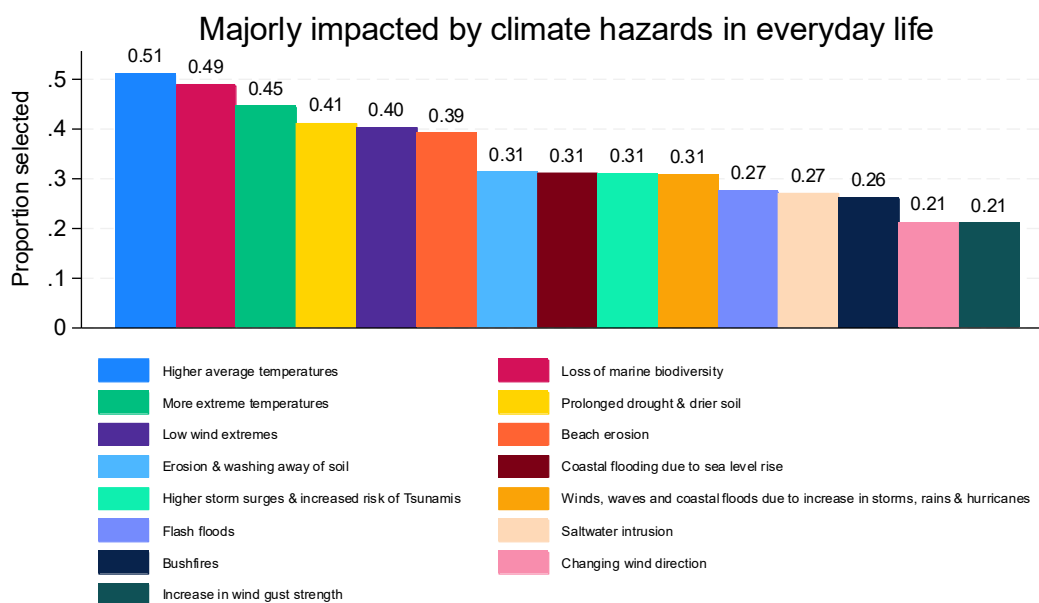
<b>Variable</b>	<b>Question</b>	<b>Proportion (frequency)</b>
Age	How old are you, in years?	16 – 17 years: 2% (10) 18 – 19 years: 7% (39) 20 – 24 years: 8% (46) 25 – 29 years: 8% (47) 30 – 34 years: 7% (41) 35 – 39 years: 10% (54) 40 – 44 years: 9% (52) 45 – 49 years: 10% (54) 50 – 54 years: 12% (64) 55 – 59 years: 10% (53) 60 – 64 years: 7% (37) 65 – 69 years: 5% (26) 70 – 74 years: 4% (21) 75 – 79 years: 1% (8) 80+ years: <1% (4) Prefer not to say: 0% (0)
Gender	What is your gender?	Male: 41% (229) Female: 58% (322) Other: <1% (2) Prefer not to say: <1% (3)
Income	Which of the following options best describes your monthly household income for 2025 after taxes?	Less than Afl. 2,010: 6% (32) Afl. 2,010 – 2,500: 5% (27) Afl. 2,501 – 3,000: 7% (37) Afl. 3,001 – 4,000: 9% (49) Afl. 4,001 – 5,000: 9% (49) Afl. 5,001 – 7,000: 16% (87) Afl. 7,001 – 9,000: 11% (60) Afl. 9,001 – 12,000: 10% (55) Afl. 12,001 – 15,000: 3% (17) More than Afl. 15,000: 7% (39) Don't know: 6% (31) Prefer not to say: 13% (71)
Education	What is your highest completed level of education?	Primary education: 2% (10) Secondary vocational education (EPB/EPI): 10% (55) Secondary intermediary education (MAVO): 9% (51) Secondary higher education (HAVO/VWO): 21% (115) Graduated from university/college (WO/HBO): 47% (260) Post-graduate education (PhD): 4% (20) Other: 4% (20) Prefer not to say: 4% (25)
Employment	Which of the following categories best characterizes you?	Full-time employee: 53% (292) Part-time employee: 7% (40) Employer: 2% (12) Homemaker: 2% (10) Self-employed / Freelancer: 5% (29) Entrepreneur: 5% (26) Unemployed / Looking for a job: 1% (7) Retired: 8% (46) Student: 13% (70) Disabled: <1% (2) Other: 3% (14) Prefer not to say: 1% (8)
Place of residence	In which district of Aruba	Noord/Tanki Leendert: 31% (171)

	do you live?	Oranjestad West: 12% (65) Oranjestad Oost: 6% (35) Paradera: 13% (73) Santa Cruz: 19% (108) Savaneta: 9% (48) San Nicolaas Noord: 4% (25) San Nicolaas Zuid: 4% (21) Prefer not to say: 2% (10)
<p>General population statistics are as follows for age, gender, income, education, employment and place of residence:</p> <p><i>Age (as of 2025):</i> 15 – 19 years: 7% (6,927); 20 – 24 years: 6% (5,519); 25 – 29 years: 6% (5,672); 30 – 34 years: 7% (6,872); 35 – 39 years: 8% (7,372); 40 – 44 years: 8% (7,487); 45 – 49 years: 8% (7,507); 50 – 54 years: 8% (7,820); 55 – 59 years: 9% (8,315); 60 – 64 years: 9% (8,636); 65 – 69 years: 8% (7,433); 70 – 74 years: 6% (5,752); 75 – 79 years: 4% (3,848); 80+ years: 4% (4,109).</p> <p><i>Gender (as of 2025):</i> Male: 46% (43,342); Female: 54% (49,927).</p> <p><i>Income (as of 2016):</i> Median gross monthly household income from all sources: Afl. 3,558 (adjusted for inflation to 2025 based on <a href="https://www.worlddata.info">https://www.worlddata.info</a>: Afl. 4,168).</p> <p><i>Education (as of 2010):</i> Primary education or less: 35%; Secondary education: 41%; Vocational middle level: 11%; Higher level and university level: 13%.</p> <p><i>Employment (as of 2024):</i> Employed: 61%; Unemployed: 4%; Economically inactive (students, retired, homemakers, etc.): 37%.</p> <p><i>Place of residence (as of 2020):</i> Noord/Tanki Leendert: 23%; Oranjestad West: 13%; Oranjestad Oost: 14%; Paradera: 13%; Santa Cruz: 14%; Savaneta: 11%; San Nicolaas Noord: 9%; San Nicolaas Zuid: 4%.</p>		

## 3.2 Climate change experiences and attitudes

Among respondents in the sample who believe climate change is occurring, the majority (80%) think it is mainly caused by human activity. The remaining 20% believe climate change is simply a natural fluctuation in the Earth's temperature. Moreover, 22% indicated they think about climate change *daily*, 33% think about it *weekly*, and 38% think about it *a few times a year*. Only 4% *never* think about it, and another 4% *don't know* how often they think about it. In addition, when asked about the potential impact of climate change on their lives over the next 10 years, 24% indicated they are *very worried*, 33% are *quite worried*, and another 33% are *slightly worried*. Meanwhile, 8% say they are *not worried at all*, and 1% are unsure whether they are worried or not.

Figure 3-1 displays the shares of respondents who indicated being majorly negatively impacted in everyday life by different climate hazards over the past five years. Each climate hazard was grouped based on Aruba's six climate themes. Heat-related stressors and impacts were most frequently identified as major issues. These include *higher average temperatures (e.g., reduced outdoor activity and labor productivity, increase in energy consumption)* (51%), *loss of marine biodiversity (e.g., decline in coral reefs, sea grass, mangroves, etc.)* (49%), *more extreme temperatures (e.g., loss of biodiversity, increase in power outages, higher mortality)* (45%), *prolonged drought & drier soil* (41%), and *low wind extremes (e.g., more mosquito nuisance, feels hotter)* (40%). Large to moderate shares of respondents also reported being majorly affected by sea level rise-related impacts. These include *beach erosion (i.e., loss of beach sand)* (39%), *coastal flooding due to sea level rise* (31%), *higher storm surges & increased risk of Tsunamis* (31%), and *saltwater intrusion (i.e., salt concentration increase in soil & groundwater)* (27%). Similarly, moderate shares indicated major impacts from storms and rain. These include *erosion & washing away of soil* (31%), *winds, waves and coastal floods due to increase in storms, rains & hurricanes* (31%), and *flash floods* (27%). A slightly smaller share of respondents reported being majorly impacted by *bushfires* (26%). The lowest shares were reported for wind-related challenges, including *changing wind direction (e.g., change in airport or harbor operations, fishing activities, air pollution nuisance)* (21%), and *increase in wind gust strength (e.g., damage to buildings & roofs, blowing beach sand)* (21%).



*Figure 3-1 Proportions of respondents who selected each climate hazard they have been majorly negatively impacted by in everyday life in the past five years*

Figure 3-2 presents the shares of respondents who selected each of the most commonly experienced negative climate impacts over the past five years (respondents could select up to three most commonly experienced). Household cost pressures were the most frequently reported impacts, including *higher food prices* (57%), and *increased financial expenses from energy, water and/or fuel* (55%). Moderate proportions of respondents indicated climate impacts such as *reduced outdoor activities* (34%), *power cut or energy supply issues* (33%), and *destruction of land- or marine-environment or natural spaces* (25%). Smaller shares reported other impacts: *discomfort of pets* (12%), *mental health issues (such as stress and anxiety)* (12%), *reduced labor, work or learning productivity* (9%), *transportation disruptions (such as road closures or public transport delays)* (8%), *physical health issues (such as contracting an infectious disease or heat stroke)* (8%), *property damage (such as roof damage, or damage from flooding)* (6%), *increased financial expenses due to excess insurance premiums (or not able to insure)* (4%), *loss of intangible cultural heritage (such as disruption to traditional fishing practice, challenges in protecting archaeological sites or impacts on events like carnival)* (4%), and *disruption of public services (such as school closures or waste collection delays)* (4%). Negligible shares reported *drinking water issues* (1%), *displacement (e.g., due to natural disasters)* (1%), and *loss of value of your home or property* (1%). A further 4% selected *other* climate impacts as most commonly experienced, while 3% reported experiencing *none*.

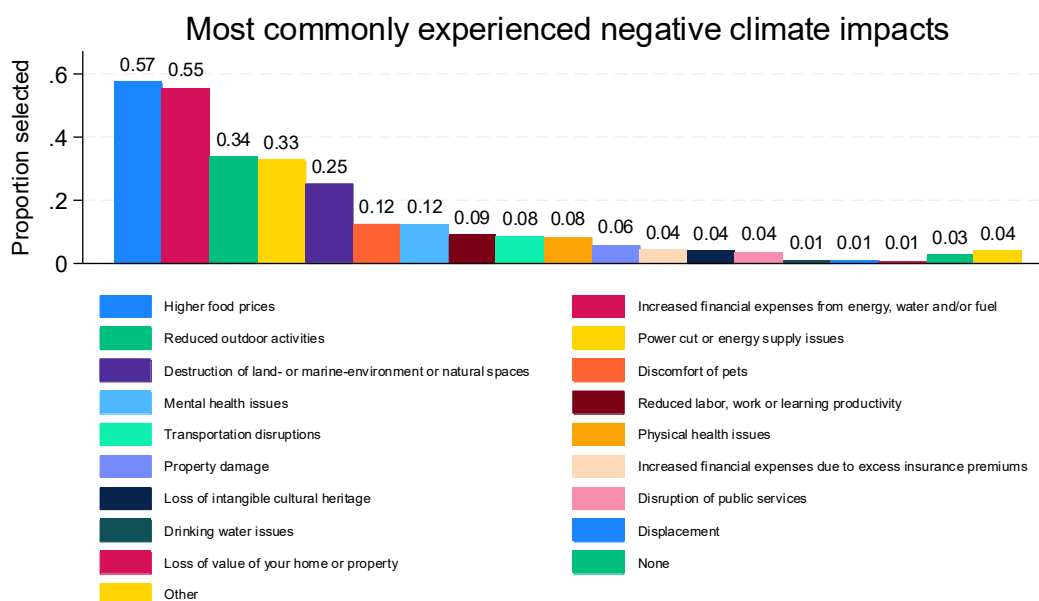


Figure 3-2 Proportions of respondents who selected each of the most commonly experienced negative climate impacts over the last five years (respondents could select up to three most commonly experienced)

### 3.3 Attitudes towards climate change adaptation

When asked whether the expected impacts of climate change over the next 10 years might lead respondents to change and adapt the way they live, the majority answered *yes, absolutely* (37%) or *yes, quite a bit* (39%). In contrast, 23% do not expect to make adjustments to their lifestyle, and 1% are unsure. In a related question, 39% of respondents think that adapting to climate change should be *a critical urgency*, and 49% think it is *a top priority*. Meanwhile, 9% think it is *important but not a priority*, and 2% think it is *not important*. The remaining respondents (<1%) are unsure.

Regarding management of climate change, 31% of respondents think that adaptation would be best managed at the national level. Smaller shares point to the regional level (i.e., across the Caribbean) (9%), the international level (8%), the Kingdom of the Netherlands level (8%), the household level (4%), the district level (2%), and local street and / or neighborhood level (2%). However, the largest share of respondents (33%) believe that the management should be a shared responsibility across levels. Fewer than 1% think that none of these stakeholders should take the lead, while the remainder (3%) are unsure who should be responsible.

Respondents were asked to rank the importance of different climate themes to address and adapt to in the next 10 years in Aruba (1 = most important to adapt to, 6 = least important to adapt to). The following scoring rule is used to generate a linear score out of 100 for each observation (i.e., ranked climate theme):  $Score = \frac{6 - ranking}{5} \times 100$ . Therefore, a climate theme ranked 1<sup>st</sup> receives a score of 100, 2<sup>nd</sup> receives 80, and so on, with the lowest ranking, 6<sup>th</sup>, receiving a score of 0. Figure 3-3 shows the mean

scoring for the perceived importance of the different climate themes. Moreover, Table 3-2 presents, for each climate theme, how many respondents (frequency) and what proportion of respondents assigned each possible ranking.

The results indicate that *it is getting warmer* was considered the most important theme, with a mean score of 78.63. This is followed by *warmer & more acidic sea* (52.27), *the sea level is rising* (48.38), *it is getting drier* (47.73), *storms, rains & hurricanes* (45.97), and *the wind is changing* (27.01), which was perceived as the least important climate theme. Investigation of the distribution of rankings highlights that *it is getting warmer* was ranked first by a majority (52%) and second by 19%, while other themes were more evenly spread across the intermediate rankings. In contrast, *the wind is changing* was ranked lowest by most respondents (38%), confirming its status as the least prioritized theme.

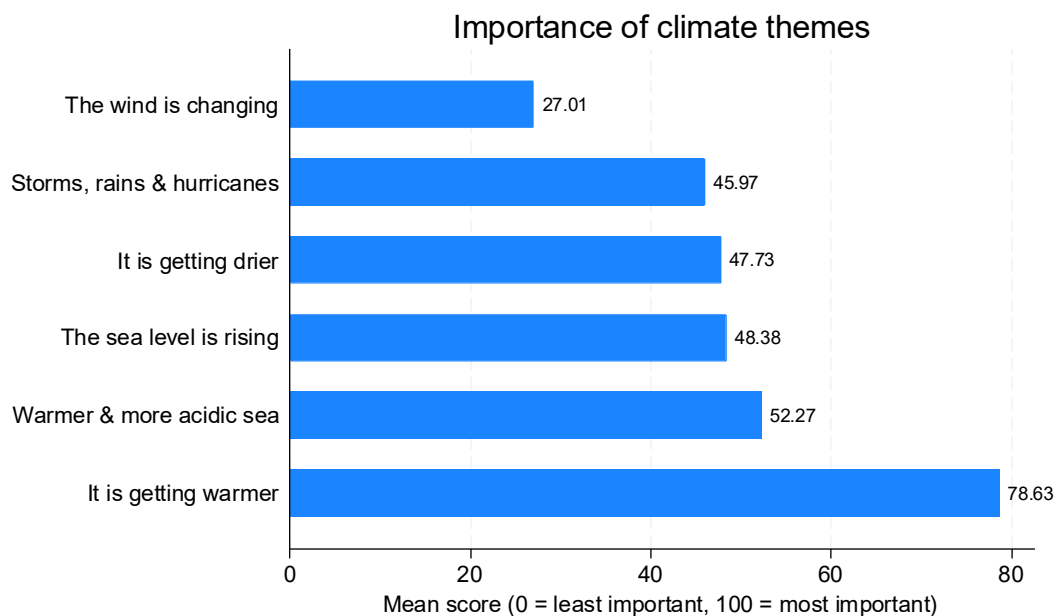


Figure 3-3 Importance of different climate themes to address and adapt to in Aruba (0 = least important, 100 = most important)

**Table 3-2: Distribution of respondents' rankings of the importance of different climate themes to address and adapt to in Aruba**

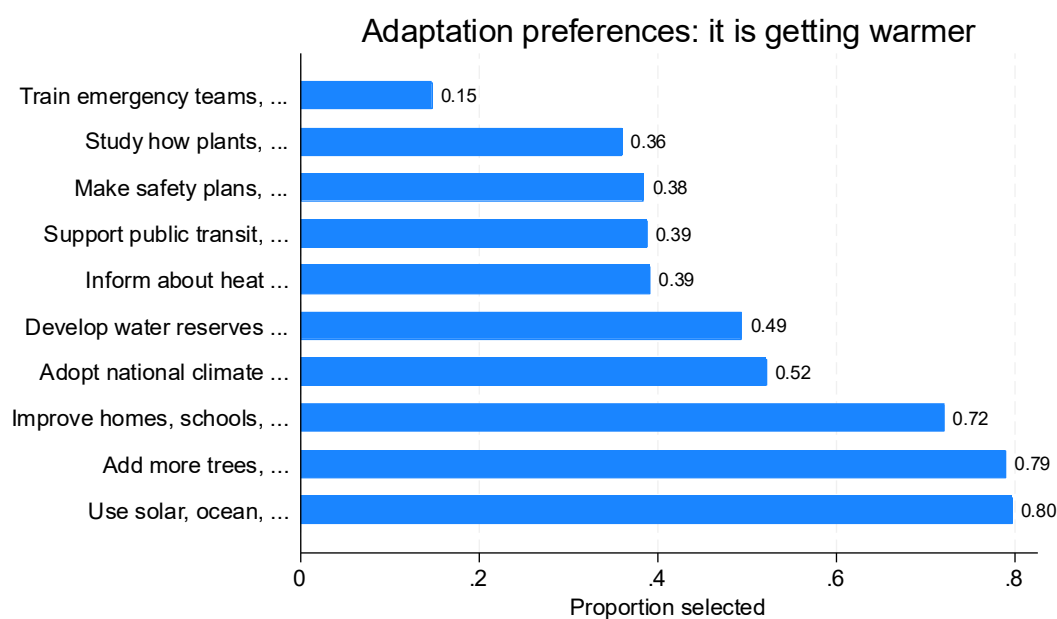
<i>Climate theme</i>	<i>Ranking 1</i>	<i>Ranking 2</i>	<i>Ranking 3</i>	<i>Ranking 4</i>	<i>Ranking 5</i>	<i>Ranking 6</i>
It is getting warmer	52% (291)	19% (103)	12% (69)	7% (41)	5% (30)	4% (22)
It is getting drier	8% (44)	22% (120)	19% (107)	18% (102)	18% (102)	15% (81)
Storms, rains & hurricanes	11% (59)	15% (86)	18% (101)	20% (109)	21% (118)	15% (83)
Warmer & more acidic sea	14% (76)	20% (113)	21% (116)	18% (99)	13% (75)	14% (77)
The sea level is rising	12% (68)	17% (97)	18% (101)	19% (104)	19% (106)	14% (80)
The wind is changing	3% (18)	7% (37)	11% (62)	18% (101)	22% (125)	38% (213)

Notes: Proportions are presented with frequencies in parentheses.

Figures 3-4 – 3-9 display the shares of respondents who selected each adaptation option they preferred most, within the climate theme they ranked as the most important to adapt to, respectively: *it is getting warmer*, *it is getting drier*, *storms, rains & hurricanes*, *warmer & more acidic sea*, *the sea level is rising*, and *the wind is changing* (respondents could select up to five adaptation options). The rankings of most to least preferred adaptation options within each climate theme are provided on the following pages. The number of times chosen (frequency) is reported in parentheses beside each adaptation option.

**It is getting warmer**

- 1<sup>st</sup>: Use solar, ocean, and wind power for affordable, reliable cooling (232)
- 2<sup>nd</sup>: Add more trees, parks, and water spaces to lower city temperatures (230)
- 3<sup>rd</sup>: Improve homes, schools, and hospitals by using materials and systems designed to maintain cooler temperatures (210)
- 4<sup>th</sup>: Adopt national climate programs and building codes that protect against heat (152)
- 5<sup>th</sup>: Develop water reserves and improve irrigation for people, farms, and nature (144)
- 6<sup>th</sup>: Inform about heat stress, benefits of healthy diets, and ways to save energy (114)
- 7<sup>th</sup>: Support public transit, provide shaded walkways, and ensure road safety (113)
- 8<sup>th</sup>: Make safety plans, build cooling centers, and share guidelines to help children, seniors, and visitors stay safe (112)
- 9<sup>th</sup>: Study how plants, animals, and coral can survive rising temperatures (105)
- 10<sup>th</sup>: Train emergency teams, store food and water, and prepare for extreme heat (43)



*Figure 3-4 Proportions of respondents who selected each adaptation option within the climate theme of it is getting warmer (respondents could select up to five adaptation options), N = 291*

***It is getting drier***

1<sup>st</sup>: Upgrade systems to recycle water for residential, agricultural, and garden use (35)

Joint 2<sup>nd</sup>: Replant forests and restore damaged land to help soil hold more water when it's dry; Build systems to store rainwater and greywater to use during dry periods (each 29)

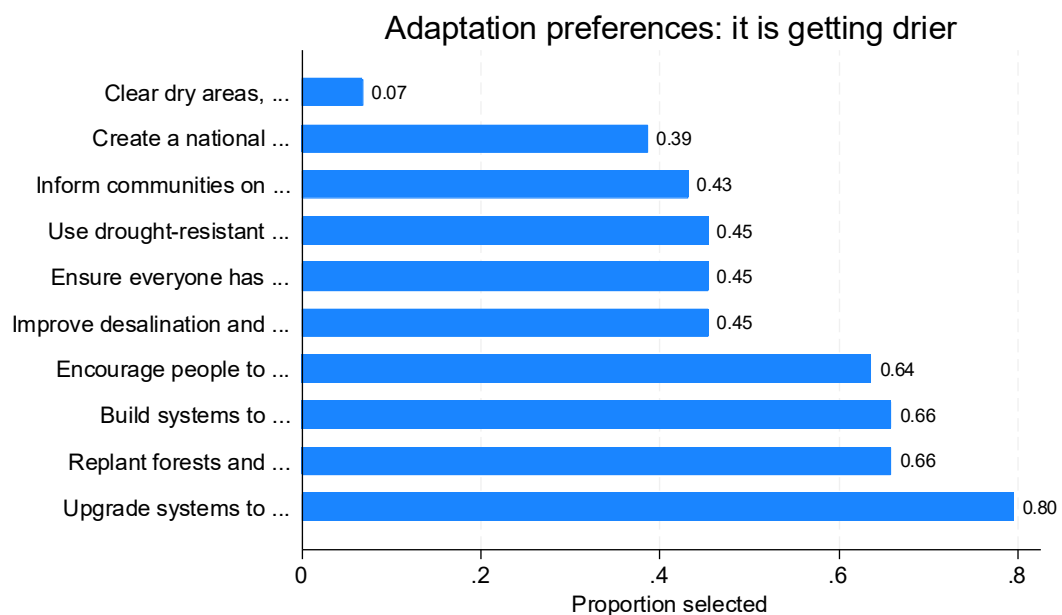
4<sup>th</sup>: Encourage people to save water and energy, and support eco-friendly housing designs (28)

Joint 5<sup>th</sup>: Improve desalination and develop new ways to make freshwater when reservoirs are dry; Ensure everyone has access to water during droughts and provide assistance to groups at risk; Use drought-resistant crops, hydroponics, and greenhouses to grow food with less water (each 20)

8<sup>th</sup>: Inform communities on water conservation, resource reuse, and bushfire prevention (19)

9<sup>th</sup>: Create a national water plan and enforce laws to conserve water during droughts (17)

10<sup>th</sup>: Clear dry areas, create open spaces to slow fires, and equip firefighters with effective tools (3)



*Figure 3-5 Proportions of respondents who selected each adaptation option within the climate theme of it is getting drier (respondents could select up to five adaptation options), N = 44*

**Storms, rains & hurricanes**

1<sup>st</sup>: *Improve rainwater management and drainage systems to prevent floods* (44)

2<sup>nd</sup>: *Restore mangroves, reefs, and wetlands to act as storm shields* (40)

Joint 3<sup>rd</sup>: *Strengthen roads, power lines, and essential services for extreme weather; Adopt long-term nature and climate policies, secure funding, and support a diverse economy* (each 35)

5<sup>th</sup>: *Provide safe shelters and clear plans for people and animals during storms* (32)

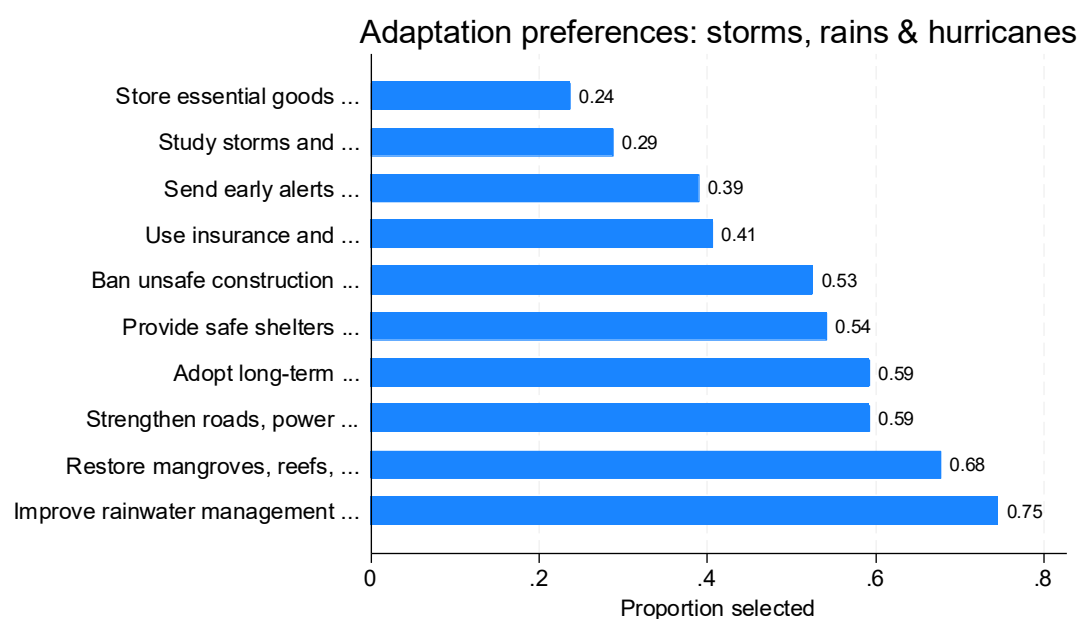
6<sup>th</sup>: *Ban unsafe construction in flood zones and update building codes* (31)

7<sup>th</sup>: *Use insurance and emergency funds to help communities recover faster* (24)

8<sup>th</sup>: *Send early alerts and coordinate national responses during disasters* (23)

9<sup>th</sup>: *Study storms and floods to improve future preparedness* (17)

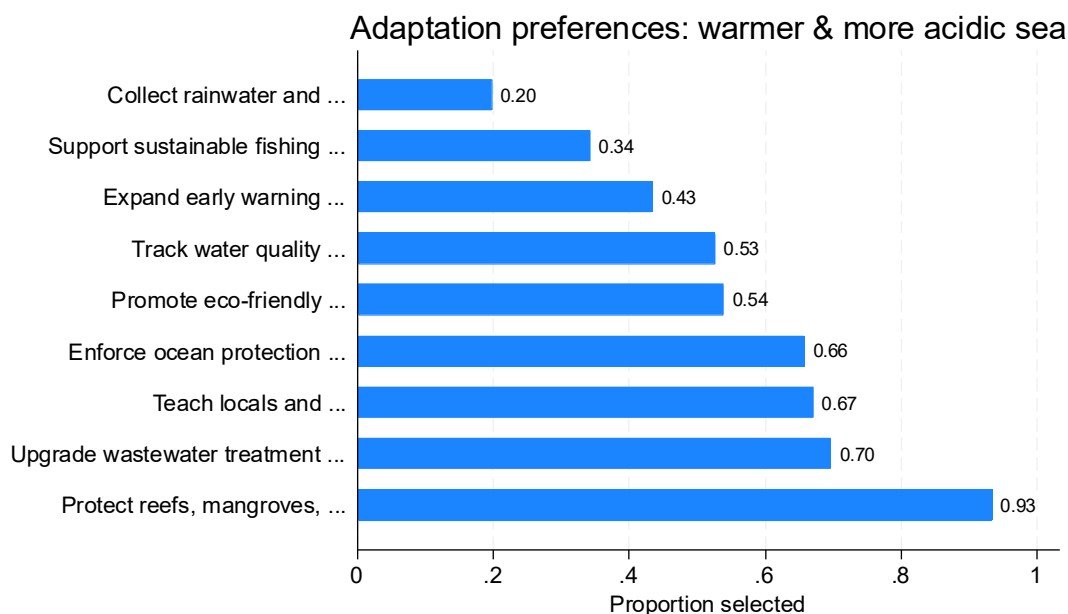
10<sup>th</sup>: *Store essential goods and plan their safe distribution after disasters* (14)



*Figure 3-6 Proportions of respondents who selected each adaptation option within the climate theme of storms, rains & hurricanes (respondents could select up to five adaptation options), N = 59*

**Warmer & more acidic sea**

- 1<sup>st</sup>: *Protect reefs, mangroves, and expand marine park to support ocean life* (71)
- 2<sup>nd</sup>: *Upgrade wastewater treatment facilities and prevent contaminated runoff from entering the sea* (53)
- 3<sup>rd</sup>: *Teach locals and visitors how to care for the ocean and its wildlife* (51)
- 4<sup>th</sup>: *Enforce ocean protection laws and recognize the “Rights of Nature and Ocean”* (50)
- 5<sup>th</sup>: *Promote eco-friendly tourism and find new ways for communities to earn income* (41)
- 6<sup>th</sup>: *Track water quality and marine life health as the ocean changes* (40)
- 7<sup>th</sup>: *Expand early warning systems (e.g., for events such as coral bleaching that can kill coral) and coordinate with local groups to address ocean changes* (33)
- 8<sup>th</sup>: *Support sustainable fishing and develop new food sources to protect sea life* (26)
- 9<sup>th</sup>: *Collect rainwater and improve purification to keep drinking water safe* (15)



*Figure 3-7 Proportions of respondents who selected each adaptation option within the climate theme of warmer & more acidic sea (respondents could select up to five adaptation options), N = 76*

**The sea level is rising**

1<sup>st</sup>: Restore reefs, mangroves, seagrass, and coastal plants to reduce erosion and prevent saltwater intrusion (59)

2<sup>nd</sup>: Keep water and power systems safe from saltwater intrusion, improve wastewater treatment, and collect rainwater (48)

3<sup>rd</sup>: Construct dikes, levees, seawalls, and reinforce reefs to protect against rising seas, and adapt ports and airstrips (44)

4<sup>th</sup>: Update building rules and land-use plans to prepare for rising seas (42)

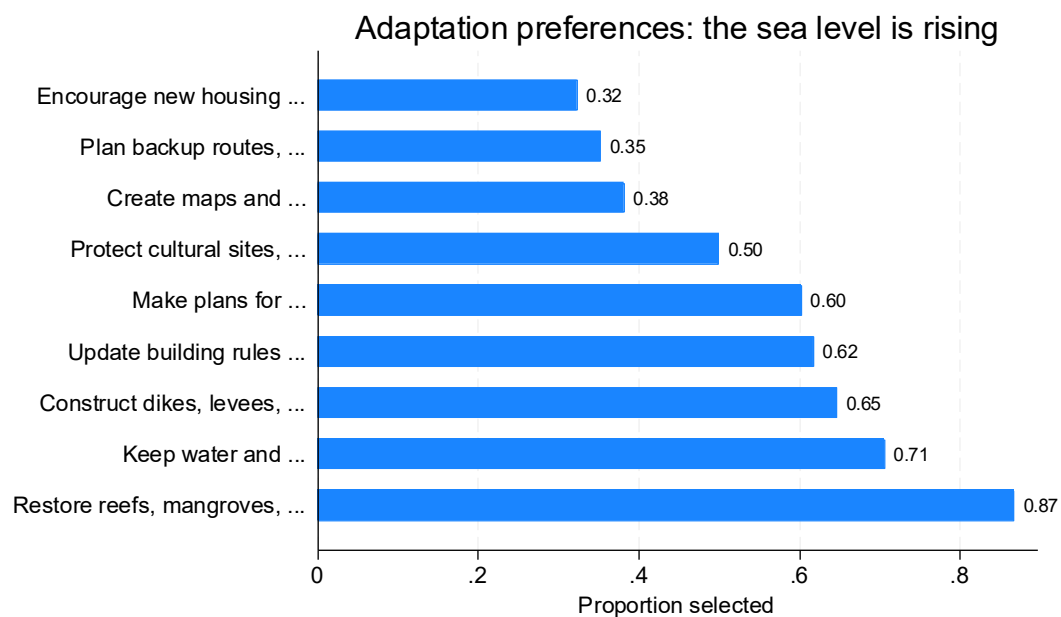
5<sup>th</sup>: Make plans for floods and tsunamis, set up evacuation routes, store food and water, and train people to respond safely (41)

6<sup>th</sup>: Protect cultural sites, strengthen community ties with nature, and include sea level rise in education (34)

7<sup>th</sup>: Create maps and collect data to identify safe locations for future developments and infrastructure projects (26)

8<sup>th</sup>: Plan backup routes, use alternative airports, and make sure people can move to safety before/during floods (24)

9<sup>th</sup>: Encourage new housing/businesses to be built inland or in safe, higher areas (22)



*Figure 3-8 Proportions of respondents who selected each adaptation option within the climate theme of the sea level is rising (respondents could select up to five adaptation options), N = 68*

**The wind is changing**

1<sup>st</sup>: Plant local trees, build parks, and add ponds or canals to cool urban areas (15)

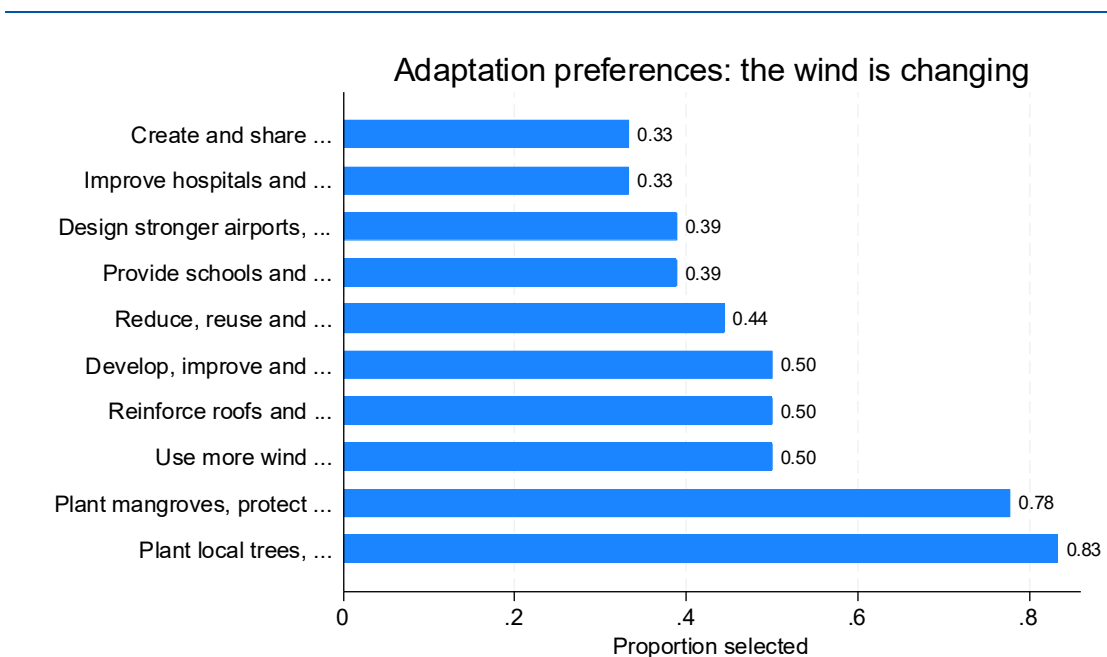
2<sup>nd</sup>: Plant mangroves, protect sand dunes, and restore reefs and vegetation to reduce storm damage (14)

Joint 3<sup>rd</sup>: Use more wind and solar power, make electricity more stable and affordable, and improve the energy grid; Reinforce roofs and walls, implement stricter building codes, and use natural cooling and ventilation; Develop, improve and enforce nature and climate laws, track progress, and work together to adapt to wind changes (each 9)

6<sup>th</sup>: Reduce, reuse and recycle waste, capture harmful gases, and clean up polluted areas (8)

Joint 7<sup>th</sup>: Provide schools and communities with information and training about changing wind conditions; Design stronger airports, ports, and digital systems, and monitor them to prevent damage from strong winds (each 7)

Joint 9<sup>th</sup>: Improve hospitals and healthcare systems, and study how wind and heat affect people's health; Create and share evacuation routes, expand warning systems, and prepare safety measures to protect people from changing wind patterns and pollution (each 6)



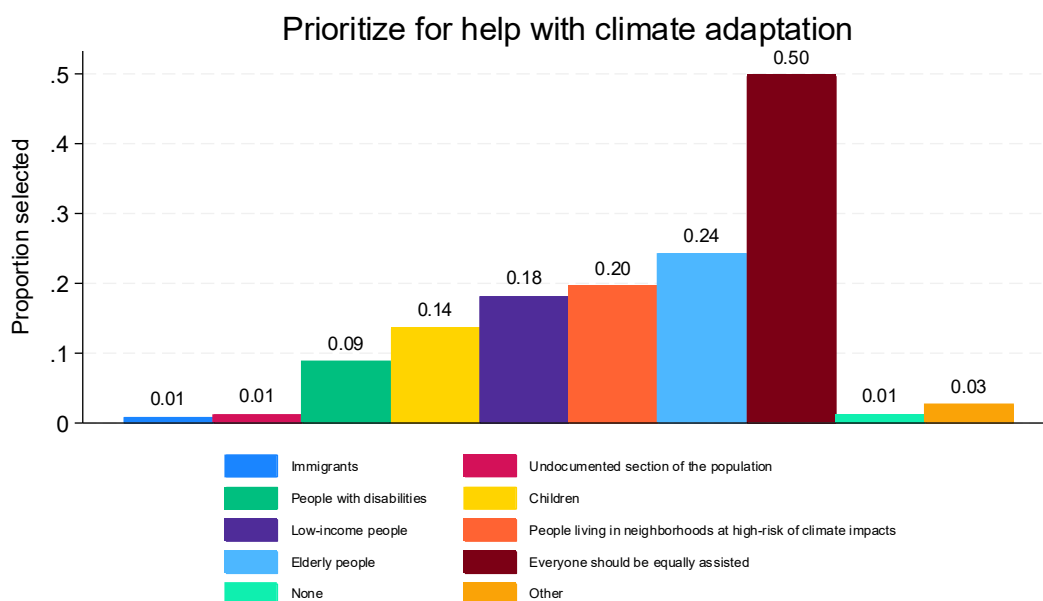
*Figure 3-9 Proportions of respondents who selected each adaptation option within the climate theme of the wind is changing (respondents could select up to five adaptation options), N = 18*

Respondents were further asked to score different criteria based on how relevant each were in their choice of adaptation options (1 = not relevant at all, 5 = extremely relevant). Table 3-3 displays, for each criterion, the number of respondents (frequency) and the proportion of respondents assigning each level of relevance. *Protects our community* and *positive impact on nature* were considered most relevant, with the majority of respondents rating them as very or extremely relevant (79% and 81%, respectively). *Affordability* and *fits our way of life* were also rated as important, though less so, with around 65% and 60% of respondents assigning them very or extremely relevant scores.

<b>Criteria</b>	<b>Not relevant at all</b>	<b>Slightly relevant</b>	<b>Moderately relevant</b>	<b>Very relevant</b>	<b>Extremely relevant</b>
Protects our community	1% (8)	4% (23)	16% (87)	44% (246)	35% (192)
Positive impact on nature	1% (7)	4% (22)	14% (77)	37% (206)	44% (244)
Affordability	3% (18)	7% (40)	25% (137)	36% (200)	29% (161)
Fits our way of life	4% (21)	10% (56)	27% (148)	35% (192)	25% (139)

Notes: Proportions are presented with frequencies in parentheses.

Figure 3-10 presents the shares of respondents who selected each subgroup of the population they think should be prioritized for help when adapting to climate change (respondents could select up to two subgroups). *Everyone should be equally assisted* was selected most often by 50% of respondents. *Elderly people* was selected by 24%, *people living in neighborhoods at high-risk of climate impacts* by 20%, *low-income people* by 18%, *children* by 14%, *people with disabilities* by 9%, and the *undocumented section of the population* and *immigrants* by 1% each. The *other* and *none* categories were chosen 3% and 1% of the time, respectively.



*Figure 3-10 Proportions of respondents who selected each subgroup of the population to prioritize for help when adapting to climate change (respondents could select up to two subgroups)*

### 3.4 Predictors of climate beliefs, awareness, perceptions and economic impacts

Table 3-4 presents the predictors of climate-related beliefs, awareness, and perceptions. Specifically, it shows the predictors of respondents' beliefs that climate change is anthropogenic rather than caused by natural processes based on a logit regression model, as well as the predictors of how often respondents think about climate change and whether they are worried about the potential impact of climate change on life in the future (next 10 years), both estimated using ordered logit regression models. Education is associated with several of these outcomes. More educated respondents (based on a one-unit increase in the ordinal education variable) are, on average, 4 percentage points more likely to believe climate change is anthropogenic rather than originating from natural processes, an effect that is significant at the 5% level. They also report thinking about climate change more frequently (significant at the 1% level). In contrast, respondents with higher income levels think about climate change less frequently (significant at the 5% level) and are less likely to be worried about the potential impact of climate change (significant at the 5% level). Gender differences are also evident in one case: compared to male respondents, female respondents are more likely to be worried about the potential impact of climate change (significant at the 1% level). In addition, older respondents report thinking about climate change more frequently (significant at the 1% level).

Table 3-5 presents the predictors of experienced negative climate impacts, specifically *higher food prices* and *increased financial expenses from energy, water and/or fuel*,

based on separate logit regression models. Among the sociodemographic variables considered, only education is significantly related to these personal economic impacts. Respondents with higher levels of educational attainment (based on a one-unit increase in the ordinal education variable) are, on average, 6 percentage points less likely to report having experienced higher food prices as a negative climate impact.

Across all estimated regression models, geographic location is not significantly associated with climate beliefs (anthropogenic versus natural causes), awareness (how often respondents think about climate change), perceptions (worry about future climate impacts), or negative experienced economic impacts from climate change, including elevated food prices and the costs of energy, water and/or fuel.

**Table 3-4: Logit regression results of the likelihood respondents' beliefs climate change is anthropogenic, and ordered logit regression results of how often they think about climate change and whether they are worried about the potential impact of climate change**

	Model 1	Model 2	Model 3
Age ordinal	0.001 (0.006)	0.087** (0.031)	0.031 (0.030)
Female	0.031 (0.038)	0.074 (0.193)	0.526** (0.189)
Income ordinal	0.014 (0.008)	-0.105* (0.042)	-0.100* (0.041)
Education ordinal	0.036* (0.017)	0.318** (0.100)	0.132 (0.098)
Oranjestad West	0.074 (0.066)	0.160 (0.323)	0.078 (0.305)
Oranjestad Oost	-0.002 (0.071)	-0.196 (0.368)	-0.356 (0.362)
Paradera	-0.005 (0.060)	0.432 (0.304)	-0.093 (0.290)
Santa Cruz	0.011 (0.053)	0.166 (0.268)	0.045 (0.269)
Savaneta	0.046 (0.074)	-0.086 (0.356)	-0.553 (0.346)
San Nicolaas Noord	0.042 (0.096)	-0.320 (0.503)	-0.049 (0.491)
San Nicolaas Zuid	-0.062 (0.082)	0.263 (0.486)	0.512 (0.476)
Log likelihood	-185.867	-464.993	-514.379
Pseudo R <sup>2</sup>	0.042	0.028	0.022
N	420	411	417

**Notes:**

Average marginal effects are provided for model 1 with standard errors in parentheses. For models 2 and 3, coefficient estimates are provided with standard errors in parentheses.

N < 556 due to *prefer not to say*, *other* and *don't know* responses for certain sociodemographic and outcome variables.

Age, income, and education are coded as ordinal variables, with higher values indicating higher age, income, and education levels. The lowest category for each variable is coded as 1, and the highest category is coded as the maximum value. Female is a dummy variable coded as 1 for female respondents and 0 for male respondents. The different location variables are also dummy coded, with the omitted (reference) category given by respondents who reside in Noord/Tanki Leendert.

\*\*Significant at 1%; \*Significant at 5%.

The modelled dependent variables are as follows:

- Model 1: Belief in anthropogenic climate change, rather than originating from natural processes;
- Model 2: Frequency respondents think about climate change: 1 = Never; 2 = A few times a year; 3 = Weekly; 4 = Daily;
- Model 3: Worry about the potential impact of climate change on life in the future (next 10 years): 1 = Not worried at all; 2 = Slightly worried; 3 = Quite worried; 4 = Very worried.

**Table 3-5: Logit regression results of the likelihood respondents experienced negative climate impacts in terms of higher food prices and increased financial expenses from energy, water and/or fuel**

	Model 1	Model 2
Age ordinal	0.013 (0.008)	0.013 (0.008)
Female	0.059 (0.049)	0.018 (0.050)
Income ordinal	0.003 (0.011)	0.006 (0.011)
Education ordinal	-0.056* (0.025)	-0.014 (0.025)
Oranjestad West	0.009 (0.081)	0.032 (0.082)
Oranjestad Oost	0.090 (0.098)	0.090 (0.098)
Paradera	-0.074 (0.078)	0.111 (0.081)
Santa Cruz	-0.022 (0.069)	-0.028 (0.070)
Savaneta	0.066 (0.090)	0.102 (0.091)
San Nicolaas Noord	-0.133 (0.124)	0.117 (0.131)
San Nicolaas Zuid	0.160 (0.143)	-0.022 (0.126)
Log likelihood	-280.058	-284.199
Pseudo R <sup>2</sup>	0.025	0.013
N	421	421

**Notes:**

Average marginal effects are provided with standard errors in parentheses.

N < 556 due to *prefer not to say*, *other* and *don't know* responses for certain sociodemographic variables.

Age, income, and education are coded as ordinal variables, with higher values indicating higher age, income, and education levels. The lowest category for each variable is coded as 1, and the highest category is coded as the maximum value. Female is a dummy variable coded as 1 for female respondents and 0 for male respondents. The different location variables are also dummy coded, with the omitted (reference) category given by respondents who reside in Noord/Tanki Leendert.

\*\*Significant at 1%; \*Significant at 5%.

The modelled dependent variables are as follows:

- Model 1: Experienced negative climate impacts from higher food prices;
- Model 2: Experienced negative climate impacts from increased financial expenses from energy, water and/or fuel.

### 3.5 Predictors of climate themes and adaptation options viewed as most important

Table 3-6 displays the predictors of the climate change theme respondents ranked as most important to adapt to based on a multinomial logit regression model. Overall, there are relatively few significant relationships between the theme ranking and sociodemographic variables. Female respondents are, on average, 8 percentage points less likely to rank *the sea level is rising* as the most important theme compared to male respondents, a difference that is significant at the 5% level. Education also shows several significant associations. Respondents with higher levels of education (based on a one-unit increase in the ordinal education variable) are, on average, 7 percentage points more likely to rank *it is getting warmer* as the most important theme, a relationship that is significant at the 1% level. At the same time, more educated respondents are 3 percentage points less likely to rank *it is getting drier* and 2 percentage points less likely to rank *the wind is changing* as the most important themes, with both effects significant at the 5% level. Moreover, geographic location matters in one case. Respondents located in Oranjestad West are, on average, 19 percentage points less likely to rank *warmer & more acidic sea* as the most important theme compared to respondents located in Noord/Tanki Leendert, a difference that is significant at the 5% level.

Table 3-7 presents the predictors of the preferred adaptation options within the climate theme that was ranked highest (*it is getting warmer*) according to separate logit regression models. As in the previous analysis, there are relatively few significant associations to report. Age is associated with one of the adaptation preferences. Older respondents (based on a one-unit increase in the ordinal age variable) are, on average, 3 percentage points less likely to choose *support public transit, provide shaded walkways, and ensure road safety*, an effect that is significant at the 1% level. Education is also related to several preferences. More educated respondents (based on a one-unit increase in the ordinal education variable) are, on average, 5 percentage points more likely to choose *add more trees, parks, and water spaces to lower city temperatures*, a relationship that is significant at the 5% level. At the same time, they are 8 percentage points less likely to choose *make safety plans, build cooling centers, and share guidelines to help children, seniors, and visitors stay safe* (significant at the 5% level). They are also 5 percentage points less likely to choose *train emergency teams, store food and water, and prepare for extreme heat*, which is likewise significant at the 5% level. Furthermore, geographic location shows several significant differences. Respondents located in Savaneta are, on average, 15 percentage points less likely to choose *add more trees, parks, and water spaces to lower city temperatures* compared to respondents located in Noord/Tanki Leendert, an effect that is significant at the 5% level. Respondents located in San Nicolaas Zuid are even less likely to select this option: on average, they are 25 percentage points less likely to choose *add more trees, parks, and water spaces to lower city temperatures* compared to respondents in Noord/Tanki Leendert, a difference that is significant at the 1% level. At the same time, respondents in San Nicolaas Zuid are, on average, 33 percentage points more likely to choose *inform about heat stress, benefits of healthy diets, and ways to save energy* compared to respondents in Noord/Tanki Leendert, an effect that is significant at the 5% level.

Table 3-6: Multinomial logit regression results of the likelihood of ranking different climate themes highest						
	It is getting warmer	It is getting drier	Storms, rains & hurricanes	Warmer & more acidic sea	The sea level is rising	The wind is changing
Age ordinal	-0.006 (0.008)	0.001 (0.004)	0.006 (0.005)	0.002 (0.006)	-0.002 (0.005)	-0.001 (0.002)
Female	0.094 (0.049)	0.013 (0.027)	0.043 (0.031)	-0.034 (0.034)	-0.079* (0.032)	-0.037 (0.020)
Income ordinal	-0.014 (0.011)	-0.001 (0.006)	0.009 (0.007)	-0.008 (0.008)	0.011 (0.007)	0.003 (0.004)
Education ordinal	0.066** (0.025)	-0.029* (0.012)	-0.019 (0.015)	0.012 (0.018)	-0.009 (0.016)	-0.020* (0.008)
Oranjestad West	0.120 (0.089)	0.010 (0.043)	0.065 (0.043)	-0.193* (0.092)	-0.012 (0.055)	0.009 (0.025)
Oranjestad Oost	0.137 (0.098)	-0.024 (0.060)	0.018 (0.056)	-0.077 (0.078)	-0.070 (0.079)	0.015 (0.032)
Paradera	0.015 (0.081)	0.028 (0.041)	-0.066 (0.061)	0.042 (0.049)	-0.012 (0.051)	-0.007 (0.032)
Santa Cruz	-0.004 (0.070)	0.003 (0.038)	-0.025 (0.045)	0.008 (0.046)	0.010 (0.044)	0.009 (0.023)
Savaneta	0.177 (0.093)	-0.038 (0.060)	-0.073 (0.072)	-0.096 (0.077)	0.019 (0.055)	0.012 (0.031)
San Nicolaas Noord	0.697 (45.757)	-1.069 (78.313)	0.165 (10.676)	0.226 (13.505)	0.285 (11.185)	-0.304 (36.255)
San Nicolaas Zuid	0.932 (50.861)	0.068 (8.481)	0.145 (10.572)	0.201 (15.961)	-1.427 (89.286)	0.081 (3.413)

Notes:  
Average marginal effects are provided with standard errors in parentheses.  
Log likelihood = -561.518 and Pseudo R<sup>2</sup> = 0.062.  
N = 421 due to *prefer not to say*, *other* and *don't know* responses for certain sociodemographic variables.  
Age, income, and education are coded as ordinal variables, with higher values indicating higher age, income, and education levels. The lowest category for each variable is coded as 1, and the highest category is coded as the maximum value. Female is a dummy variable coded as 1 for female respondents and 0 for male respondents. The different location variables are also dummy coded, with the omitted (reference) category given by respondents who reside in Noord/Tanki Leendert.  
\*\*Significant at 1%; \*Significant at 5%.

Table 3-7: Logit regression results of the likelihood of choosing different adaptation options										
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Age ordinal	0.001 (0.008)	0.007 (0.008)	-0.010 (0.009)	0.002 (0.011)	0.010 (0.011)	0.001 (0.010)	-0.027** (0.010)	0.014 (0.010)	0.003 (0.010)	>-0.001 (0.007)
Female	0.011 (0.055)	0.011 (0.054)	-0.103 (0.062)	-0.033 (0.069)	0.129 (0.070)	0.011 (0.068)	-0.043 (0.069)	-0.043 (0.067)	0.016 (0.069)	0.056 (0.053)
Income ordinal	-0.005 (0.012)	-0.006 (0.012)	0.009 (0.012)	0.016 (0.014)	0.001 (0.015)	0.023 (0.014)	-0.019 (0.015)	0.006 (0.014)	-0.017 (0.014)	-0.010 (0.010)
Education ordinal	0.024 (0.029)	0.054* (0.026)	0.046 (0.030)	0.071 (0.037)	-0.011 (0.038)	-0.047 (0.035)	-0.007 (0.036)	-0.078* (0.034)	-0.009 (0.035)	-0.045* (0.022)
Oranjestad West	-0.086 (0.083)	0.132 (0.113)	0.006 (0.091)	-0.059 (0.108)	0.023 (0.115)	0.192 (0.103)	-0.194 (0.114)	-0.092 (0.109)	0.111 (0.102)	-0.007 (0.078)
Oranjestad Oost	0.006 (0.106)	0.065 (0.114)	0.053 (0.106)	-0.140 (0.119)	0.024 (0.127)	0.033 (0.124)	0.024 (0.120)	-0.176 (0.133)	0.024 (0.118)	0.067 (0.074)
Paradera	-0.082 (0.085)	-0.006 (0.090)	0.019 (0.094)	0.026 (0.114)	0.053 (0.117)	0.121 (0.108)	-0.126 (0.113)	0.089 (0.104)	0.022 (0.110)	/
Santa Cruz	0.064 (0.093)	-0.027 (0.076)	0.158 (0.094)	-0.098 (0.097)	0.026 (0.103)	-0.011 (0.102)	-0.085 (0.098)	-0.071 (0.098)	0.105 (0.092)	-0.060 (0.079)
Savaneta	-0.041 (0.090)	-0.153* (0.073)	0.049 (0.097)	0.083 (0.115)	0.054 (0.116)	0.119 (0.108)	-0.006 (0.109)	0.039 (0.105)	-0.191 (0.130)	0.046 (0.072)
San Nicolaas Noord	-0.166 (0.120)	0.069 (0.159)	0.260 (0.198)	-0.276 (0.196)	0.134 (0.192)	0.215 (0.168)	-0.146 (0.181)	0.213 (0.169)	/	0.047 (0.100)
San Nicolaas Zuid	-0.020 (0.128)	-0.253** (0.094)	0.319 (0.192)	-0.179 (0.157)	0.042 (0.162)	0.331* (0.146)	-0.099 (0.155)	-0.032 (0.148)	0.104 (0.143)	-0.072 (0.120)
Log likelihood	-102.557	-96.176	-116.624	-141.126	-148.772	-137.422	-140.332	-135.205	-130.122	-68.723
Pseudo R <sup>2</sup>	0.027	0.100	0.053	0.060	0.015	0.041	0.048	0.049	0.036	0.078
N	218	218	218	218	218	218	218	218	210	194
Notes:										
Average marginal effects are provided with standard errors in parentheses.										
N < 291 due to <i>prefer not to say</i> , <i>other</i> and <i>don't know</i> responses for certain sociodemographic variables.										
Age, income, and education are coded as ordinal variables, with higher values indicating higher age, income, and education levels. The lowest category for each variable is coded as 1, and the highest category is coded as the maximum value. Female is a dummy variable coded as 1 for female respondents and 0 for male respondents. The										

different location variables are also dummy coded, with the omitted (reference) category given by respondents who reside in Noord/Tanki Leendert.

San Nicolaas Noord and Paradera are excluded from Models 9 and 10, respectively, due to insufficient variation: in all observations where these variables equal 1, the adaptation option is never chosen.

\*\*Significant at 1%; \*Significant at 5%.

The modelled dependent variables are ordered from most to least preferred adaptation options, i.e.:

- Model 1: Use solar, ocean, and wind power for affordable, reliable cooling;
- Model 2: Add more trees, parks, and water spaces to lower city temperatures;
- Model 3: Improve homes, schools, and hospitals by using materials and systems designed to maintain cooler temperatures;
- Model 4: Adopt national climate programs and building codes that protect against heat;
- Model 5: Develop water reserves and improve irrigation for people, farms, and nature;
- Model 6: Inform about heat stress, benefits of healthy diets, and ways to save energy;
- Model 7: Support public transit, provide shaded walkways, and ensure road safety;
- Model 8: Make safety plans, build cooling centers, and share guidelines to help children, seniors, and visitors stay safe;
- Model 9: Study how plants, animals, and coral can survive rising temperatures;
- Model 10: Train emergency teams, store food and water, and prepare for extreme heat.

### 3.6 Qualitative insights

Based on the raw data from the community survey in Aruba, the final open-ended question yielded a wealth of qualitative insights. The respondents provided feedback across four languages: English, Dutch, Papiamentu, and Spanish. This linguistic diversity highlights a broad cross-section of the Aruban community and reflects deep local engagement with the topic.

Below is a critical analysis and comprehensive thematic summary, whereby the responses can be distilled into several core themes, reflecting both urgent local issues and broader climate adaptation concerns.

#### A. Overdevelopment and Tourism Pressures

- **Halt Excessive Construction:** A large number of respondents, across all languages, pleaded to stop the over-development of hotels, condominiums, and commercial centers. They pointed out that replacing natural landscapes with concrete and asphalt drastically increases local temperatures (the urban heat island effect).
- **Tourism Industry Accountability:** Many noted that the tourism sector is a major driver of environmental degradation. They specifically called out off-road vehicles (UTVs/ATVs) destroying nature and causing dust pollution, the clearing of mangroves for water villas, and damage to coral reefs from tourist activities.
- **Corporate Responsibility:** Several comments insisted that large corporations (e.g., major hotel chains, tour companies) must bear more of the financial and environmental responsibility for adaptation, rather than placing the burden solely on regular citizens.

#### B. Nature-Based Solutions, Greening, and Biodiversity

- **Reforestation and Shade:** A heavily repeated suggestion was to plant more trees, specifically native species (e.g., Kibrahacha, Pal'i Brasil, Wayaca and Watapana), to provide natural shade and cooling for pedestrians and buildings.
- **Protecting Existing Ecosystems:** Residents are deeply concerned about the practice of “rosa tereno” (clearing land entirely of vegetation before building), expressing demand for an immediate halt to the destruction of local flora, fauna, and marine ecosystems.
- **Agriculture and Food Security:** Promoting local agriculture, fishing, and animal husbandry was mentioned as a crucial step for local food security in the face of global climate disruptions.

#### C. Waste Management and Local Pollution

- **Litter and Illegal Dumping:** While somewhat adjacent to global climate change, local environmental degradation through littering emerged as a significant concern. Respondents frequently reported the presence of waste accumulation in Oranjestad, San Nicolas, and along the coastline.

- Recycling and Circular Economy: Multiple comments referenced the need for a structural recycling system (like the deposit system in the Netherlands) and a ban on single-use plastics to reduce localized pollution.

#### D. Infrastructure, Resources, and Government Action

- Water and Energy Costs: There is significant anxiety regarding the high cost of water and electricity. Respondents suggested subsidizing renewable energy (solar and wind) for low-income households.
- Bureaucratic Hurdles: One respondent highlighted that, despite strong interest in adopting solar energy, the average waiting time for the required inspection is around one and a half years, thereby significantly constraining the pace of the energy transition.
- Building Codes and Adaptation: Suggestions included modifying building codes to make rainwater harvesting mandatory, ensuring houses can withstand hurricanes, and requiring solar integration for new builds and electric vehicles (EVs).
- Action Over Talk: A strong sense of fatigue was evident regarding perceived government rhetoric. Residents emphasized the need for strict enforcement ("handhaving") of existing environmental laws, rather than more surveys and unimplemented policy plans.

#### E. Education and Community Awareness

- Grassroots Education: Respondents stressed the need to educate everyone, from school children to adults.
- Clear Communication: One respondent drew an analogy between climate change awareness and seatbelt campaigns, emphasizing that scientific insights should be effectively distilled and communicated in a manner that is accessible and compelling to all segments of society, regardless of educational background.

#### F. Climate Skepticism and Survey Feedback

- Skepticism/Denialism: A vocal minority expressed disbelief in anthropogenic climate change. Arguments ranged from citing local observations ("sea levels haven't risen here in my lifetime," "we never get hit by hurricanes") to broader climate denial talking points (claiming ocean acidification is a myth, calling it "climate hysteria" or a "communist revenue model").
- Critique of Methodology: Some respondents were hyper-aware of environmental issues and pointed out the irony of using Generative AI images in a climate survey, citing the massive carbon footprint and water usage of AI data centers.

## 4 Discussion of key insights

This survey report provides valuable insights into how residents of Aruba perceive climate change, the impacts they are already experiencing, and which adaptation measures they consider to be most important. This section discusses the main implications of these findings for policymakers in the context of the NAS-A. The section ends with a few limitations to consider when interpreting the findings.

### 4.1 Societal mandate for climate adaptation

Overall, climate change adaptation is viewed as an urgent policy priority among respondents. That is, a large majority (88%) indicated that adapting to climate change should be either *a critical urgency* or *a top priority* for Aruba in the next decade. Consistent with this finding, most respondents (76%) expect that climate change will require changes in how they live in the near future. The survey also indicates a relatively high level of concern about climate impacts: 57% reported being either *very worried* or *quite worried* about the potential impacts of climate change on their lives over the next decade.

Taken together, these findings suggest that climate change adaptation policies are likely to benefit from a strong societal mandate. Therefore, it can be expected that policymakers have an opportunity to advance ambitious adaptation plans with relatively high levels of public support.

At the same time, insights from open-ended responses indicate that this support may not be unconditional. Many respondents expressed frustration with a perceived disconnect between economic policy and environmental preservation, arguing that current development patterns, particularly those linked to mass tourism, undermine ecological sustainability and community well-being. This suggests that public support for adaptation may depend on whether policies are perceived as addressing these underlying tensions.

### 4.2 Addressing rising temperatures as the primary climate concern

Among the six climate themes presented in the survey, rising temperatures clearly emerged as the most important to address from the perspective of residents, contrary to the typical focus on sea level rise for small island communities (Vousdoukas et al., 2023). The theme *it is getting warmer* received the highest mean importance score and was ranked as the most important theme by 52% of respondents, with an additional 19% ranking it second. Moreover, *warmer & more acidic sea* received the second-highest mean score, indicating that concerns about both terrestrial and marine warming are salient among respondents.

Furthermore, respondents' reported experiences over the past five years reinforce the importance of heat-related risks: large shares reported being majorly negatively impacted by *higher average temperatures* (51%) and *more extreme temperatures* (45%). In addition, 41% reported major impacts from *prolonged drought & drier soil*, and 40% from *low wind extremes*, which can exacerbate perceived heat stress. In addition, around one-third (34%) reported *reduced outdoor activities* as one of the most commonly experienced climate impacts, illustrating how heat is already

influencing behavior and wellbeing. In sum, the findings indicate that heat-related impacts are already widely experienced by residents.

This is further highlighted in qualitative responses, in which residents describe the island as becoming “hotter than hot,” often linking rising temperatures to land-use changes such as the replacement of native greenery with concrete. These perceptions show that climate risks are perceived not as abstract global phenomena, but as direct consequences exacerbated by local spatial planning decisions.

Implicitly, policies aimed at reducing heat exposure are likely to resonate strongly with residents. Most respondents ranking *it is getting warmer* as the most important theme supported adaptation options such as expanding renewable energy for affordable and reliable cooling, increasing urban trees and green spaces, improving building materials and designs to maintain cooler indoor temperatures, as well as adopting national programs and building codes that protect against heat. This could include targeted residential cooling incentives, such as programs that combine high-albedo roofing materials with solar-powered cooling, supported through subsidies or low-interest loans to reduce household energy costs while improving thermal comfort.

The commonly chosen options further demonstrate that adaptation is closely intertwined with spatial planning and urban design. In our view, there is value in tailoring urban greening to local built environment conditions, e.g., through district-specific green maps that identify where tree planting, shading, and green corridors would be most beneficial.

### 4.3 Addressing economic impacts as the most commonly experienced climate effects

While respondents reported experiencing a range of climate-related impacts, the most frequently reported impacts relate to household economic pressures, as opposed to severe physical disruptions. *Higher food prices* were identified as one of the three most commonly experienced climate impacts by 57% of respondents. Moreover, 55% reported *increased financial expenses from energy, water and/or fuel*. Rising costs associated with food and energy may reflect climate-related pressures on supply chains and energy demand for cooling.

Other commonly reported impacts include *power cut or energy supply issues* (33%), and *destruction of land- or marine-environment or natural spaces* (25%). In contrast, direct physical damages and impacts appear to be less commonly experienced at present. For example, (yet a notable) 6% reported property damage, while 1% reported displacement or drinking water issues.

The findings highlight the importance of linking adaptation strategies with economic resilience of the general public. Policies that improve energy and water-use efficiency, or strengthen climate-resilient food production may help reduce household cost pressures while simultaneously improving climate resilience.

Open-ended responses further emphasize concerns about fairness, with some residents expressing worry that the financial burden of adaptation measures, such as transition taxes or higher utility costs, may fall disproportionately on households, while larger commercial actors such as hotels or tour operators are perceived to contribute more to

environmental pressures. This points to the importance of designing adaptation policies that are not only effective, but also perceived as equitable.

#### 4.4 Strong public support for nature-based policies alongside support for technical and infrastructure-based adaptation

Across several climate themes, respondents showed strong support for nature-based solutions and ecosystem protection. Within the theme *warmer & more acidic sea*, the most frequently selected adaptation option was protecting coral reefs, mangroves, and expanding marine parks. Similarly, for the theme *the sea level is rising*, the most frequently selected option was restoring reefs, mangroves, seagrass and coastal vegetation to reduce erosion and saltwater intrusion.

Nature-based approaches were highly ranked for other climate risks as well. For example, within the *storms rains & hurricanes* theme, restoring mangroves, reefs and wetlands to operate as storm shields was among the most frequently selected options. In the context of rising temperatures, respondents also favored urban greening measures like planting trees and creating parks and water spaces.

The importance of nature-based protection is also reflected in the criteria respondents considered when evaluating adaptation options: 81% rated *positive impact on nature* as very or extremely relevant to their decision-making. Thus, overall the results indicate recognition by Aruban citizens of the role that ecosystems can play in reducing climate risks.

Qualitative responses also reveal a sense of ecological loss and degradation, with residents expressing concern about the clearing of mangroves, loss of natural spaces, and increasing pressure on public beaches. These sentiments suggest that support for nature-based solutions is not only grounded in their functional role in climate adaptation, but also in a broader desire to preserve remaining natural assets and public space.

For policymakers, this suggests that investments in ecosystem restoration and nature-based solutions are likely to be widely supported. Such measures are typically highly cost-effective, especially when considering their additional societal and environmental benefits (so-called co-benefits) beyond climate adaptation, including biodiversity protection, carbon sequestration and recreational opportunities (González-García et al., 2025).

At the same time, respondents also expressed support for more technical and infrastructure-based adaptation measures. For example, within *the sea level is rising* theme, constructing dikes, levees and seawalls and reinforcing reefs was among the most frequently selected measures.

Similarly, for the *storms, rains & hurricanes* theme, respondents prioritized improvements to rainwater management and drainage systems to prevent flooding, as well as strengthening roads, power lines and other essential services to withstand extreme weather. Technical measures were also prominent in other themes, including upgrading wastewater treatment facilities to reduce marine pollution. In the context of rising temperatures, respondents prioritized expanding renewable energy systems to provide affordable and reliable cooling, highlighting the role of energy infrastructure in climate adaptation.

Taken together, these findings suggest that residents broadly support a diversified adaptation strategy combining nature- and ecosystem-based solutions with investments in resilient infrastructure and technological systems. For policymakers, this underscores the importance of pursuing integrated adaptation pathways that leverage both nature-based and engineered measures to address the multiple climate risks facing Aruba. These integrated pathways can be operationalized through hybrid approaches, e.g., by combining coral reef restoration with engineered coastal protection, where restored reefs reduce wave energy and enhance the durability of seawalls and other hard infrastructure. To support such approaches, policymakers could consider strengthening regulatory frameworks for marine ecosystems, e.g., by expanding or enforcing regenerative marine zoning and Rights of Nature principles that recognize coral reefs and mangroves as critical infrastructure for coastal protection. Moreover, it is also our view that policymakers consider effectiveness of nature-based measures for reducing climate risk, which can be impacted by factors such as local ecological conditions, land availability and long-term maintenance (Chausson et al., 2020; Fernandes and Guiomar, 2018).

#### 4.5 Role of education in shaping climate perceptions and preferences

The regression analyses showcase the role of education in shaping climate-related beliefs and perceptions. Respondents with higher levels of education were more likely to attribute climate change to anthropogenic causes and think about climate change more frequently.

Education was also associated with certain adaptation preferences, i.e., more educated respondents were more likely to rank *it is getting warmer* as the most important theme to address, and to opt for nature-based adaptation within this theme. Therefore, the results suggest that education and awareness may play an important role in shaping how individuals understand climate risks and evaluate adaptation strategies.

Targeting climate awareness initiatives could help strengthen public engagement with adaptation policies and improve understanding of climate risks. For instance, policymakers may tailor communication strategies to reach low-education subgroups, using simple messaging, local languages, and relevant examples (Pujadas-Farreras and McDonagh, 2025).

Nevertheless, an interesting observation is that information, awareness, and education did not feature strongly among the most preferred adaptation options within each climate theme. This may indicate a community blind spot.<sup>10</sup> As some respondents may not view information as a useful adaptation tool, it may be more effective to frame communication and awareness initiatives as practical, outcome-oriented measures, e.g., by linking them to immediate benefits such as reducing household energy costs or improving thermal comfort.

Furthermore, open-ended responses point to the presence of some climate skepticism, with certain residents questioning the relevance or existence of climate change due to Aruba's limited exposure to extreme events such as hurricanes or only gradual sea-level

---

<sup>10</sup> With the notable exception of teaching locals and visitors how to care for the ocean and its wildlife within the theme of *warmer & more acidic sea*, which was the third most preferred option.

rise. This suggests a gap in localized climate education and communication, highlighting the need for context-specific evidence on how climate change is expected to affect Aruba (e.g., through increasing extreme heat days, sargassum blooms and food supply chain disruptions).

#### 4.6 Implications of other sociodemographic differences in climate perceptions and preferences

Other sociodemographic characteristics have a relatively limited association with how respondents experience and perceive climate impacts, or shape their preferences, with a few notable exceptions. That is, older respondents report thinking about climate change more frequently, indicating that awareness of climate issues may increase with accumulated experience of environmental change. In addition, female respondents are more likely to worry about the potential impact of climate change in the future, compared to male respondents, a finding that is broadly consistent with the survey literature on climate risk perceptions (Ergun et al., 2024; Zainulbhai, 2015).

Furthermore, those with higher incomes think about climate change less frequently and worry less about the impacts within the next 10 years, which may reflect a higher perceived ability to cope with climate impacts in the future among high-income respondents. In contrast, surprisingly income is not significantly associated with whether households reported already experiencing negative economic impacts from climate change. This may suggest that cost pressures have been widely felt across society rather than being confined to low-income groups thus far.

Moreover, geographic location within Aruba does not significantly predict climate beliefs, levels of awareness, perceptions of future climate impacts, or reported household economic impacts. The absence of strong geographic differences indicates that climate change is perceived as a shared island-wide challenge rather than one affecting only specific districts.

However, it is notable that location is related to a preference for nature-based adaptation, i.e., compared to residents of Noord/Tanki Leendert (the most populated area), those living in Savaneta and San Nicolaas Zuid are less likely to opt for more trees, urban green and water spaces to lower city temperatures. Nevertheless, this difference may simply reflect variation in the built environment across districts, e.g., areas with greater existing vegetation or open space may perceive less need for additional greening interventions.

In sum, the findings suggest that climate change is widely perceived as a shared island-wide challenge in Aruba, with limited differences in perceptions or experienced impacts across geographic groups. At the same time, certain demographic patterns, such as higher awareness among older respondents and lower perceived risk among high-income respondents, indicate that engagement with climate issues is not uniform across the island's population.

For policymakers, this implies support for adaptation strategies implemented through national-level policies that benefit the population broadly. While climate communication and outreach efforts may need to be tailored to different demographic groups. Younger citizens could be engaged via social media channels and incorporating the Aruba Climate Impact Atlas into the national school curriculum to ensure awareness and engagement are maintained across society. Specific interventions, like urban

greening, may receive more support if they are logically tailored to reflect differences in the built environment across districts with the help of district-specific green maps.

#### 4.7 Expected leadership on climate adaptation

The survey results provide insights into how residents believe climate adaptation should be managed or governed. When asked at which level adaptation efforts should be managed, around one-third of respondents (31%) indicated that adaptation would be best managed at the national level. While another one-third (33%) stated that responsibility should be shared across multiple levels of management, that would include the national level, the regional Caribbean level, the international level, the Kingdom of the Netherlands level, and to an extent the district, neighborhood and household levels.

These findings indicate that many residents expect the government to play a central coordinating role in climate adaptation. This perhaps reinforces prior evidence that the public tends to view national authorities as the primary actors responsible for managing complex, cross-sectoral risks, and as having the largest impact on climate change (Flynn et al., 2024). Addressing climate risks typically requires coordinated action across sectors such as water management, infrastructure, land-use planning, and environmental protection, and such action can be expected to be led by national government.

For Aruba, this underscores the public's perceived importance of institutional coordination in implementing the NAS-A. Collaboration between national agencies, local communities, regional Caribbean partners, and international institutions will likely be essential to ensuring effective adaptation, as implicitly recognized by a large share of respondents. A clear operational roadmap outlining responsibilities would be beneficial in this regard.

Moreover, qualitative responses indicate that public trust in how environmental and economic priorities are currently balanced may be limited, reinforcing the importance of transparent and accountable governance structures. Importantly, to maintain and ensure long-term effectiveness and legitimacy, it is vital to prioritize meaningful citizen participation over solely top-down mandates (IPCC, 2022). Central to strengthening just climate resilience are key mechanisms such as the NCRC platform, community workshops, and community surveys, complemented by expert and industry focus groups. By utilizing these tools, climate adaptation planning and decision-making processes become more inclusive, equitable, and grounded in the needs of the Aruban community.

#### 4.8 Equity considerations in adaptation policies

The survey further explored which groups respondents believe should be prioritized for assistance when adapting to climate change. Half of respondents indicated that everyone should be equally assisted, suggesting strong support for universal approaches to climate adaptation.

However, a substantial share of respondents identified specific subgroups as deserving additional support. That is, the elderly were selected by 24%, those living in high-risk areas by 20%, low-income individuals by 18%, children by 14%, and people with disabilities by 9%.

These findings suggest that while universal policies may be broadly supported, many also recognize the importance of supporting societally vulnerable subgroups. Policymakers may therefore wish to consider a combination of universal adaptation measures, like resilient infrastructure and ecosystem restoration, alongside targeted support for populations that may face greater exposure or fewer resources to cope with climate risks. This is further reflected in qualitative concerns that the costs of adaptation may not be evenly distributed, reinforcing the need for policies that explicitly address questions of fairness across different societal actors.

Such support for vulnerable subgroups can be especially important for measures such as protection against heat, thereby addressing a risk that older subgroups are particularly susceptible to (Baniassadi et al., 2023). Furthermore, financial assistance for climate-resilient housing and/or provision of low-interest, means-tested loans that spread the oftentimes large upfront costs of climate protection measures over time, may be beneficial for stimulating adaptation among low-income subgroups (Kunreuther, 2021). Such loans could be managed via the creation of an Aruban National Adaptation Fund. In addition, complementary micro-adaptation grant schemes could support community-led, small-scale interventions, like neighborhood cooling centers or rain gardens.

Moreover, given the strong relationship between social vulnerability and coping capacities in climate risk management more generally (Otto et al., 2017; Islam and Winkel, 2017), special attention may be needed to ensure socially vulnerable subgroups have access to clear, understandable information on climate risks and adaptation, as well as support to participate effectively in adaptation planning and response.

#### 4.9 Survey limitations and caveats

There are a few caveats to keep in mind when drawing recommendations and conclusions based on the survey findings. First, participation to the survey relied on voluntary response and targeted outreach rather than random sampling. While multiple recruitment methods were used to reduce coverage bias, some residual under-representation of specific societal subgroups is apparent, as indicated in section 3.1. Future surveys could address this by applying quota sampling approaches to ensure adequate representation of under-represented groups.

Second, even though the survey provides valuable insights into public support for different adaptation measures, it may also highlight potential gaps in understanding or awareness. For example, lower support for certain actions could reflect limited public knowledge of their long-term benefits, systemic importance, or effectiveness under future climate conditions. To better distinguish between genuine public preferences and constraints related to awareness or understanding, future research may focus on complementary qualitative or deliberative research on Aruban citizens' climate perceptions and adaptation preferences.

## 5 Conclusion

The survey demonstrates that climate change adaptation is a high-priority concern for residents of Aruba, with broad awareness of climate change impacts and strong expectations for action. Several priorities emerged from the survey. Importantly, rising temperatures was recognized as the most pressing climate theme. Respondents prioritized expanding renewable energy for cooling, urban greening, as well as resilient building design and building codes to protect against heat. Consistent with qualitative insights, these priorities also point toward the immediate importance of embedding nature-based climate adaptation more explicitly within spatial planning. For example, policy interventions could require integrating native tree planting and shading into new infrastructure, commercial developments, and residential areas, supported by incentives such as subsidies or tax deductions for citizens and businesses maintaining green spaces. These measures could be further strengthened through district-level planning tools, such as localized green maps.

Nature and ecosystem protection were highly valued for adaptation, with respondents emphasizing the restoration of reefs, mangroves, seagrass, and the creation of urban green spaces. Strengthening marine planning through more regenerative approaches to marine zoning could further support the protection and recovery of these ecosystems as critical coastal infrastructure. Nevertheless, respondents overall supported a balanced and integrated approach, combining certain ecological/nature-based solutions with technical and infrastructure measures. The value of an integrated approach is also implied by qualitative insights. Concerns about environmental degradation linked to tourism and development suggest that effective adaptation may require stronger enforcement of environmental regulations (handhaving), e.g., against illegal dumping, off-road driving in protected areas, and unauthorized land clearing (*rosa tereno*), as well as consideration of tourism carrying-capacity limits to safeguard natural buffer systems.

Furthermore, economic pressures, including higher food, fuel and basic utility costs, were identified as the most experienced climate impacts, highlighting the need for adaptation strategies that strengthen household economic resilience. Such measures may take the form of policies targeted towards improving energy and water-use efficiency, or strengthening the climate resilience of food production. At the same time, qualitative responses suggest that efforts to accelerate the energy transition, such as expanding access to solar energy, should be accompanied by measures to reduce administrative bottlenecks, like long waiting times for solar panel inspections, and ensure affordability for lower-income households, for instance through grants or financial support schemes.

Significant shares of respondents highlighted the need for additional support for vulnerable groups. This may take the form of financial or practical support for measures that vulnerable subgroups, like the elderly, are especially exposed to, subsidies and/or means-tested loans for climate-resilient housing and adaptation through the creation of a National Adaptation Fund, and access to clear, understandable information on climate risk and adaptation. Small-scale community grant schemes could support locally driven adaptation actions. In addition, ensuring equitable access to affordable energy

and water services emerges as a key priority in qualitative analyses in light of concerns about rising living costs and the distributional impacts of adaptation policies.

Further findings confirmed the value of complementary targeted measures among potentially vulnerable subgroups, i.e., analyses indicated certain sociodemographic differences in climate perceptions. Specifically, the role of education and age in shaping climate beliefs and awareness highlights the need for tailored, outcome-orientated communication strategies that reach low-education and younger subgroups, e.g., by utilizing social media and integrating the Aruba Climate Impact Atlas into the national school curriculum. Qualitative insights further suggest that such communication should be locally grounded and relatable, focusing on tangible impacts for Aruba, such as extreme heat, food security, desalination capacity, and sargassum influxes, and delivered in accessible language (e.g., Papiamentu, Dutch, Spanish, and English).

Management preferences indicated a desire for strong national leadership by one subgroup. Another implicitly chose for meaningful multi-level coordination and participation in decision-making at local, regional, and international levels. Anchoring adaptation policies in residents' lived experiences, perceptions, and practical priorities can help strengthen the societal legitimacy and fairness of such leadership while also enhancing long-term effectiveness. To formalize multi-level management, it is important to define a clear operational roadmap outlining how national leadership will coordinate adaptation efforts with regional Caribbean and relevant Kingdom of the Netherlands partners, ensuring alignment of decision-making processes, responsibilities and resources across governance levels.

Furthermore, qualitative responses highlight the importance of transparency and follow-through, as some residents express "survey fatigue" and call for the public sharing of findings alongside the implementation of tangible and binding adaptation actions. To support this, the establishment of clear, time-bound Key Performance Indicators (KPIs) could help track progress in public climate awareness, policy implementation, and adaptation uptake over time, thereby strengthening accountability and ensuring that adaptation commitments translate into measurable outcomes.

## References

- Adger, W. N., Barnett, J., Brown, K., Marshall, N., & O'Brien, K. (2013). Cultural dimensions of climate change impacts and adaptation. *Nature Climate Change*, 3(2), 112-117.
- Baniassadi, A., Lipsitz, L. A., Sailor, D., Pascual-Leone, A., & Manor, B. (2023). Heat waves, climate change, and implications for an aging population. *The Journals of Gerontology: Series A*, 78(12), 2304-2306.
- Chausson, A., Turner, B., Seddon, D., Chabaneix, N., Girardin, C. A., Kapos, V., ... & Seddon, N. (2020). Mapping the effectiveness of nature-based solutions for climate change adaptation. *Global Change Biology*, 26(11), 6134-6155.
- Ergun, S. J., Karadeniz, Z. D., & Rivas, M. F. (2024). Climate change risk perception in Europe: country-level factors and gender differences. *Humanities and Social Sciences Communications*, 11(1).
- European Investment Bank (EIB). (2024). The EIB climate survey: 7<sup>th</sup> edition. Doi: 10.2867/4661519
- Fernandes, J. P., & Guiomar, N. (2018). Nature-based solutions: The need to increase the knowledge on their potentialities and limits. *Land Degradation & Development*, 29(6), 1925-1939.
- Flynn, C., Jardon, S. T., Fisher, S., Blayney, M., Ward, A., Smith, H., Struthoff, P., & Fillingham, Z. (2024). Peoples' climate vote 2024. New York: United Nations Development Programme (UNDP). Available at: <https://www.undp.org/publications/peoples-climate-vote-2024>
- González-García, A., Palomo, I., Codemo, A., Rodeghiero, M., Dubo, T., Vallet, A., & Lavorel, S. (2025). Co-benefits of nature-based solutions exceed the costs of implementation. *Cell Reports Sustainability*, 2(3).
- Gruber, C., Fiertz, N., Rouleau, T., MacMurray, M. and Risi, L. (2025). *CORVI: Measuring Multidimensional Climate Risks in Aruba*. Environmental Security Program Report. The Stimson Center, Washington DC.
- Intergovernmental Panel on Climate Change (IPCC). (2022). *Climate change 2022: Impacts, adaptation and vulnerability; Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK: Cambridge University Press.
- Islam, N., & Winkel, J. (2017). Climate change and social inequality. United Nations Department of Economic and Social Affairs. Available at: [https://www.un.org/esa/desa/papers/2017/wp152\\_2017.pdf](https://www.un.org/esa/desa/papers/2017/wp152_2017.pdf)
- Kaminski, I. (2026, January 28). Dutch government discriminated against Bonaire islanders over climate adaptation, court rules. The Guardian. Available at: <https://www.theguardian.com/environment/2026/jan/28/netherlands-government-discriminated-bonaire-islanders-caribbean-climate-crisis-adaptation>
- Kunreuther, H. (2021). Improving the national flood insurance program. *Behavioural Public Policy*, 5(3), 318-332.

Latai-Niusulu, A., Binns, T., & Nel, E. (2020). Climate change and community resilience in Samoa. *Singapore Journal of Tropical Geography*, 41(1), 50-70.

Mycoo, M., M. Wairiu, D. Campbell, V. Duvat, Y. Golbuu, S. Maharaj, J. Nalau, P. Nunn, J. Pinnegar, and O. Warrick, 2019: Sea Level Rise and Implications for Low Lying Islands, Coasts and Communities. In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 321–445. <https://doi.org/10.1017/9781009157964.006>

Nalau, J., Becken, S., & Mackey, B. (2018). Ecosystem-based adaptation: A review of the constraints. *Environmental Science & Policy*, 89, 357-364.

Nurse, L. A., McLean, R. F., Agard, J., Briguglio, L. P., Duvat-Magnan, V., Pelesikoti, N., ... & Webb, A. (2014). Small islands. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects*. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

Otto, I. M., Reckien, D., Reyer, C. P., Marcus, R., Le Masson, V., Jones, L., ... & Serdeczny, O. (2017). Social vulnerability to climate change: a review of concepts and evidence. *Regional Environmental Change*, 17(6), 1651-1662.

Palacios, E., van Beukering, P., van Zanten, B., Lacle, F., Schep, S., & Soellner, I. (2021). Linking ecosystem services and the Sustainable Development Goals in Small Island Developing States: the case of Aruba. *One Ecosystem*, 6, e71033. <https://doi.org/10.3897/oneeco.6.e71033>

Pujadas-Farreras, M., & McDonagh, S. A. (2025). A study of easy-to-read adaptations in climate communication: a corpus analysis. *Universal Access in the Information Society*, 24(3), 1917-1929.

Thomas, A., & Benjamin, L. (2018). Policies and mechanisms to address climate-induced migration and displacement in Pacific and Caribbean small island developing states. *International Journal of Climate Change Strategies and Management*, 10(1), 86-104.

Vousdoukas, M. I., Athanasiou, P., Giardino, A., Mentaschi, L., Stocchino, A., Kopp, R. E., ... & Feyen, L. (2023). Small Island Developing States under threat by rising seas even in a 1.5 C warming world. *Nature Sustainability*, 6(12), 1552-1564.

Zainulbhai, H. (2015). Women, more than men, say climate change will harm them personally. Pew Research Center. Available at: <https://www.pewresearch.org/short-reads/2015/12/02/women-more-than-men-say-climate-change-will-harm-them-personally>

## Appendix A Questionnaire

### Start of Block: Opening

English: Please continue with the survey once you have indicated your preferred language in the drop-down menu above (right corner).

Papiamentu: Sigui cu e encuesta despues cu bo scohe bo idioma prefera for di e menu (skina drechi) aki riba.

Nederlands: Ga verder met de enquête nadat u uw voorkeurstaal heeft aangegeven in het keuzemenu (rechts) hierboven.

Español: Continúe con la encuesta una vez que haya indicado su idioma preferido en el menú desplegable de arriba (esquina derecha).

### End of Block: Opening

### Start of Block: Page 1 (end survey if 2nd option is chosen)



This research aims to understand the perceptions of Aruba's residents regarding climate change and to explore their preferences for different climate adaptation strategies. The research is being carried out by the University of Aruba (UA) and VU University Amsterdam. The results of this research are to support the development of Aruba's National Adaptation Strategy, led and coordinated by the National Climate Resilience Council of Aruba (NCRC), the International Panel on Deltas, Coastal Areas & Islands (IPDC), and Impact Blue Foundation (IB). Completing the survey will take

approximately 15 minutes. You need to be at least 16 years of age to participate. Your participation is voluntary, which means that you can withdraw at any time. Your privacy will be protected to the extent permitted by Dutch law. No personally identifiable information will be included in any research product and results will be published in aggregate. All data from the research will be kept confidential and stored in a secure and password-protected location. If you have any questions or comments, please contact: peter.robinson@vu.nl or diego.acevedo@ua.aw. By agreeing to participate in this research, you signify that you have read and understood the above information.

Do you agree to participate in this study?

- Yes, I agree to participate
- No, I do not agree to participate

*Skip To: End of Survey If Do you agree to participate in this study? = No, I do not agree to participate*

End of Block: Page 1 (end survey if 2nd option is chosen)

Start of Block: Page 2

Which of the following statements best describes your thoughts about climate change?

- I don't think that climate change is happening
- I have no idea whether climate change is happening or not
- I think that climate change is happening, but it's just a natural fluctuation (variation) in Earth's temperatures
- I think that climate change is happening, and I think that humans are largely causing it

End of Block: Page 2

Start of Block: Page 3

How often do you think about climate change?

- Daily
- Weekly
- A few times a year
- Never
- Don't know

When you think of the potential impact of climate change on your life in the future (next 10 years), do you feel...

- Very worried
- Quite worried
- Slightly worried
- Not worried at all
- Don't know

End of Block: Page 3

Start of Block: Page 4

Please read the following before answering the next questions.

Climate change is impacting Aruba in several critical ways. Sea-level rise increases the risk of flooding and (beach) erosion in low-lying coastal areas. Higher temperatures cause extreme heat effects in densely populated areas and longer droughts strain freshwater resources. Warming and more acidic oceans damage coral reefs, leading to bleaching and loss of marine habitats. More extreme weather events, such as storms and hurricanes, further disrupt ecosystems and infrastructure. All these impacts also lower the island's attractiveness to tourism. These changes endanger Aruba's natural environment, economy and quality of life.

End of Block: Page 4

Start of Block: Page 5

Please indicate to what extent each of the following climate hazards has had a direct negative impact on your everyday life within the past five years. Each of the following climate hazards are presented in different climate themes, e.g., it is getting warmer, it is getting drier, etc.



Climate theme 1: It is getting warmer

	No impact	Minor impact	Moderate impact	Major impact
Higher average temperatures (e.g., reduced outdoor activity and labor productivity, increase in energy consumption)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
More extreme temperatures (e.g., loss of biodiversity, increase in power outages, higher mortality)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Climate theme 2: It is getting drier

	No impact	Minor impact	Moderate impact	Major impact
Bushfires	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prolonged drought & drier soil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Climate theme 3: Storms, rains & hurricanes

	No impact	Minor impact	Moderate impact	Major impact
Erosion & washing away of soil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flash floods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Winds, waves and coastal floods due to increase in storms, rains & hurricanes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Climate theme 4: Warmer more acid sea

	No impact	Minor impact	Moderate impact	Major impact
Loss of marine biodiversity (e.g., decline in coral reefs, sea grass, mangroves, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Climate theme 5: The sea level is rising

	No impact	Minor impact	Moderate impact	Major impact
Coastal flooding due to sea level rise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Higher storm surges & increased risk of Tsunamis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beach erosion (i.e., loss of beach sand)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Saltwater intrusion (i.e., salt concentration increase in soil & groundwater)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Climate theme 6: The wind is changing

	No impact	Minor impact	Moderate impact	Major impact
Changing wind direction (e.g., change in airport or harbor operations, fishing activities, air pollution nuisance)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase in wind gust strength (e.g., damage to buildings & roofs, blowing beach sand)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Low wind extremes (e.g., more mosquito nuisance, feels hotter)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Page 5

Start of Block: Page 6



Over the past five years, have you experienced any of the following negative climate impacts (select up to three most common experienced)?

- Power cut or energy supply issues
- Drinking water issues
- Property damage (such as roof damage, or damage from flooding)
- Destruction of land- or marine-environment or natural spaces
- Physical health issues (such as contracting an infectious disease or heat stroke)
- Mental health issues (such as stress and anxiety)
- Transportation disruptions (such as road closures or public transport delays)
- Disruption of public services (such as school closures or waste collection delays)
- Increased financial expenses due to excess insurance premiums (or not able to insure)
- Increased financial expenses from energy, water and/or fuel
- Discomfort of pets
- Higher food prices
- Loss of value of your home or property
- Loss of intangible cultural heritage (such as disruption to traditional fishing practice, challenges in protecting archaeological sites or impacts on events like carnival)
- Reduced outdoor activities
- Reduced labor, work or learning productivity

Displacement (e.g., due to natural disasters)

Other, specify:

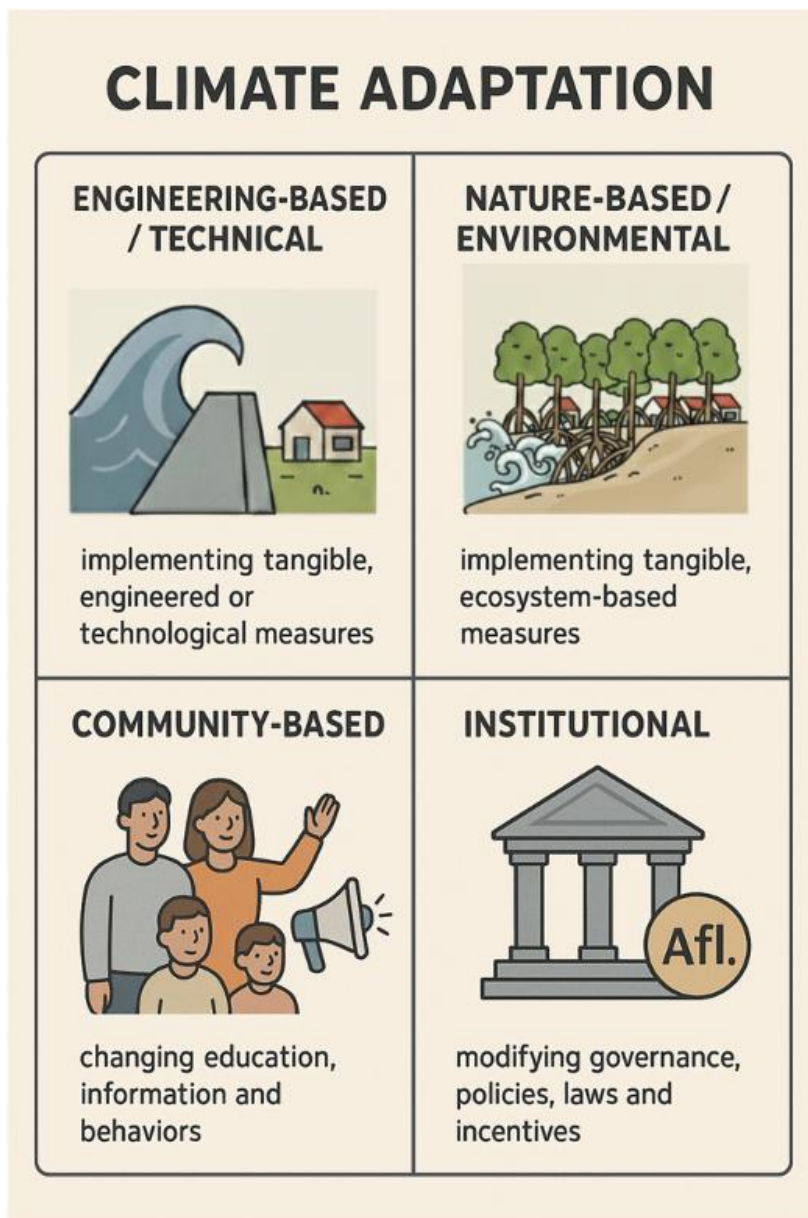
---

None of the above

End of Block: Page 6

Start of Block: Page 7

Adapting to climate change means taking action to adjust to its present and future impacts. A range of adaptation options are available to protect residents of Aruba from the impacts of climate change. These can be broadly classified based on the following categories:



End of Block: Page 7

Start of Block: Page 8



Which of the following climate themes do you consider to be the most important to address and adapt to in the next 10 years in Aruba? Please drag and drop the following

climate themes from 'most important to adapt to' (1) to 'least important to adapt to' (6).

\_\_\_\_\_ It is getting warmer (e.g., higher average temperatures and/or more extreme temperatures)

\_\_\_\_\_ It is getting drier (e.g., bushfires and/or prolonged drought & drier soil)

\_\_\_\_\_ Storms, rains & hurricanes (e.g., erosion & washing away of soil, flash floods and/or winds, waves and coastal floods due to increase in storms, rains & hurricanes)

\_\_\_\_\_ Warmer & more acidic sea (e.g., loss of marine biodiversity)

\_\_\_\_\_ The sea level is rising (e.g., coastal flooding due to sea level rise, higher storm surges & increased risk of Tsunamis, beach erosion and/or saltwater intrusion)

\_\_\_\_\_ The wind is changing (e.g., changing wind direction, increase in wind gust strength and/or low wind extremes)

End of Block: Page 8

Start of Block: Page 9a

*Display this question:*

*If Which of the following climate themes do you consider to be the most important to address and ada... [ It is getting warmer (e.g., higher average temperatures and/or more extreme temperatures) ] = 1*



Thinking about your *highest-ranked climate theme (it is getting warmer)*, please select your 5 most preferred adaptation options.

- Make safety plans, build cooling centers, and share guidelines to help children, seniors, and visitors stay safe
- Train emergency teams, store food and water, and prepare for extreme heat
- Use solar, ocean, and wind power for affordable, reliable cooling
- Improve homes, schools, and hospitals by using materials and systems designed to maintain cooler temperatures
- Develop water reserves and improve irrigation for people, farms, and nature
- Support public transit, provide shaded walkways, and ensure road safety
- Adopt national climate programs and building codes that protect against heat
- Add more trees, parks, and water spaces to lower city temperatures
- Inform about heat stress, benefits of healthy diets, and ways to save energy
- Study how plants, animals, and coral can survive rising temperatures

End of Block: Page 9a

Start of Block: Page 9b

Display this question:

*If Which of the following climate themes do you consider to be the most important to address and ada... [ It is getting drier (e.g., bushfires and/or prolonged drought & drier soil) ] = 1*



Thinking about your *highest-ranked climate theme (it is getting drier)*, please select your 5 most preferred adaptation options.

- Clear dry areas, create open spaces to slow fires, and equip firefighters with effective tools
- Ensure everyone has access to water during droughts and provide assistance to groups at risk
- Upgrade systems to recycle water for residential, agricultural, and garden use
- Build systems to store rainwater and greywater to use during dry periods
- Improve desalination and develop new ways to make freshwater when reservoirs are dry
- Use drought-resistant crops, hydroponics, and greenhouses to grow food with less water
- Replant forests and restore damaged land to help soil hold more water when it's dry
- Encourage people to save water and energy, and support eco-friendly housing designs
- Inform communities on water conservation, resource reuse, and bushfire prevention
- Create a national water plan and enforce laws to conserve water during droughts

End of Block: Page 9b

Start of Block: Page 9c

Display this question:

*If Which of the following climate themes do you consider to be the most important to address and ada... [ Storms, rains & hurricanes (e.g., erosion & washing away of soil,*

flash floods and/or winds, waves and coastal floods due to increase in storms, rains & hurricanes) ] = 1



Thinking about your *highest-ranked climate theme (storms, rains & hurricanes)*, please select your 5 most preferred adaptation options.

- Provide safe shelters and clear plans for people and animals during storms
- Send early alerts and coordinate national responses during disasters
- Store essential goods and plan their safe distribution after disasters
- Use insurance and emergency funds to help communities recover faster
- Ban unsafe construction in flood zones and update building codes
- Improve rainwater management and drainage systems to prevent floods
- Strengthen roads, power lines, and essential services for extreme weather
- Restore mangroves, reefs, and wetlands to act as storm shields
- Study storms and floods to improve future preparedness
- Adopt long-term nature and climate policies, secure funding, and support a diverse economy

End of Block: Page 9c

Start of Block: Page 9d

Display this question:

If Which of the following climate themes do you consider to be the most important to address and ada... [ Warmer & more acidic sea (e.g., loss of marine biodiversity) ] = 1



Thinking about your *highest-ranked climate theme (warmer & more acidic sea)*, please select your 5 most preferred adaptation options.

- Expand early warning systems (e.g., for events such as coral bleaching that can kill coral) and coordinate with local groups to address ocean changes
- Upgrade wastewater treatment facilities and prevent contaminated runoff from entering the sea
- Collect rainwater and improve purification to keep drinking water safe
- Track water quality and marine life health as the ocean changes
- Support sustainable fishing and develop new food sources to protect sea life
- Promote eco-friendly tourism and find new ways for communities to earn income
- Protect reefs, mangroves, and expand marine park to support ocean life
- Teach locals and visitors how to care for the ocean and its wildlife
- Enforce ocean protection laws and recognize the "Rights of Nature and Ocean"

End of Block: Page 9d

Start of Block: Page 9e

Display this question:

*If Which of the following climate themes do you consider to be the most important to address and ada... [ The sea level is rising (e.g., coastal flooding due to sea level rise, higher storm surges & increased risk of Tsunamis, beach erosion and/or saltwater intrusion) ] = 1*



Thinking about your *highest-ranked climate theme (the sea level is rising)*, please select your 5 most preferred adaptation options.

- Make plans for floods and tsunamis, set up evacuation routes, store food and water, and train people to respond safely
- Plan backup routes, use alternative airports, and make sure people can move to safety before/during floods
- Construct dikes, levees, seawalls, and reinforce reefs to protect against rising seas, and adapt ports and airstrips
- Keep water and power systems safe from saltwater intrusion, improve wastewater treatment, and collect rainwater
- Create maps and collect data to identify safe locations for future developments and infrastructure projects
- Encourage new housing and businesses to be built inland or in safe, higher areas
- Restore reefs, mangroves, seagrass, and coastal plants to reduce erosion and prevent saltwater intrusion
- Protect cultural sites, strengthen community ties with nature, and include sea level rise in education
- Update building rules and land-use plans to prepare for rising seas

End of Block: Page 9e

Start of Block: Page 9f

Display this question:

*If Which of the following climate themes do you consider to be the most important to address and ada... [ The wind is changing (e.g., changing wind direction, increase in wind gust strength and/or low wind extremes) ] = 1*



Thinking about your *highest-ranked climate theme (the wind is changing)*, please select your 5 most preferred adaptation options.

- Create and share evacuation routes, expand warning systems, and prepare safety measures to protect people from changing wind patterns and pollution
- Reinforce roofs and walls, implement stricter building codes, and use natural cooling and ventilation
- Use more wind and solar power, make electricity more stable and affordable, and improve the energy grid
- Reduce, reuse and recycle waste, capture harmful gases, and clean up polluted areas
- Design stronger airports, ports, and digital systems, and monitor them to prevent damage from strong winds
- Provide schools and communities with information and training about changing wind conditions
- Plant mangroves, protect sand dunes, and restore reefs and vegetation to reduce storm damage
- Plant local trees, build parks, and add ponds or canals to cool urban areas
- Improve hospitals and healthcare systems, and study how wind and heat affect people's health
- Develop, improve and enforce nature and climate laws, track progress, and work together to adapt to wind changes

End of Block: Page 9f

Start of Block: Page 10

How relevant were each of the following criteria in your choice of adaptation options?

	Not relevant at all	Slightly relevant	Moderately relevant	Very relevant	Extremely relevant
Protects our community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Positive impact on nature	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Affordability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fits our way of life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Page 10

Start of Block: Page 11

Among the actions that Aruba must take in the coming 10 years, how important is it to adapt to climate change?

- A critical urgency
- A priority
- Important but not a priority
- Not important
- Don't know

At what level do you think adaptation to climate change would be best managed?

- My house / property
- My local street and / or neighborhood
- My district
- Nationally (country wide)
- Regionally (across the Caribbean)
- Kingdom (of the Netherlands)
- Internationally (other countries)
- None of the above
- All of the above
- Don't know

When you think of the impact of climate change on your life in the future (next 10 years), do you think you will have to change and adapt the way you live?

- Yes, absolutely
- Yes, quite a bit
- No, not so much
- No, not at all
- Don't know

End of Block: Page 11

Start of Block: Page 12



Which sections of the population should be prioritized for help with adapting to climate change? Select a maximum of two.

- Elderly people
  - Children
  - Low-income people
  - Immigrants
  - People with disabilities
  - People living in neighborhoods at high-risk of climate impacts
  - Other, specify:
- 
- Everyone should be equally assisted
  - None
  - Undocumented section of the population

End of Block: Page 12

Start of Block: Page 13

How old are you, in years?

16 – 17 years

18 – 19 years

20 – 24 years

25 – 29 years

30 – 34 years

35 – 39 years

40 – 44 years

45 – 49 years

50 – 54 years

55 – 59 years

60 – 64 years

65 – 69 years

70 – 74 years

75 – 79 years

80+ years

Prefer not to say

What is your gender?

- Male
- Female
- Other
- Prefer not to say

End of Block: Page 13

Start of Block: Page 14

In which district of Aruba do you live?

- Noord/Tanki Leendert
- Oranjestad West
- Oranjestad Oost
- Paradera
- Santa Cruz
- Savaneta
- San Nicolaas Noord
- San Nicolaas Zuid
- Prefer not to say

Which of the following categories best characterizes you?

- Full-time employee
- Part-time employee
- Employer
- Homemaker
- Self-employed / Freelancer
- Entrepreneur
- Unemployed / Looking for a job
- Retired
- Student
- Disabled
- Other, specify: \_\_\_\_\_
- Prefer not to say

End of Block: Page 14

Start of Block: Page 15

Which of the following options best describes your monthly household income for 2025 after taxes?

- Less than Afl. 2,010
- Afl. 2,010 – 2,500
- Afl. 2,501 – 3,000
- Afl. 3,001 – 4,000
- Afl. 4,001 – 5,000
- Afl. 5,001 – 7,000
- Afl. 7,001 – 9,000
- Afl. 9,001 – 12,000
- Afl. 12,001 – 15,000
- More than Afl. 15,000
- Don't know
- Prefer not to say

What is your highest completed level of education?

- Primary education
- Completed secondary vocational education (EPB/EPI)
- Completed secondary intermediary education (MAVO)
- Completed secondary higher education (HAVO/VWO)
- Graduated from university/college (WO/HBO)
- Completed post-graduate education (PhD)
- Other, specify: \_\_\_\_\_
- Prefer not to say

End of Block: Page 15

Start of Block: Page 16

Is there anything else you would like to add?

---

---

---

---

---

End of Block: Page 16

We thank you for your time spent taking this survey.  
Your response has been recorded.

For additional information and resources on climate change in Aruba, please visit the NCRC Aruba website or consult Aruba's Climate Impact Atlas.

Wij danken u voor de tijd die u heeft genomen om deze enquête in te vullen.  
Uw antwoord is opgeslagen.

Voor meer informatie en bronnen over klimaatverandering op Aruba bezoek de website van de NCRC Aruba of raadpleeg Aruba's Climate Impact Atlas.

Nos ta gradici bo tempo pa yena e encuesta aki.  
Bo respuesta a wordo registra.

Pa mas informacion y recurso tocante cambio climatico na Aruba, por bishita website di NCRC Aruba of consulta Aruba su Climate Impact Atlas.  
Le agradecemos el tiempo dedicado a responder esta encuesta.

Su respuesta ha sido registrada.  
Para información y recursos adicionales sobre cambio climático en Aruba, visite el sitio web de NCRC Aruba o consulte el Climate Impact Atlas de Aruba.