Implementation of a Climate Adaptation Options Database

Findings from Focus Groups in Curaçao, Aruba, and the island of Saint Martin

RESEARCH REPORT

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Colophon

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Author: Renske Pin, PhD.

Contact: info@requestcaribbean.com

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Content

Summary

The Dutch Caribbean islands are increasingly confronted with the impacts of climate change, including sea-level rise, coastal erosion, heat stress, drought and extreme weather events. While extensive climate-relevant knowledge already exists in the region, it is fragmented across ministries, NGOs, universities, civil society and community initiatives, and is not consistently accessible for decision-making. The Climate Adaptation Options Database has been developed under the International Panel on Deltas, Coasts and Islands (IPDC) to support evidence-based adaptation by compiling adaptation options, practical examples and supporting data for use in policy, research, education and public engagement.

Three focus group sessions were held to explore opportunities and barriers for the implementation of the database. Each session targeted a different group of stakeholders:

- **Curaçao:** sectoral experts and societal organizations (8 participants)
- **Aruba:** academic representatives from the University of Aruba (6 participants)
- **The island of Saint Martin:** policy officers and technical experts from both Sint Maarten (southern part) and Saint-Martin (northern part) (11 participants)

Across the sessions, participants discussed four structured questions relating to missing knowledge, sustainable use, governance and long-term vision. The findings were further analyzed using the Fleuren implementation framework.

Across all islands, stakeholders recognized the database as a timely and valuable instrument for strengthening climate adaptation. The need for the database is driven not by a shortage of scientific knowledge, but by the lack of accessibility, continuity and translation of existing knowledge to the community and decision makers.

A comparison across islands shows distinct implementation pathways:

- **Curaçao** emphasized cross-sector coordination, neighborhood relevance and accessible communication for citizens and policymakers.
- **Aruba** focused on institutional embedding within teaching, research and community engagement at the university, including active student contributions.
- **The island of Saint Martin** highlighted the database as a neutral mechanism for collaboration across the two jurisdictions, supporting whole-island decision-making despite political and institutional fragmentation.

Across all islands, participants stressed that sustainable implementation requires structural resourcing, clear governance and the ability to integrate both institutional and community-based knowledge.

The Climate Adaptation Options Database has strong potential to advance climate resilience in the Dutch Caribbean, but its value will only be realized if it becomes embedded rather than simply available. Implementation must go beyond technical completion and focus on long-term stewardship, accessibility for multiple user groups, and relevance for real decision-making. The database should be treated as a living knowledge infrastructure requiring continuous curation, communication and collaboration.

To ensure long-term adoption and cross-island impact, the following priorities are recommended:

1. Establish multi-institutional governance and clear role division for stewardship, data validation and communication.
2. Allocate structural resources and staffing for database maintenance beyond project cycles.
3. Translate content into formats accessible to policymakers, professionals, students and the wider public, including layered explanations and visual tools.
4. Integrate community-based knowledge and practical lessons learned, with attribution and contextual interpretation.
5. Use the database as a routine reference point in decision-making processes such as spatial planning, disaster preparedness, education and public information campaigns.
6. Enable inter-island learning and joint action, while recognizing each island's institutional and cultural specificities.

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1. Introduction

1.1 Background and Context

The Dutch Caribbean islands Curaçao, Aruba, and the island of Saint Martin are increasingly facing the consequences of climate change. Rising sea levels, shifting rainfall patterns, prolonged droughts, and more frequent extreme weather events are placing growing pressure on ecosystems, infrastructure, and the wellbeing of local communities. These developments have highlighted the need for coordinated and evidence-based climate adaptation strategies across the region.

To address this need, a collaborative initiative under the International Panel on Deltas, Coasts, and Islands (IPDC) has been established to strengthen both scientific knowledge and practical implementation of climate adaptation within the Dutch Caribbean. A central outcome of this initiative is the development of the Climate Adaptation Options Database: a shared, open-access resource designed to support policy development, research, and education on climate resilience. The Climate Adaptation Options Database compiles adaptation measures, good practices, and datasets across key domains, including water management, coastal protection, biodiversity and ecosystem restoration, spatial planning, the energy transition, and social resilience.

The database is jointly coordinated by the Universities of Aruba, Curaçao, and Sint Maarten, in partnership with VU–IVM, Wageningen University & Research, Deltares, and the Caribbean Academics for Sustainability (CAS). It is envisioned as a platform for knowledge integration and co-creation, connecting scientific expertise with local and community-based insights and thereby strengthening collaboration among governments, civil society, academia, and the private sector.

To inform the implementation and practical application of the Climate Adaptation Options Database, this report presents the results of three focus group sessions held across the region. Each session examined opportunities and challenges associated with adopting and embedding the database, but from different stakeholder perspectives: academic and university representatives in Aruba, technical and sectoral experts in Curaçao, and policy workers on the island of Saint Martin, including participants from both the Dutch constituent country Sint Maarten (southern part) and the French Overseas Collectivity Saint-Martin (northern part). Throughout this report, the term *"the island of Saint Martin"* refers to the island as a whole, while *"Sint Maarten"* and *"Saint-Martin"* are used only when referring to the respective jurisdictions.

1.2 The Database Development

The development of the Climate Adaptation Options Database builds on a systematic and region-wide effort to identify, assess, and prioritise climate adaptation measures relevant to the Dutch Caribbean. In the initial phase, the three universities in the Dutch Caribbean, together with VU–IVM, conducted an extensive inventory of approximately 800 adaptation options based on international and national sources, scientific and grey literature, ongoing projects, and local and traditional knowledge systems. Through successive rounds of review, this inventory was reduced first to 125 and subsequently to 90 options, following a collective prioritisation process across the islands distinguishing between "need-

to-have" and "nice-to-have" options. Each option is accompanied by key descriptors, including origin, feasibility, cost, expected effectiveness, and equity considerations, as well as its relevance for different islands and user groups such as citizens, policymakers, or knowledge professionals. For clarity and usability, all options were categorised across nine impact areas to facilitate comparison and structured decision-making:

1. Adaptive Finance
2. Biodiversity & Ecosystems
3. Coastal & Flood Protection
4. Cultural Heritage
5. Food Security & Sovereignty
6. Health & Wellbeing
7. Resilience & Disaster Preparedness
8. Urban Resilience & Infrastructure
9. Water Security

The focus groups examined in this report were organised immediately after the final selection phase; their objective was to assess whether the database, in its near-final form, meets stakeholder expectations in terms of usability, perceived relevance, and potential added value for climate adaptation planning and implementation.

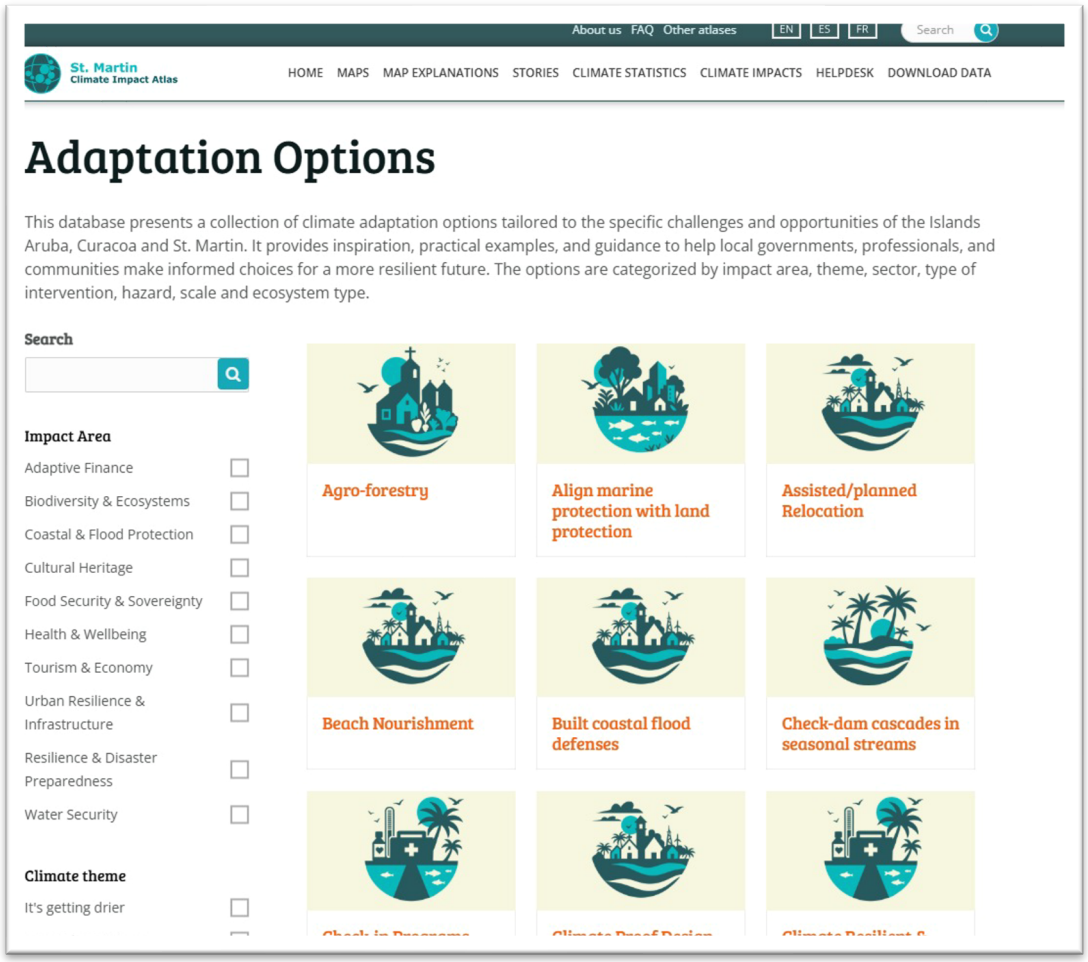

Figure 1. Screenshot from the *St. Martin Climate Impact Atlas*, where the Climate Adaptation Options Database will be integrated. The combined platform is scheduled for launch in the first week of December 2025.

1.3 Objectives of the Focus Groups

As part of the implementation phase of the Climate Adaptation Options Database, three focus groups were organized between October and November 2025, one on each of the partner islands. The focus groups were intended to:

- Gather local insights and perspectives on the relevance, usability, and sustainability of the database;
- Identify knowledge gaps and missing data or expertise relevant to each island's context;
- Explore pathways for implementation, including governance, collaboration, and integration into education and policy;
- Formulate recommendations for embedding the database within local institutions and ensuring long-term maintenance and use.

Each island session was co-organized with the respective university and tailored to its institutional and societal context:

Island	Theme	Focus
Curaçao	Hidden knowledge and implementation pathways	Expert perspectives on missing datasets, sustainability, and partnerships
Aruba	Embedding within academic structures	Integration into teaching, research, and student engagement
The island of Saint Martin	Whole Island Approach	Collaboration across French and Dutch sides and community inclusion

The outcomes of these discussions provide valuable input for refining the Climate Adaptation Options Database and guiding its implementation strategy across the Dutch Caribbean.

2. Research method

2.1 Research Design

The study employed a qualitative, participatory approach through focus group discussions, aimed at eliciting diverse stakeholder perspectives in a structured yet interactive setting. The method was selected for its ability to uncover both consensus and divergence in viewpoints, allowing participants to co-create insights through dialogue.

Each focus group followed a comparable structure, with an emphasis on island-specific themes. Sessions were facilitated by local moderators with content expertise, while documentation and synthesis were coordinated by RE-Quest. Discussions were conducted in English (Aruba, Saint Martin) and Dutch/Papiamentu (Curaçao) and summarized anonymously.

2.2 Focus Group Format

- **Participants:** Approximately 6-11 representatives per island, selected to ensure diversity across government, academia, and civil society organizations.
- **Duration:** Two hours per session, followed by an informal networking lunch.
- **Materials:** For each focus group, a tailored interview guide was developed and a condensed handout was provided, accompanied by short demonstrations of the database and example materials (e.g. adaptation options list, dummy entries, and the preview of the climate atlas website for the island of Saint Martin), see Appendix 1 and 2.
- **Structure:** Four thematic rounds of discussion, plus opening and closing reflections.
- **Data Collection:** Observational notes and (where permitted) audio recordings were used to ensure accuracy of reporting.

2.3 Discussion Themes

While the overarching topic, implementation of the Climate Adaptation Options Database, was shared, each island's focus group addressed distinct thematic priorities:

1. **Curaçao:**
    - Identification of "hidden gems" (local data and expertise) missing from the database
    - Pathways for long-term sustainability and use across sectors
    - Governance and partnership models
    - Future-oriented visions for climate adaptation by 2050
2. **Aruba:**
    - Embedding the database within academic structures
    - Faculty and student roles in maintenance and expansion
    - Use for teaching, research, and community engagement
    - Long-term vision for institutionalization within the university

3. **The island of Saint Martin:**
    - Whole Island Approach: collaboration across the French and Dutch territories
    - Inclusion of community-level knowledge
    - Use and ownership among local actors
    - Governance and continuation beyond the project phase

2.4 Analytical Framework

The analysis follows a policy implementation lens, drawing conceptually on Fleuren et al.'s *Implementation of Innovations Framework*.[1] This model distinguishes between four domains influencing implementation success:

1. **Characteristics of the innovation** – qualities of the Climate Adaptation Options Database itself
2. **Characteristics of the adopting individuals and organizations** – capacities, motivation, and perceived relevance
3. **Socio-political and contextual factors** – governance, coordination, and institutional environment
4. **Implementation process** – phases of adoption, use, and continuation

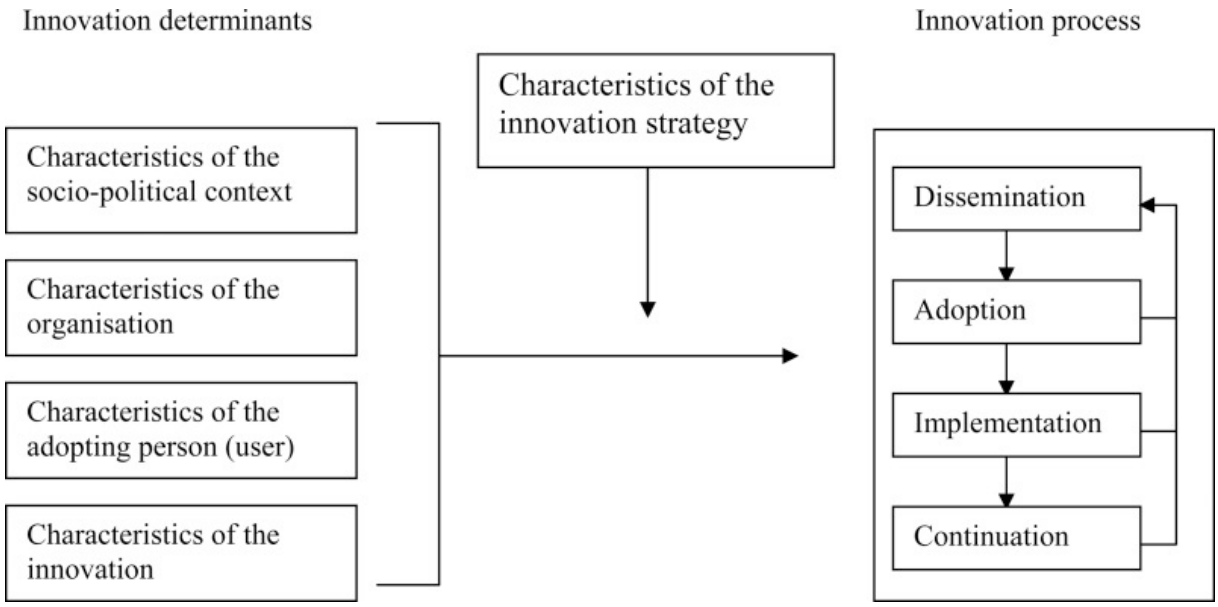

Figure 2. Determinants of innovation implementation. From Fleuren, M.A.H., et al. (2014). *Towards a measurement instrument for determinants of innovations that may affect its implementation.* Implementation Science, 9: 35. © 2014 by the original authors; reused under PMC open-access licence.

[1] Fleuren MA, Paulussen TG, Van Dommelen P, Van Buuren S. Towards a measurement instrument for determinants of innovations. Int J Qual Health Care. 2014 Oct;26(5):501-10. doi: 10.1093/intqhc/mzu060. Epub 2014 Jun 20. PMID: 24951511; PMCID: PMC4195468.

This framework supports systematic comparison across the three islands and enables policy-oriented interpretation of the findings.

2.5 Limitations

As exploratory sessions, the focus groups are not intended to produce statistically representative findings. Instead, they offer qualitative depth and contextual understanding that complement the broader quantitative and technical work on the Climate Adaptation Options Database. Differences in participant composition and local institutional dynamics may also influence the range of insights per island.

3. Results

3.1 Overview of Participation and Engagement

The three focus group sessions were conducted between 30 October and 21 November 2025, engaging a total of 25 participants across Curaçao, Aruba, and Sint Maarten. Each session gathered stakeholders representing government agencies, academic institutions, environmental NGOs and entrepreneurs.

The discussions followed a common structure: four thematic rounds exploring (1) content and missing knowledge, (2) use and sustainability, (3) collaboration and governance, and (4) long-term vision, while allowing for island-specific priorities to emerge organically.

Across all sessions, participants expressed a strong sense of ownership and willingness to contribute to the Climate Adaptation Options Database as a shared regional resource. However, they also emphasized the importance of institutional embedding, data ownership clarity, and continued coordination beyond the project phase to ensure sustained use and expansion. In addition, participants in all three focus groups identified the translation of academic language and formats into communication styles accessible to policymakers and the wider public as a central challenge, alongside the influence of political context on the adoption and practical uptake of adaptation measures.

For each island, results are reported in three layers: (1) responses to the four guiding research questions, (2) opportunities and barriers identified using the Fleuren implementation framework, and (3) key recommendations for successful implementation of the Climate Adaptation Options Database.

3.2 Curaçao – Expert Perspectives on Knowledge Gaps and Implementation Pathways

3.2.1 Composition and Context

The Curaçao focus group, held on 30 October 2025 at *The Triangle Meetingroom* in Otrobanda, convened eight representatives from disaster management, environmental research, civil society, and the private sector. Participants included representatives of the Curacao Governments Risk Coordination Department, the Meteorological Department, research institute *CARMABI*, NGO *Amigu di Tera* and community greening initiatives.

3.2.2 Missing Data and Knowledge Sources

Participants highlighted that large amounts of climate-relevant information do exist on Curaçao, but that data are fragmented across government ministries, NGOs, universities and private initiatives, and are often difficult to locate and to exchange. Critical datasets remain unavailable or inaccessible, including physical reports stored in ministry offices, student research outputs, environmental monitoring results, and non-public investigations undertaken for governmental purposes. Data on land

biodiversity, groundwater quality, coastal water pollution dynamics, and spatial vulnerability differences across neighborhoods were specifically described as either missing or inaccessible. Participants stressed that the problem is not only the *absence* of scientific knowledge, but also the lack of *systematic documentation, digitization and public access* to existing knowledge. The absence of up-to-date and high-resolution GIS information was mentioned as a significant gap, making it difficult to translate island-wide developments to specific places.

"There should be a clear place where you can find everything. Right now I spend days searching different websites for reports, only to end up with broken links. We really need a central repository that shows what has been published." – Focus group respondent, Curacao.

Several participants emphasized that documentation of past projects and community-based practices, including successful and unsuccessful pilots, is rarely recorded or shared, resulting in continual reinvention and missed learning opportunities. Overall, the primary missing knowledge is not the science itself, but a transparent and findable record of research, practice, and lived experience across sectors and neighborhoods.

Participants noted that the database already compiles a substantial body of formal scientific and policy data. Nonetheless, several *"hidden gems"* were identified as missing:

- **Community-based and NGO-driven initiatives** (e.g., neighborhood greening projects, informal adaptation practices);
- **Long-term local datasets** on temperature, soil quality, and freshwater availability that remain fragmented or unpublished;
- **Socio-cultural knowledge** on behavioral adaptation and public awareness initiatives.

The group emphasized the importance of integrating non-traditional and practice-based knowledge into the database, while maintaining scientific credibility through transparent metadata and validation procedures.

"Renewal has to happen at the neighborhood level. When you show up with your story, you're intruding into people's everyday lives — why would they give you attention if you come from outside saying 'the world is ending'? Scientists tend to assume science is everything, but people have their own lives. If you keep insisting 'I know better,' you push them away — and that happens on a large scale." – Focus group respondent, Curacao.

3.2.3 Use, Sustainability, and Relevance: communication and localization

Participants agreed that the Climate Adaptation Options Database could be a powerful instrument if it evolves from a static catalogue into a dynamic infrastructure for long-term decision-making, community engagement and education. They stressed that sustainable use depends on four design requirements:

1. Connecting rather than replacing existing repositories, e.g., by linking to sector-specific platforms instead of centralizing control;
2. Ensuring that the information is usable in multiple "languages", academic, policy, practitioner and citizen;
3. Maintaining continuity beyond project cycles, particularly regarding curation, updating, and responsible ownership;
4. Building incentives for partners to contribute, rather than treating the database as a one-way information sink.

"It's all about translating the information. You need people who can do that. We're scientists — we tell stories with data and statistics, but nobody understands it. That's why we brought in a specialist to help." – Focus group respondent, Curacao.

Participants repeatedly underlined that the main bottleneck is not technical, but *communication*. While scientists, policymakers and NGOs can interpret detailed academic material, citizens and frontline professionals require formats that connect to their lived realities, such as neighborhood-level maps, contextualized examples, short story-based explanations, alerts, and concrete actions that individuals can take. Without this translation layer, the database risks limited behavioral or policy impact, even if well-filled with information.

"They read so much about everything that's bad or threatening, and not enough about what's possible. We need to work in a more inspiring way and not only focus on what's going wrong. That's essential if we want to motivate a new generation." – Focus group respondent, Curacao.

Participants viewed the database as potentially valuable for:

- Evidence-based policymaking, particularly within the National Adaptation Strategy (NAS);
- Educational and outreach purposes, including community awareness and student research projects;
- Cross-sectoral communication, helping bridge data silos among government, academia, and NGOs.

However, they warned that databases often risk becoming *"static repositories"* unless institutional mechanisms ensure regular updates. Suggested solutions included:

- Linking the Climate Adaptation Options Database to existing data platforms (e.g., CARMABI's ecological databases);
- Assigning a local host institution or coordinator responsible for curation and training;
- Ensuring bilingual accessibility (English and Papiamentu) to broaden usability.

"We work with different target groups, and for schoolchildren our success comes from aligning with the existing curriculum. We support teachers with what they already have to do, instead of adding yet another program." – Focus group respondent, Curacao.

3.2.4 Governance and Partnerships

Participants described climate adaptation governance on Curaçao as vibrant but fragmented. Collaboration exists through personal networks, but institutional structures tend to be weak, politically volatile and financially constrained. Ministries do not consistently share data, in some cases because of resource shortages, in others due to internal politics and perceived sensitivities. Initiatives led by civil society or scientists are sometimes appropriated or ignored after political uptake, which discourages participation.

"It's difficult, yes. We produce reports and studies, we submit them to the minister. Whether they are used or not is another story. But we cannot stop. We have to keep going, ensure the information is correct, and make sure it leads to the right decisions." – Focus group respondent, Curacao.

To counteract these dynamics, participants proposed a governance model for the database based on shared stewardship across knowledge institutions, NGOs and government**,** supported by clear protocols on data ownership, attribution, acknowledgement of contributors and public transparency. They emphasized that implementation requires not only cooperation at national level, but also a multi-level approach**:**

- ministries and regulators (strategic)
- knowledge institutions and NGOs (translation and applied expertise)
- neighborhood-based organizations (local adaptation and legitimacy)

Sustained collaboration was seen as unlikely without explicit resourcing and mandate, because most organizations already operate at capacity.

"Some people naturally find each other, and others are simply very difficult to work with — not out of unwillingness, but because the circumstances and funding conditions create that reality. The pots are small: if you get funding, someone else doesn't. And once you have it, you want to use it as effectively as possible. With the requirements set by funders, you can't collaborate with everyone or do everything you'd ideally want to do." – Focus group respondent, Curacao.

The discussion underscored the need for a multi-stakeholder governance structure, potentially anchored at the University of Curaçao, with defined roles for government agencies, NGOs, and private actors.
Participants also proposed regional data-sharing agreements to facilitate interoperability with neighboring islands and partners.

"We already have all this knowledge on the island, but we don't use it ourselves — and the other islands are advancing with our knowledge." – Focus group respondent, Curacao.

3.2.5 Vision 2050

Participants expressed future visions that were diverse but complementary. Long-term aspirations included:

- a real-time sustainability dashboard integrating scientific indicators with social impact
- complete mapping of terrestrial biodiversity and coral reef health, including long-term monitoring of trends
- governance structures that support evidence-based policy and lifelong learning for civil servants
- strengthened climate literacy across the education system from primary school to professional training
- locally relevant risk insights at neighborhood level, particularly regarding flooding, heat and food security
- a trusted public voice or "science guide" providing regular interpretation of climate information across media channels

"There's a whole range of secondary students who will be Curaçao's future decision-makers, yet many feel completely disconnected from what's happening around them because they're focused on survival or superficial things. Telling them 'it will be hotter in 2050' doesn't land — but when you say, 'remember that tree at the bus stop by your school? It's gone because the groundwater dropped,' then the message reaches them. These are

powerful examples of how information can be translated in a way that truly resonates." – Focus group respondent, Curacao.

Overall, participants envisioned a future in which climate data are not only technically available, but culturally embedded, enabling citizens, policymakers and organizations to act purposefully and collectively rather than reactively.

Participants envisioned Curaçao as a climate-resilient island by 2050, characterized by:

- Stronger nature-based coastal protection;
- Circular water management systems;
- Community-driven adaptation projects integrated into urban planning;
- Education systems embedding climate literacy from primary to tertiary levels. The database was seen as an *"engine for collective learning"* that should evolve alongside these goals.

"In every neighborhood there are already active people — community leaders. You can involve them. And if there's a well-functioning community center, that's incredibly valuable as well. You could even identify in advance which topics they want to address." – Focus group respondent, Curacao.

3.2.6 Aditional notable observations

Beyond the four guiding questions, several cross-cutting insights emerged:

- **Translation of academic knowledge to citizen and policy contexts** was identified as the single greatest challenge, and the most decisive determinant of impact. Participants repeatedly noted that "information does not find its audience by itself."
- **Neighborhood-level engagement** was seen as indispensable for climate adaptation on Curaçao. Participants argued that climate issues manifest differently across districts (e.g., waterlogging, fisheries decline, heat stress), and that successful action requires starting from existing local motivation and knowledge rather than applying generic messaging.
- **Political dynamics strongly influence knowledge flows.** Instances were shared of community initiatives that collapsed due to electoral competition, and of scientific work becoming politicized or suppressed.
- **Fragmentation is reinforced by funding competition.** Organisations sometimes prioritise their institutional survival over collaboration, not out of unwillingness but due to resource scarcity.
- **People want to contribute when they are acknowledged.** Some contributors, especially within civil society, could withdraw when their work is co-opted or uncredited.
- **Community-driven adaptation requires long-term persistence.** Some impactful neighborhood projects described took years or decades before results became visible.

"It was small, interactive, and very inspiring. They want to scale it up, and I think that makes sense, the idea that you can raise issues locally and on a small scale, then follow up at a national level and build from there." – Focus group respondent, Curacao.

3.2.7 Implementation factors – Curaçao

The focus group discussions revealed that the successful implementation of the Climate Adaptation Options Database depends on interactive dynamics across all four levels of the Fleuren framework.

While participants demonstrated strong motivation and perceived value, they also emphasized structural and contextual barriers that must be addressed for long-term adoption.

1. Innovation characteristics

Participants viewed the database as a potentially transformative instrument, especially because it centralizes climate adaptation knowledge that is currently dispersed across institutions. Opportunities identified include its regional scope, the consolidation of scientific and community insights, and the potential for comparative learning across islands.

However, perceived complexity emerged as a core barrier. If the database remains overly technical in language, structure or interface, users outside the academic sphere may struggle to meaningfully apply the information. Participants also stressed that the innovation will be judged not by its existence but by its practical value in daily decision-making. A static catalogue, even if comprehensive, was described as insufficient. Instead, participants suggested that the database should support adaptive learning, including neighborhood-specific insights, examples of successful and unsuccessful interventions, and clear guidance on "who this option is for" and "what action follows from it". The risks of conceptual overload and limited usability were therefore highlighted as central innovation-related threats.

2. User characteristics

Across sectors, participants expressed high willingness to contribute to and use the database, indicating strong perceived relevance and ownership. Yet their ability to contribute depends heavily on time, capacity, and literacy in data handling. Civil society organisations, technical professionals and policymakers emphasised that the end users (citizens, decision makers, journalists) need tailored communication and translations to their needs and concerns.

3. Organisational characteristics

Organizational readiness constituted one of the strongest determinants of implementation success. Participants reported that climate-relevant information on Curaçao is scattered not because organizations are unwilling to cooperate, but because no entity has the mandate, resources or continuity to steward shared knowledge infrastructures. Staff turnover, project-based funding and siloed administrative structures impede sustained collaboration.

Opportunities exist in leveraging universities and NGOs as neutral knowledge brokers, but only if their role is institutionally recognized rather than dependent on individual champions. Participants also suggested the need for clear protocols for data ownership, reuse and attribution, to stimulate sharing information without worry that contributions will be politically appropriated or stripped of origin.

4. Socio-political context

Contextual conditions represent both the most powerful enablers and the most visible risks for implementation. Participants repeatedly pointed to political cycles, competition for visibility, and strategic selectivity in data sharing as barriers to long-term climate governance. Some knowledge remains intentionally non-public for political reasons, and initiatives may lose continuity when (political) priorities or funding shift.

Despite this, the wider context also offers significant opportunities. Public concern about climate impacts is increasing, climate adaptation is receiving more attention in regional and international cooperation programmes, and there is growing recognition that evidence-based planning strengthens institutional legitimacy. Participants emphasized that the database could become a stabilizing force by

outlasting elections and providing long-term memory for the policy system, provided that governance is multi-institutional, transparent and insulated from party politics.

Synthesis

Together, the four levels highlight that implementation success depends not merely on technical completion of the database but on social, organizational and political embedding. The strongest enablers identified were collective ownership, user translation and the desire for structured knowledge sharing across sectors. The most critical risks involved usability barriers, overreliance on voluntary contributions, data-sharing sensitivities and vulnerability to shifting political agendas.

Participants repeatedly expressed that meaningful implementation will require a balance between scientific rigour and translation into the lived reality of citizens, frontline professionals and policymakers. Without this translation layer, the innovation risks reinforcing existing knowledge silos rather than unlocking their potential.

3.2.8 Recommendations emerging from the focus group – Curaçao

Based on the insights shared by participants, the following actions are recommended to strengthen the implementation and long-term use of the Climate Adaptation Options Database:

- Translate academic and technical content into multiple communication formats (e.g., citizen-facing visuals, policy briefs, neighborhood-level maps, action-oriented summaries) to maximise usability for diverse audiences.
- Localize and embed neighborhood-level perspectives in the database, ensuring that climate adaptation options reflect the varied vulnerabilities, priorities and practices across Curaçao's districts.
- Integrate existing knowledge repositories rather than replacing them, for example by linking to ministry datasets, NGO archives and scientific repositories to prevent duplication and fragmentation.
- Create a dedicated coordination structure responsible for stewardship, curation and continuity of the database across political cycles, rather than relying on individual project champions.
- Develop clear protocols for data ownership, contribution and attribution, ensuring that organizations and individuals are visibly acknowledged for their contributions and remain confident in sharing information.
- Enable iterative contribution mechanisms, allowing users to share preliminary data, learning experiences and community practices without needing polished reports.
- Resource time and capacity for knowledge sharing, recognizing that organizations cannot contribute sustainably without explicit support (financial, personnel or mandate).
- Safeguard the platform against political appropriation, for example by hosting governance across multiple institutions, ensuring transparency and developing long-term non-partisan management principles.

"I'm a strong believer in thinking big and starting small. With the information we have now, localizing it and bringing it to the neighborhood level — maybe we just need to start somewhere." – Focus group respondent, Curacao.

3.3 Aruba – Embedding the Database within Academic Structures

3.3.1 Composition and Context

The focus group in Aruba was held on 3 November 2025 at the University of Aruba. The two-hour session, which included a networking lunch, brought together six participants representing faculty members and program coordination from SISSTEM (Sustainable Island Solutions through Science, Technology, Engineering and Mathematics programme), FEF (Financial Economical Faculty), FHTMS (Faculty of Hospitality and Tourism Management Studies), and the university's research center. The discussion centered on the academic integration of the Climate Adaptation Options Database (reflecting the university's mandate in teaching, research, and community service) and on conditions for its long-term institutionalization.

3.3.2 Integration into Teaching, Research, and Community Service

Participants agreed that the Climate Adaptation Options Database aligns closely with the University of Aruba's core mandate of teaching, research and community engagement. They stressed that genuine academic embedding requires more than simply referring students to the database; instead, it should be incorporated into course assignments, interdisciplinary case-based learning, and research-driven teaching. Lecturers highlighted that these opportunities already exist within several programs, yet integration currently depends on individual initiative rather than curriculum-wide structures. Participants therefore emphasized that long-term adoption requires institutional rather than personal commitment, ensuring that the database becomes a recurring component of academic learning across faculties.

> *"Some of our courses include hands-on projects where students work with companies that are already experiencing the effects of climate change on their business. If students understand where these changes come from and what the possible solutions are, they can use the outcomes to advise companies on how to become more sustainable." – Focus group respondent Aruba*

Participants highlighted several concrete entry points:

- Embedding the database into curriculum design for courses on environmental science, sustainability, and management
- Using it as a teaching tool for data literacy, student projects, and capstone research
- Linking it to community engagement and applied research initiatives in collaboration with NGOs and government agencies

> *"We shouldn't forget the responsibility of communities in situ. If everything is lifted to the global level, local communities feel, 'I can't change anything there.' …. Ownership and agency." – Focus group respondent Aruba*

They emphasized that adaptation and sustainability themes are already part of various programs, but the Climate Adaptation Options Database can serve as a unifying platform to foster interdisciplinary collaboration between faculties.

3.3.3 Roles and Responsibilities of faculties, research units and students

The group expressed willingness for faculties, research units and students to contribute to the ongoing development of the database, provided that clear governance, time allocation and institutional

recognition are in place. Faculties were seen as key to identifying new content based on academic expertise and professional networks, while the research center could serve as a coordinating body and external liaison to government and industry. Students were widely viewed as having strong potential to contribute through thesis projects, fieldwork and applied research, but participants cautioned that such contributions cannot rely on goodwill alone. Without explicit role definitions, incentives and support structures, responsibility for maintaining and expanding the database risks remaining fragmented and inconsistent.

"It all depends on the educational goals that you have of course. If you want to teach students to work independently in these kinds of databases, you really have to have them experience it, live it, rather than just referring them to it. Assignments should be creating that kind of engagement" – Focus group respondent Aruba

Several faculty members proposed the establishment of a central point for coordination, which could:

- Coordinate contributions from students and researchers;
- Oversee database maintenance;
- Facilitate partnerships with government and private actors;
- Host training workshops and outreach events.

"I would suggest reaching out to the Dutch Caribbean Digital Competence Network, launched on October 1st by the three universities. Its purpose is to enable database exchange — not just on this topic, but across the Caribbean as a whole." – Focus group respondent Aruba

This would also provide opportunities for students to gain practical experience through data collection, analysis, and project implementation, thereby building local human capacity.

3.3.4 Student Involvement and Capacity Building

Student participation was considered both an immediate opportunity and a mechanism for strengthening climate literacy on the island, e.g. by bringing the information to cooperation/businesses. Participants noted that students would benefit from using the database as a learning tool, while simultaneously contributing new information and reflections based on research projects. However, meaningful involvement requires targeted capacity building: training on how to extract and critically interpret information from the database, formal learning outcomes linked to its use, and mentorship that ensures quality and continuity. Students were expected to engage only when database-related work is structurally embedded in coursework and formally recognized in grading, rather than positioned as an optional extra task.

"I think like maybe it is also manpower to operate something like this, indeed like I think it would be very useful actually for sure, the activity of this in classes for students. I think we can integrate it in a curriculum and courses. Then it is indeed the question of who it falls down to maintain it, to manage it and all of this. Where does the funding come from? Who has the time then to do it? Those are important questions to discuss. The usefulness is amazing." – Focus group respondent Aruba

Students were identified as both beneficiaries and contributors to the database. Faculty members suggested:

- Integrating database-related assignments into existing courses
- Offering research internships linked to database updating

- Developing joint thesis supervision schemes with external partners

3.3.5 Sustainability and long-term vision (2030–2050)

Participants emphasized that sustainability rests on institutionalization rather than one-off project delivery. A successful database in 2030 or 2050 was described as one with a clear governance structure, predictable funding and the ability to evolve continuously through new data and evaluations of adaptation outcomes. In the long term, the group envisioned the database operating as a bridge between academia, government and society, informing decision-making and supporting climate adaptation across sectors. They stressed that impact should not be measured solely by the size or completeness of the repository, but by its ability to shape planning processes, build climate literacy and facilitate inter-island learning. Ultimately, success was described as a future in which climate adaptation knowledge becomes a routine and normalized part of professional practice on Aruba.

Participants recognized that sustainability depends on institutional commitment and external partnerships.

> *"At this moment the University of Aruba is proposing to the government in Aruba to develop a national research agenda. Climate is part of what we are proposing. I would say of course, but that means that we are also negotiating budgets for that." – Focus group respondent Aruba*

The University of Aruba was seen as ideally positioned to serve as a regional hub for climate adaptation knowledge. By 2030–2050, participants envisioned the Climate Adaptation Options Database as part of a dynamic regional knowledge ecosystem, where universities across the islands exchange and co-develop data in support of evidence-based decision-making.

> *"My future vision for the database is that it is like this art of creating a new mindset as well between faculties and lecturers." – Focus group respondent Aruba*

3.3.6 Additional notable observations

Beyond the four guiding questions, several cross-cutting insights emerged that have implications for the future use and positioning of the Climate Adaptation Options Database.

Participants stressed that the value of the database depends not only on the availability of information but on its accessibility to different audiences. Academic language, technical terminology and high-level conceptual framing may limit uptake among policymakers, professionals and the wider public unless deliberate translation efforts are made.

> *"Imagery works much better. We like to say we're 99.9% literate as a nation, but we're not. Not when it comes to understanding text, and certainly not when it comes to digital skills." – Focus group respondent Aruba*

The group further noted that the database could become a strategic engagement tool for sectors where climate risk is highly visible, particularly tourism, suggesting a strong opportunity for structured collaboration with hotels, coastal operators and industry associations.

At the same time, participants cautioned that implementation would benefit from a phased rollout, with initial consolidation and testing within academia before broad expansion to external stakeholders.

This sequencing was viewed as essential to safeguard quality, prevent reputational risk and establish stable governance before wider uptake.

Taken together, these observations highlight that the long-term success of the database will depend not only on academic integration, technological robustness and institutional support, but also on deliberate communication strategies and timing.

3.3.7 Implementation factors – Aruba

The discussions in Aruba demonstrate that the successful implementation of the Climate Adaptation Options Database depends on the interaction of determinants across all four levels of the Fleuren framework. Participants expressed strong motivation to use and contribute to the database, but emphasized that its long-term institutionalization hinges on structural rather than individual commitment.

1. Innovation characteristics

Participants considered the database highly promising because of its potential to centralize scattered adaptation knowledge, support inter-disciplinary learning and offer cross-island comparative insight. Its relevance for both academic and societal stakeholders was widely recognized. At the same time, participants emphasized that the innovation will only gain traction if it provides clear practical value for teaching, research and outreach. A key barrier identified is the risk of the database feeling "static" or excessively technical; if it remains limited to academic terminology or conceptual framing, users outside climate science might not perceive its utility. Participants stressed the importance of an interface that supports applied usage, for example through clear guidance for different user groups, case examples, and links to real practices on Aruba. Perceived complexity and lack of accessible language were therefore identified as the most significant innovation-level risks.

> *"If there is any way to make it more visual, more videos and more short reads, that is also not wrong, anything like that can grab attention. For this I think that is a great way to translate it for a more general public." – Focus group respondent Aruba*

2. User characteristics

Academic staff, program coordinators and research personnel expressed strong willingness to contribute and saw the database as aligning well with their professional identity and values. However, their ability to contribute is constrained by workload and the absence of assigned time for updating or curating content. Without institutional incentives or formal responsibilities, contributions remain dependent on individual enthusiasm, which participants considered unsustainable. Students were recognized as highly promising contributors, both in terms of content generation and in developing future climate adaptation professionals, but this requires training, supervision and formal embedding in coursework and assessment. A positive motivational factor for both staff and students is visible recognition of contributions, while a negative factor is uncertainty over expectations and quality control.

3. Organisational characteristics

Organizational conditions emerged as the strongest determinants of long-term implementation. Participants repeatedly stressed that the university must formalize roles, responsibilities and time allocation related to the database; otherwise, institutional memory will erode as staff change or projects end. Lecturers currently integrate climate topics into curricula on a voluntary basis, and participants warned that the database will not become structurally embedded without support from program

leadership and curriculum committees. The research center was identified as a potential coordinating unit, particularly for liaising with external partners, but only if its coordination role is institutionally recognized rather than dependent on informal initiative. Participants also emphasized that database management requires continuity of staffing and funding, and cannot rely on short-term project budgets.

You are implementing the project, but as I understand you will probably not be responsible for the project after it is launched. You are looking for a house for the project to be managed. – Focus group respondent Aruba

4. Socio-political context

Participants described a favorable societal and policy environment for the introduction of the database, noting growing attention to climate adaptation on Aruba and increased expectations for universities to produce knowledge that benefits society. However, the group also noted risks linked to political sensitivities around climate information, particularly when evidence challenges economic or development priorities. Engagement with government and industry therefore requires strategic communication and clear expectations about the purpose of the database. At the regional level, the inter-island collaboration within the Dutch Caribbean is seen as an enabling factor, providing knowledge exchange and legitimacy beyond national boundaries. Participants stressed that aligning the database with broader agendas, such as industry climate resilience and international cooperation, may reinforce its stability across changing political contexts.

"You really want to come to a point where being able to do your work is not a threat to yourself. When I work on ecological indicators, which is very close to being combined with climate data, I have been approached by government representatives. Not officially, but they really would like us to first run stuff by the government before we publish, and we will not of course. We are an independent university. So that is the reality. So, there are all these kind of threats." - "Do you feel that this topic is indeed a topic that is under political pressure?" – *"Yes."* – *Focus group respondent Aruba*

Synthesis

The Aruba focus group indicates strong perceived relevance and motivation across users, but also makes clear that sustainable implementation requires institutional rather than voluntary engagement. The most promising enablers include academic enthusiasm, the opportunity for student-centred knowledge production and the potential to link research innovation with societal impact. The most critical risks emerge when the innovation is not translated into accessible formats, when responsibility remains individual rather than organisational and when coordination depends on project funding rather than formal mandate. Participants therefore framed implementation not as a technical exercise but as a process of embedding climate knowledge within the academic and societal infrastructure of Aruba.

3.3.8 Recommendations emerging from the focus group – Aruba

Based on the insights shared by participants, the following actions are recommended to support the successful implementation and long-term institutionalization of the Climate Adaptation Options Database at the University of Aruba:

- Embed the database structurally within curricula**,** ensuring that its use becomes part of course requirements rather than dependent on voluntary lecturer interest.
- Assign formal roles and time allocation for database stewardship**,** including responsibilities for updating content, coordinating contributions and ensuring quality control.

- Position the University Research Centre as a coordinating hub**,** with a recognized mandate for internal alignment and external collaboration with government, NGOs and industry.
- Enable supervised student contributions through coursework, thesis projects and fieldwork, supported by training, clear expectations and academic recognition (credits/grades).
- Develop translation layers for non-academic audiences, including practitioner summaries, visuals, sector-specific examples and accessible language to ensure wider societal uptake.
- Sequence the rollout strategically, consolidating academic integration before scaling to policy and industry actors, to safeguard quality and minimise reputational risk.
- Secure long-term funding and staffing for database management to prevent dependency on time-limited projects or individual champions.
- Integrate monitoring and reflection on real adaptation practices, ensuring that the database continues to grow through documented successes, failures and lessons learned rather than only through inventories of new options.
- Leverage inter-island collaboration, using regional networks to strengthen legitimacy, exchange of learning and continuity across political and institutional changes.

3.4 The island of Saint Martin – Whole Island Approach and Collaborative Governance

3.4.1 Composition and Context

The Saint Martin focus group, held on 21 November 2025 at the University of St. Martin (USM), gathered 11 civil servants from policy bodies from both the Dutch and French territories. This "Whole Island Approach" explicitly aimed to bridge administrative boundaries in addressing shared adaptation challenges.

3.4.2 Content and Missing Knowledge

Participants stressed that the Climate Adaptation Options Database must combine formal technical datasets, such as hazard maps, spatial planning data, meteorological data and disaster-risk management outputs, with community-based and experiential knowledge from residents across the island of Saint Martin. A recurring theme was that informal knowledge held by communities, NGO networks and neighborhood groups is often the earliest indicator of vulnerabilities (e.g., flood-prone streets or inaccessible shelters), yet this information is not systematically captured in government datasets. Participants therefore called for a platform that accommodates data from both institutional and grassroots sources, and that recognizes the insights of communities not only as "stories" or anecdotes but as valid resilience intelligence. Furthermore, stakeholders from Saint-Martin emphasized the importance of integrating technical products from external regional research institutions (e.g., Université des Antilles and hazard-mapping centers), noting that climate-related risks on the northern part of the island are assessed within French national risk frameworks and should be visible on a shared platform.

Participants emphasized that the database must include localized and community-level data, for example, small-scale flood risk observations, neighborhood mapping, and oral histories of storm impact and recovery.

They identified a lack of integration between French and Dutch datasets, and called for interoperability between data systems, language accessibility, and mutual recognition of standards. There was also some gaps between data sets provided for by the Prefecture (national French Government) and the Collectivité de Saint-Martin (local government) or access to same.

3.4.3 Use and Sustainability

Participants agreed that the database has the potential to evolve into a shared, island-wide tool, but only if both sides feel genuine ownership. Policy workers noted that, the North and the South could rely on information originating from the other side during emergencies. The database could therefore provide a structured foundation for a form of cooperation that has considerable potential.

However, sustained use depends on accessibility and translation: the database must serve not only policymakers and experts but also communities, young people and groups with limited climate literacy. Participants stressed that without communication strategies tailored to different audiences, the tool risks being perceived as another technical governmental resource without public value. Sustainability also relies on institutional commitment: participants noted that disaster-risk departments on both sides

are understaffed and cannot maintain the database without dedicated resources, communication support and recognition of the tool's strategic importance.

Participants noted that institutional fragmentation can hinder adoption. They recommended:

- Developing shared data governance protocols between both administrations
- Creating user-friendly interfaces to allow NGOs and schools to contribute data
- Ensuring training and support for non-technical users

Motivating factors included policy alignment, research visibility, and community empowerment, while barriers included limited technical capacity and funding continuity.

"How is heat stress affecting a child's ability to focus in school? That is a message you can share to parents, saying that heat stress is due to a change in climate and affecting your child's performance. So, it is picking out these things and not just identifying it as like, what are those messages? We know it is important, what is the pathway to find those messages that are relevant to us." – Focus group participant, Island of Saint Martin.

3.4.4 Collaboration and Governance

Across the discussion, the most fundamental barrier to climate adaptation on the island of Saint Martin was repeatedly framed as governance fragmentation rather than data scarcity. Participants, from both Sint Maarten and Saint-Martin, described frequent informal cooperation potential and professional alignment across the border, however, formal governmental structures often inhibit collaboration due to differences in mandates, decision-making authority and political accountability. Several stakeholders noted that climate change impacts do not respect jurisdictional boundaries, and that delays in action on one side undermine resilience on the other. Participants therefore saw the database as a potential neutral coordination mechanism, a space for shared knowledge, joint decision-support and continuous dialogue independent of election cycles or bilateral politics. At the same time, they emphasized that for such a role to be realized, joint governance agreements are needed, including clear responsibility for data submission, validation, updating frequency and communication protocols.
The discussion emphasized the value of joint coordination mechanisms, potentially involving both the USM and a French-side counterpart institution. Participants proposed establishing a bilingual steering committee to ensure equitable representation and sustained collaboration.
The group also discussed the need for clear ownership and accountability mechanisms, so that maintenance responsibilities are shared but not diffused.

"I don't think we have work stop here. We've met more French colleagues than I have got my own. We have seen the tool, we are going to be able to see more about the adaptation options. As you know we are working towards a national adaptation strategy next year so let's continue the dialogue, keep improving the atlas, improving our adaptation options and synchronize our different adaptation strategies." – Focus group participant, Island of Saint Martin.

3.4.5 Vision 2050 – Whole-Island Resilience

Participants articulated a 2050 vision in which the island of Saint Martin is climate-resilient due to anticipatory planning, transparent risk communication and bold decision-making. Residents would be equipped with accessible knowledge to understand their personal climate risk; policymakers would base development and spatial-planning decisions on data rather than short-term economic gains; and infrastructure, housing and critical public assets would be relocated or protected based on long-term projections rather than post-disaster reactions. Participants also connected this vision explicitly to

cultural identity, emphasizing that preparing communities for relocation, behavioral change and long-term adaptation requires honest, sometimes uncomfortable public communication rather than reassurance. In this vision, students and young professionals returning to the island act as carriers of new ideas and global best practices, and the database functions as a territorial reference point supporting both immediate decision-making and generational knowledge transfer.

"The idea of having an events calendar around this where just like you have the children come back 3 months from now, there is a project that they can do, there is a meet and greet at the chill spots, talking about these things, so it can be an engaging platform that doesn't end with just here is the content, here is the new data, that's it" – Focus group participant, Island of Saint Martin.

Participants envisioned Saint Martin in 2050 as a resilient and cohesive island, where climate adaptation measures are co-created and implemented jointly across sectors and borders. The database was seen as both a *technical tool* and a *social platform*, one that supports continuous learning, citizen participation, and policy coherence.

3.4.6 Additional Notable Observations

Several insights emerged beyond the four guiding questions. First, participants repeatedly highlighted the issue of translation, not only linguistically (English, French, Spanish, Creole) but culturally and cognitively. They stressed that climate science must be communicated through the channels and formats in which people actually consume information, including radio, schools, church networks, community gatherings, youth-focused interactive tools and digital video.

Second, the group described political economy dynamics as a barrier to anticipatory adaptation: decision-makers, bound to short mandates, are disincentivized to take bold mitigation or relocation decisions that may be unpopular in the short term.

Third, tourism and land ownership were identified as powerful structural drivers of climate vulnerability: decisions around coastal development, hotel permits and land use often conflict with climate data.

Finally, the discussion underscored a shared desire, among both governments' technical officers, for continuous whole-island cooperation outside of formal political constraints**,** and several participants expressed that this focus group represented a rare and valuable space for cross-border professional alignment.

3.4.7 Implementation factors– the island of Saint Martin

The focus group demonstrated that the potential for successful implementation of the Climate Adaptation Options Database on the island of Saint Martin depends on the interaction of determinants across all four levels of the Fleuren framework. Participants expressed strong motivation to use the database and a clear recognition of its value for cross-border collaboration, yet emphasized that its success hinges on whether the platform can operate beyond, and sometimes despite, the institutional and political fragmentation between Sint Maarten (southern part) and Saint-Martin (northern part).

1. Innovation characteristics

Participants regarded the innovation as highly relevant because it has the potential to centralize climate-relevant knowledge that is currently dispersed across government departments, NGOs, international research partners and community groups. The strongest opportunity identified lies in the

database's capacity to legitimize whole-island decision-support, enabling risk-informed planning without requiring structural political integration. At the same time, several barriers were noted. If the database is too technical, too academic, or lacks actionable guidance for specific audiences (communities, developers, policymakers), there is a risk of low uptake. Participants also stressed that the database will not be judged by its comprehensiveness alone but by whether it provides concrete value in situations of risk, decisions and planning**,** for example, when a permit is evaluated, when a neighborhood association needs information after flooding, or when a government agency must justify long-term investment. Usability, not quantity of content, was therefore identified as the core innovation determinant.

"We can always plan to build buildings, to build commercial areas, but why can we never plan an environmental strategy? Why can't we do that?" – Focus group participant, Island of Saint Martin.

2. User characteristics

Motivation among policy workers, disaster-risk professionals, NGOs and community advocates appeared strong across both Sint Maarten and Saint-Martin. Participants stated that they are already searching for knowledge to support cross-border alignment and therefore saw the database as timely and necessary. However, they emphasised capacity constraints: climate-relevant staff are few, multitask across crisis response and portfolio duties, and lack time for data curation. Users will need the database to be intuitive and time-saving**,** rather than something that increases workload. Another determinant concerns ownership: contributors become more motivated when their input is attributed, respected and not re-interpreted beyond context. This is essential for both institutional actors and community groups, the latter stressed that they would share lived knowledge only if the database represents it respectfully and avoids presenting it as "less valid" than formal science.

"So it can be an engaging platform that doesn't end with just here is the content, here is the new data, that's it. But hey, what is going on for 2026 regarding this thing because I need to show up at these events, you know?", "An events calendar would be great, that is a great suggestion, to have some sort of events calendar for climate, environment, disaster." – Focus group participant, Island of Saint Martin.

3. Organisational characteristics

Participants highlighted structural limitations within both jurisdictions that could hinder implementation, including high staff turnover, short planning horizons, project-based financing and fragmented information systems. They cautioned against a governance model that places responsibility for database upkeep solely within a single ministry or office; this would make the tool vulnerable to staffing changes, political cycles and internal bottlenecks. Instead, they advocated for a shared stewardship model involving technical officers, knowledge institutions, NGOs and community-based organizations, with clearly defined roles for validation, communication and content updating. The most significant organizational opportunity lies in the existing informal collaboration between technical professionals across the border; however, institutionalizing this cooperation will require mandates that legitimize and protect such collaboration from political volatility.

"I tend to always talk about finance because again, finance is at the heart of everything that we do in Saint Martin. We depend on tourism and every action that we take is actually based on tourism. So, it is sometimes actually hard to make certain decisions." – Focus group participant, Island of Saint Martin.

4. Socio-political context

The broader context presents both powerful risks and strong enablers. Participants repeatedly emphasized that the greatest vulnerability of climate governance on the island of Saint Martin is not

data scarcity but political fragmentation, limited continuity and economic pressure to prioritize development over resilience. This context could obstruct database implementation if climate knowledge is ignored when it conflicts with short-term interests such as coastal construction or tourist infrastructure permits. At the same time, contextual enablers are emerging: climate impacts are increasingly visible to the public, inter-island and regional networks are growing, and both jurisdictions face escalating pressure from insurers, lenders and international partners to justify climate-sensitive planning with evidence. Participants argued that the database has potential to function as a neutral, non-political mechanism of continuity, preserving memory and knowledge beyond elections and supporting cooperation where formal political alignment remains difficult.

"I really hope that after this meeting that discussions can keep going on in order to maybe have a technical statement saying that yes, those exchanges is necessary, collaborate and working together is necessary. For this tool can become a reference, a territorial reference for both parts of the island." – Focus group participant, Island of Saint Martin.

Synthesis

Across the four levels, participants framed implementation not as a purely technical exercise but as part of a broader effort to institutionalize whole-island climate governance in a politically divided territory. The strongest enablers include high perceived relevance, potential informal professional cooperation, increasing global attention to climate resilience and the desire for a neutral platform to mediate joint decision-support. The greatest risks concern fragmentation of mandates, limited staffing for knowledge management, entrenched development pressures and the possibility that the innovation remains too academic or inaccessible for the audiences most affected by climate impacts. Participants therefore characterized implementation as a matter of making climate knowledge actionable, legitimate and shared across two jurisdictions, two political systems and many communities.

3.4.8 Recommendations emerging from the focus group – the island of Saint Martin

Based on the insights shared by participants, the following actions are recommended to enable successful implementation and long-term use of the Climate Adaptation Options Database across the island of Saint Martin:

- Develop a joint stewardship model across both jurisdictions, ensuring that Sint Maarten (south) and Saint-Martin (north) share responsibility for maintaining and updating the database, rather than placing full ownership on a single government office.
- Secure dedicated staffing and resources for database management, recognizing that disaster-risk and environmental departments do not currently have the time or capacity to curate content without additional support.
- Include both institutional and community-based knowledge, with protocols that validate and respectfully represent insights from neighborhood groups, NGOs and community networks alongside technical datasets.
- Design the platform to serve multiple user groups, including policymakers, frontline professionals, youth and citizens, through audience-appropriate formats such as visuals, layered explanations, short briefings and geo-referenced examples.
- Protect contributions through attribution and contextualization, ensuring that information from scientists, government agencies and community groups is not anonymized or misinterpreted, thereby encouraging continued sharing.

- Use the database as a platform for whole-island professional collaboration, supporting regular exchanges between technical officers from both sides of the border, independent of political cycles or diplomatic tensions.
- Link the database to decision-making processes, for example by encouraging planners, permitting authorities and disaster-risk units to consult database content during policy design, spatial planning and development reviews.
- Communicate the database beyond government channels, using schools, youth networks, NGOs, radio and digital media to ensure that the public, not only government, can understand risks and take climate-resilient actions.
- Adopt a phased communication and rollout strategy, beginning with internal capacity building for government professionals and gradually expanding to citizens and industry stakeholders, ensuring accuracy and buy-in at each stage.
- Position the database as a long-term memory system for climate adaptation, enabling continuity through election cycles and staff turnover, and supporting future generations of decision-makers and returning professionals.

3.5 Comparative Synthesis Across Islands

Across all three islands, participants expressed strong enthusiasm for the Climate Adaptation Options Database and recognized its potential to strengthen climate adaptation by making knowledge more accessible, connected and actionable. Yet the pathways through which this value becomes real differ per island, reflecting distinct institutional conditions, academic roles and governance dynamics.

On Curaçao, the central challenge is fragmentation of knowledge across ministries, NGOs and knowledge actors, coupled with the absence of a mandate for long-term stewardship. Participants stressed the need to translate academic language into formats suitable for policymakers and citizens, and viewed institutional continuity, neighborhood-level relevance and shared ownership as prerequisites for sustainable uptake. In this context, the database is seen largely as a tool for policy learning, cross-sector communication and public engagement, provided that its management is structurally resourced and protected from political shifts.

On Aruba, the conversation centered on academic institutionalization. Participants emphasized that the database aligns directly with the university's core mandate of teaching, research and community service. Its sustainability therefore depends on embedding it within curricula, role descriptions and learning processes rather than treating it as an optional tool. Students were widely recognized as both beneficiaries and contributors, and the long-term vision involved building organizational capacity and a new generation of professionals fluent in climate adaptation. Here, the database is viewed primarily as a knowledge infrastructure for higher education and scientific-societal exchange, requiring formal governance and a recognized coordinating unit.

On the island of Saint Martin, the database was perceived as a mechanism to overcome political fragmentation rather than a purely informational tool. While some informal collaboration across the border already exists, formal cooperation between Sint Maarten (South) and Saint-Martin (North) remains difficult because of differing mandates, administrative systems and political realities. Participants therefore saw the database as a potential neutral space for shared decision-support independent of election cycles, enabling both territories to align on risks, planning decisions and communication with the public. In this context, the database would function above all as a whole-island coordination instrument, provided that governance is jointly designed and that both institutional and community-based knowledge are represented.

Despite these differences, several patterns recur across the three islands. First, the greatest challenge is not an absence of knowledge but the inaccessibility, fragmentation and limited translation of existing knowledge. All three focus groups underscored that climate information only influences behavior and planning if it is interpretable by diverse audiences. Second, reliance on voluntary contributions was widely recognized as unsustainable; implementation requires dedicated mandate, capacity and resources rather than goodwill alone. Third, across contexts, participants highlighted the importance of visible attribution and respectful representation of contributions, including those from community groups. Finally, participants on all islands described the database not as an end-product but as a long-term process of knowledge stewardship, requiring continuous updating, validation and communication to remain relevant.

Island	Top 5 Priorities for Implementation
Curaçao	1) Establish a long-term coordination structure independent of political cycles. 2) Secure data access agreements across ministries, NGOs and knowledge actors. 3) Translate academic content into formats accessible to policymakers, communities and citizens. 4) Embed neighborhood-level relevance (mapping +

	lived experience) into database content. 5) Provide stable funding and staffing for database maintenance and continuous updates.
Aruba	1) Formally embed the database in curricula, teaching assignments and thesis processes. 2) Allocate time and mandate for lecturers and staff to curate and validate content. 3) Install a coordinating unit (e.g., the University Research Centre) with recognized governance authority. 4) Build student capacity and supervision structures to support content contributions. 5) Link academic knowledge to public and sectoral engagement through accessible communication formats.
The island of Saint Martin	1) Create a shared stewardship model between Sint Maarten (south) and Saint-Martin (north). 2) Protect continuity by resourcing database coordination beyond election and crisis cycles. 3) Incorporate both institutional and community-based knowledge with clear attribution and context. 4) Tailor communication and usability to multiple audiences (policy, frontline professionals, youth, citizens). 5) Integrate the database into key decision-making processes (spatial planning, risk management, permitting).

Taken together, the comparison shows that while the Climate Adaptation Options Database has a shared regional purpose, its implementation will succeed only if locally specific enabling conditions are addressed. On Curaçao this hinges on cross-sector continuity, on Aruba on academic embedding and resourcing, and on the island of Saint Martin on neutral coordination across jurisdictions. The database therefore functions not merely as a repository but as an institutional mechanism, capable of strengthening climate adaptation only when embedded within the governance, education and collaboration systems in which it is expected to operate.

Across all three focus groups, several converging themes emerged:

Dimension	Shared Insights	Island-Specific Emphases
Knowledge Gaps	Need to include informal and community-based data sources; improve metadata transparency.	Curaçao – local expert data; Sint Maarten – cross-border datasets; Aruba – academic integration.
Usability and Sustainability	Risk of static use unless linked to institutional roles; need for regular updates and user training.	Aruba – curriculum embedding; Curaçao – government uptake; Sint Maarten – bilingual accessibility.
Governance and Ownership	Desire for collaborative yet clearly anchored coordination models.	Curaçao – local institutional lead; Aruba – university-based hub; Sint Maarten – joint steering committee.
Long-Term Vision	Shared aspiration for climate-resilient, data-informed islands by 2050.	Each island tailored its vision to its governance and educational context.

In summary, the focus groups reveal a high level of motivation and trust among stakeholders, combined with a clear understanding that long-term success depends on institutionalization, partnership, and knowledge inclusivity. The Climate Adaptation Options Database is perceived not merely as a technical product but as a catalyst for regional collaboration and learning.

4. Conclusion and Recommendations

4.1 Conclusions

The findings across the three focus groups demonstrate that the Climate Adaptation Options Database holds clear and immediate value for the Dutch Caribbean, yet its potential impact depends on the degree to which it becomes institutionally, socially and politically embedded. Across all islands, participants emphasized that climate adaptation is not hindered primarily by a lack of knowledge, but by knowledge that is fragmented, inaccessible or insufficiently translated for diverse users. The database is therefore not only a technical product but a mechanism for enabling shared learning, continuity across political cycles and the alignment of scientific, policy and community perspectives.

Although the three islands share the same overarching vision of improved climate resilience, their implementation pathways differ. On Curaçao, the database is primarily viewed as a cross-sector decision-support and public-engagement tool, requiring stable coordination and long-term resourcing across ministries and civil society. On Aruba, the database is understood as an academic infrastructure for teaching, research and community service; its sustainability depends on structural curricular integration, formal task allocation and student involvement. On the island of Saint Martin, the tool is perceived as a bridge across jurisdictions, a neutral platform for whole-island climate decision-making in a context where political fragmentation and institutional gaps challenge coordinated climate action.

Despite these contextual differences, several cross-island priorities emerge. Long-term embedding requires (i) continuity beyond project cycles, (ii) dedicated capacity for stewardship and updating, (iii) clear attribution and responsible data governance, (iv) translation of content into audience-appropriate formats and languages, and (v) mechanisms that allow both institutional and community-based knowledge to co-exist without hierarchy. Participants across all islands also framed sustainability not as a final state but as a continuous process of curation, evaluation and communication, with the database functioning as a living asset that evolves alongside regional climate challenges and capacities.

4.2 Recommendations

To maximise the regional value and long-term sustainability of the Climate Adaptation Options Database, the following cross-cutting recommendations are proposed for implementation in the Dutch Caribbean:

1. **Establish multi-institutional governance and stewardship.** Create an oversight structure that includes representation from universities, government, NGOs and community actors, ensuring that responsibility for the database does not rely on project-based staffing or single organizations.
2. **Resource continuity explicitly.** Secure funding and staff time for database coordination, content validation and communication. Reliance on voluntary contributions by lecturers, civil servants or NGOs is not sustainable.

3. **Translate content for multiple user groups.** Support layered communication formats, including scientific, policy, sector-specific and community versions, ensuring that climate knowledge can influence behaviour and decision-making in real contexts.
4. **Enable two-way knowledge flows.** Create processes for uploading, curating and attributing not only scientific and policy knowledge but also community-generated data and experiential insights, with protocols that prevent misrepresentation.
5. **Integrate the database into existing systems rather than duplicating them.** Link to ministries' repositories, university archives and NGO datasets to reduce fragmentation and increase relevance.
6. **Embed use structurally.** Encourage the database to be consulted during strategic planning, permitting, disaster-preparedness reviews, curriculum design and public information campaigns, turning the platform into a routine reference point.
7. **Support youth and professional capacity building.** Train students and early-career professionals in climate data literacy and in contributing to the database, ensuring intergenerational continuity of knowledge.
8. **Promote inter-island collaboration.** Use the database as a shared space for exchanging lessons learned, comparing adaptation measures and increasing regional efficiency, while recognising each island's governance and cultural specificities.

4.3 Closing reflection

The database will succeed not because it exists, but because it is used, trusted and maintained. In all three islands, participants expressed a shared ambition: to move beyond reactive, project-based adaptation toward proactive, long-term and knowledge-driven resilience. The Climate Adaptation Options Database can serve as a cornerstone of that transition, provided that the region chooses not only to build it, but also to embed it as a collective and lasting capability.

Appendix 1: IPDC Adaptation Database Dummy Entries

October 13th 2025

[Dummy Entries] Adaptation Options IPDC Database

Title: Early Warning Systems

Filters

Impact Area

☒Resilience & Disaster Preparedness

Type of Intervention

☒Technological & Built Solutions

Scale

☒ national

☒ community-level

☒ farmer-level

Climate Theme

☒ Extreme weather events

Hazards

☒ All

Ecosystem

☒ All

Sector

☒ All

Description

Early warning systems are designed to alert people in time about dangers like hurricanes, floods, droughts, and heatwaves. The goal is simple: to give governments, communities, and individuals enough time to get ready and reduce the damage caused by extreme weather or disasters. These systems work best when many different groups share information and cooperate. Data comes from sources such as sensors, satellites, ocean buoys, and climate experts. Forecasting models then process this information to predict how likely an event is and how severe it might be.

Once a possible threat is identified, warnings must be sent out quickly and through different channels, so everyone in danger is reached. These alerts can trigger life-saving actions, such as evacuating people, reinforcing buildings, or conserving water and energy (UNDP, 2025).

Early warning systems can be built for specific risks, like floods or droughts, but the strongest approach is to connect them into “multi-hazard systems” that cover many kinds of threats at once. This way, communities are better prepared for whatever comes their way.

Co-benefits

Early warning systems don't just prepare and alert countries, communities, and sectors about extreme weather and disasters. They also play an important role in spreading knowledge and supporting scientific research. By making data easier to access, they open the door for citizen science projects and give many different groups—from local communities to researchers—valuable information they can use.

Feasibility & Local Fit

To be truly effective, early warning systems need to be inclusive. This means making sure that vulnerable groups—such as people living in remote areas or individuals with disabilities—are not left behind. Warnings should be adapted for different audiences, using language and formats that are accessible and culturally appropriate. Communication should happen in many ways, from modern digital alerts to offline methods like door-to-door notifications, so that no one misses out on crucial information.

The strength of an early warning system depends on several key factors: reliable data, skilled people to manage and interpret it, and strong collaboration between different organizations. But just as important is how clearly and quickly warnings are communicated and shared with the people who need them most.

Costs

Building an early warning system requires time, money, and effort. Data systems need to be aligned, and stakeholders—from governments to local responders—must be trained. These steps require resources, but once the system is running, it becomes more efficient and effective over time, ultimately saving lives, reducing damage, and protecting communities.

Case studies & examples

- Tsunami and flooding EWS in Barbados: https://www.undrr.org/news/caribbean-forefront-early-warning-systems
- CREWS Caribbean - EWS project: https://www.gfdrr.org/en/crews-caribbean
- UNDP Explainer: what are early warning systems and why do they matter for climate action: https://shorturl.at/pHQ0W

Literature

Dookie, D. S., & Spence-Hemmings, J. (2022). The timing of storm awareness in the Caribbean: the utility of climate information for improved disaster preparedness. Disasters, 46, S101-S127. https://doi-org.vu-nl.idm.oclc.org/10.1111/disa.12540

Lumbroso, D., Brown, E., & Ranger, N. (2016). Stakeholders' perceptions of the overall effectiveness of early warning systems and risk assessments for weather-related hazards in Africa, the Caribbean and South Asia. Natural Hazards, 84, 2121-2144. 10.1007/s11069-016-2537-0

Thongs, G., Collymore, J., Inniss-Springer, E., & Smith, D. (2024). Using risk and early warning system perceptions to increase self-protective behavior in the Caribbean. Natural Hazards, 1-36. 10.1007/s11069-024-06968-5

Title: Micro-Insurance Schemes for Disaster Risk Reduction

Filters

Impact Area
☒Adaptive Finance

Climate Theme
☒ All

Type of Intervention
☒Governance, Policy & Economic interventions

Scale
☒ community-level
☒ farmer-level
☒ household-level

Hazards
☒ Storm damage/Droughts/Floods

Ecosystem
☒ n.a

Sector	Effectiveness	Timespan
☒ Insurance	Medium – High	Long term

Description

Micro-insurance is a financial tool designed to offer affordable insurance coverage to low-income individuals or smallholder farmers, who are often excluded from traditional insurance markets. In the context of climate adaptation and disaster risk reduction, micro-insurance plays a vital role by providing timely financial support after extreme weather events such as hurricanes, droughts, or floods.

One common form used in the Caribbean is *parametric microinsurance*, which differs from conventional insurance by offering payouts based on pre-agreed climate indicators—such as rainfall levels, wind speeds, or storm categories—rather than on-the-ground damage assessments. This approach allows for faster, more predictable compensation, often delivered through mobile money or local insurers.

For example, the Livelihood Protection Policy (LPP) developed by CCRIF SPC enables smallholders to receive quick cash payments when a triggering event occurs, helping them meet urgent needs, replant crops, or repair damaged assets without waiting for government aid. These schemes are often subsidized by governments or donors, making premiums more accessible.

By reducing the financial shock of disasters, micro-insurance helps vulnerable communities avoid falling into debt, maintain their livelihoods, and gradually build resilience. Over time, it can also improve access to broader financial services, such as credit or savings, by increasing trust and

financial stability. In this way, micro-insurance not only supports immediate recovery but also contributes to long-term climate adaptation and economic empowerment.

Feasibility & Local Applicability
Although studies show that micro-insurance schemes can work well, getting people to use them can be difficult. Smallholder farmers may not trust these schemes, may not know they exist, or may find them too complicated. Even if the premiums are low, they might still seem too expensive or not worth the cost.

Co-benefits
Microinsurance schemes not only provide quick financial help after disasters, but they can also raise awareness and support better planning for future risks. They may also help smallholder farmers gain access to other financial tools—like loans—that they couldn't get before.

Equity & Vulnerability Considerations
Microinsurance can be a powerful tool to help people recover from disasters, but it's important to ensure it works fairly for everyone—especially the most vulnerable. Research shows that microinsurance often benefits those who already have some resources, such as access to mobile phones, bank accounts, or basic education, while the poorest or most remote communities may be left out. Groups like women, older adults, or people with disabilities may face extra barriers to joining or using insurance schemes. A challenge to fairness is affordability—since even small premiums can be too costly without subsidies.

Another issue is basis risk, where people may suffer losses but not receive a payout if the weather data doesn't meet the trigger threshold. To improve equity, governments and donors can provide subsidies to make premiums more affordable, while community outreach and education can help build trust. Involving local communities in designing insurance products makes them more accessible and relevant, and linking microinsurance to other financial services like loans or savings can further support long-term resilience.

Costs
Medium
Monthly premiums for farmers can range from 1 – 5 USD
Several factors can influence the costs of micro-insurance schemes, for example the type of risk that is covered, the geographic location and exposure to climate risks, the level of subsidy provided by governments or donors, technology used for assessments.

Case studies & Examples
The Caribbean Catastrophe Risk Insurance Facility (CCRIF) - Livelihood Protection Policy (LPP): https://www.ccrif.org/projects/crai/livelihood-protection-policy-lpp?language_content_entity=en

Literature
Climate Analytics. 2013. Changing Climate – Changing Behaviour: How agricultural microinsurance can help smallholders reduce their risk of climate-related disaster. Report: https://climateanalytics.org/publications/how-agricultural-microinsurance-can-help-smallholders-reduce-their-risk-of-climate-related-disaster
Valcin, R., Uchiyama, T., Terano, R., Celestin, D. S., & Paul, B. (2024). Agricultural Mutual Insurance in Asia, Latin America, and the Caribbean: An Integrative Review of the Micro-Level Schemes. Études caribéennes, (59). https://doi.org/10.4000/132zb

Appendix 2: Final Selection Adaptation options (17-10-2025)

Option	Column1	Score
Securing funds from private and int. donors		3
Conservation of salt lakes / Salinas		3
Mangrove Restoration		3
Coral reef protection and restoration		3
Coastal Flood Defenses		3
Climate Proof Design		3
Managed Retreat		3
Flood risk assessment & road/critical asset flood-proofing		3
Assisted Relocation		3
Strenghtening Governance and Institutions		3
Diversifying and greening tourism experiences		3
Controlling rainwater runoff (vegetated waterways)		3
Zoning Regulations		3
Scenario Planning		3
Water Governance		3
Stormwater Drainage Systems		3
Contingency Funds		2
Land reform		2
Sustainable fishing practices		2
Heat resistant building design		2
Elevate and protect critical infrastructure		2
Coastal setbacks		2
Mulching with organic matter		2
Heat-Health Action Plans		2
Workplace Adaptations		2
Social Safety Nets		2
Community-based Disaster Preparedness		2
Vulnerability/Risk assessments		2
Early warning systems		2
Conflict Resolution Mechanisms		2
Technology transfers/exchange		2
Tourism marketing focused on nature and biodiversity		2
Smart Grids		2
Strategic relocation of critical infrastructure		2
Reducing roadside erosion		2
Hazard mapping		2
Diversion channels for flood management		2
Strenghtining building codes for climate resilience		2
Improving climate resilience of existing tourism infrastructure		2
Reduced groundwater extraction		2
Managed Aquifer Recharge [MAR]		2
Water restrictions and rationing measures		2
Sustainable financing & governance (trust fund; multi-year budgeting)		2
Small Grants for local climate adaptation		2
National climate fund		2

Align marine protection with land protection		2
Rights of nature		2
Increased enforcement staff for environmental organizations (BOA officers)		2
Restoring dry tropical forests		2
Ridge to Reef Appraoch (Strategic conservation of upper watersheds)		2
Selecting climate resilient vegetation types		2
Mangrove stewardship by fishing communities		2
Marine Protected Areas		2
Reduce surface & coastal water pollution		2
Integrated coastal zone planning with hazard zoning		2
Food access support during shocks (vouchers + nutritious basket)		2
Ensuring Access to Healthcare		2
Institutionalize Climate Adaptation across all sectors		2
Open access platform for climate and environmental data		2
International/ Regional knowledge exchange on adaptation		2
Renewable energy expansion		2
Bioswales		2
Train public landscaping contractors in ecological practices		2
Urban forests & parks (Strategic Green & Blue infrastructre planning)		2
Improved & climate resilient public transportation		2
Greening Gardens		2
Green buffer zones		2
Wastewater treatment upgrades & coverage expansion		2
Check-dam cascades in seasonal streams		2
Sewage, nutrient and solid-waste management to protect reefs & coasts		2
Integrated Water Management		2
Vegetation around water sources		2
Permeable pavements & design		2
Drought resistant crops		2
Wetland Restoration		2
Reforestation of upper catchments & degraded slopes		2
Urban heat island mitigation with tree canopies		2
Integrated vector control Management		2
Strenghtening mental health services		2
Check-in programs		2
Public Awareness Campaigns on Climate-Health Hazards		2
Assisted Coral Evolution		2
Floating or elevated roads		1
Community-based hazard mapping & training		1
Climate resilient housing for vulnerable populations		1
Retrofitting existing buildings & infrastructure		1
Preserving and restoring seagrass beds		1
Bioretention systems		1
Rainwater Harvesting (RWH)		1
Grey-water reuse		1

Constructed wetlands for municipal wastewater treatment		1
Beach Nourishment		1
Precision Agriculture		1
Community-based Seed banks		1
Investing in research and monitoring of mental health		1
Intrusion Barriers		1
Environmental stewardship education for locals and tourists		1
Regulating sand mining/removal		1
Living sea walls		1
Earmark environmental fines for adaptation measures		1
Embedding climate change into education		1
Protection and management of corridors connecting key habitats and ecosystems		1
Climate smart agricultural techniques		1
Nursery for endangered plants		1
SWAC (Sea Water Air Conditioning) for hotel districts		1
Green school yards		1
Vegetated filter strips		1
Professional conservation education		1
Public Awareness Campaigns on Adaptation		1
Protection of cultural heritage		1
Saline Agriculture		1
Climate resilient health systems		1
Heat surveillance and monitoring		1
Air pollution control in urban zones		1
Ecosystem service valuation studies for decision making		1
Urban Agriculture		1
Farmer training and extension services		1
Large scale Permaculture, Syntropic agroforestry		1
Agroforestry		1
Composting & soil health hubs		1
Land access & tenure facilitation		1
Improve financial tools for local farming		1
Farmer/fisher associations/cooperatives		1
Native fruit tree corridor networks		1
Renewable energy storage scale-up		1
Multi-purpose water plazas in rural towns		1
Solar Parks & Solar PV expansion		1
Traditional dryland farming revival/Kunukus		1
Pumping Stations		1
Lower water tariffs for households producing food at home		1
Drip irrigation		1
Limit visitors to the Islands		1
Contour trenching for water retention		1

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