REPUBLIC OF THE MARSHALL ISLANDS

National Adaptation Plan

(Pāpjelṃae)

Responding to the Impact of Climate Change

The National Adaptation Plan of the Republic of the Marshall Islands

Prepared and submitted by the World Bank PREP II Project

for the

Climate Change Directorate, Ministry of the Environment October 10, 2023

Version: Final - Adopted by Cabinet October 20, 2023

The Narrow Road

The cover photograph was selected by staff members of the Climate Change Directorate because the location is readily recognizable to we Marshallese people, and because of its clear portrayal of our nation's extreme vulnerability. The road pictured here is the main road of Majuro atoll, our capital. It is one many of us travel - those living in the villages of Laura, Ajeltake and Woja heading into town for work, or those of us from Rita, Delap, Uliga, and Rairok traveling to visit family members, or to enjoy a Sunday picnic at Laura beach.

We've chosen to clearly portray the reality of the vulnerability with which we live daily, highlighting the ways in which the ocean is as much a part of our landscape as the land. Now, our present and future are threatened because of the rising level of that ocean.

The road is a representation of the pathway ahead of us as we embark on our adaptation actions. The National Adaptation Plan is preparation for our journey. It represents the foundation of the common faith we share, that the road we travel will lead us to our intended destination, even if today that is not clearly visible. Inspiration for the stylised helix wave design derives from the traditional Marshallese navigation aid, the stick chart. The Marshallese are renowned for our navigation skills, for reading the waves and currents and charting a way forward to our destination, our future. The NAP is the navigation aid the nation will use to chart the path of adaptation to climate change. The use of curved rather than straight lines speaks to there being no straight, direct pathway. Rather, the course to be taken will involve twists and turns, and will respond to and shape around influences encountered along the way.

Some aspects of the pathway will be relatively simple (the separate lines) and others will be interdependent (the interwoven lines). The design also speaks to culture – the core of society. The curves are anchored by a common point, which is the Marshallese culture, the Marshallese homeland. In this context, the interwoven curves imitate the double helix of DNA, the building block of life. This speaks to the essence of being Marshallese – being an island people. The interwoven lines also make reference to our traditional handicrafts. The design represents an island, one of several in an atoll. The curves are interpreted as the turmoil of a hurricane as waves wash inland. They also represent markers, a measurement of the encroaching sea over time. In this way the design reflects the impact of climate change with rising sea levels persistently diminishing the size of this island, and others in the atoll. Finally, the design is also interpreted as a shell, a unique home and place of comfort and protection for those whose life is of the sea. Climate change impacts this, potentially displacing the shell from its resting place, its safe haven.

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Acknowledgement

" The Government of the Republic of the Marshall Islands wishes to acknowledge and express our deepest gratitude to all of those individuals, communities, religious and other formal and informal groups, private and public sector organisations, public servants, government officials, local and international academics, consultants and advisors, and all others for the time and dedication committed to the development and completion of our National Adaptation Plan. We offer our sincere thanks and commit ourselves to drawing deeply from the rich content of this document for inspiration and guidance as we develop and navigate our future adaptation pathway – the Narrow Road."

Presidential Foreword

His Excellency, David Kabua, President of the Republic of the Marshall Islands

The Marshallese are proud navigators. Our ancestors traveled over vast distances to reach and settle our atoll and island homes, which they hoped would be safe and permanent. Over the following millennia we became closely tied to our land, our sea, and our skies.

But the tides of history swept over us. We became the testing ground for the atomic age, told that we were bringing peace to the world through our sacrifice. As a people we survived sixtyseven nuclear bomb detonations. Atolls became uninhabitable -poisoned for centuries. We lost loved ones, many moved homes, and grieved -and adapted. When the COVID pandemic swept the world, we were once again tested. Planning and preparedness and a community spirit, alongside international support, combined to see us through the crisis.

We need that spirit, preparedness and solidarity once again.

We face an unprecedented crisis due to climate change. None of us can completely escape its effects. We face droughts, rising temperatures and most importantly and inevitably sea level rise, which is already baked in by global warming and will continue long after greenhouse gas emissions end, with no half-life to its effects.

Bold actions will be required and in this NAP we set out an adaptation pathway that will guide our process. This will include putting in place nature-based adaptation, consolidating services on atolls that can be protected as sea levels rise, investments in "hard" and "soft" protective infrastructure, the creation of raised and protected land into new centers, and ultimately, planned relocation to protected areas.

We will ground our decision making in effectiveness, efficiency, equity, sustainability, and deliver it through responsible and empowered national institutions. This NAP also sets out how we will update

our public policies to ensure we're ready to respond effectively.

Given the scale of predicted sea level rise due to other countries' emissions, we are facing a cost of protecting all atolls in the order of $35 billion. We will scale up our efforts to strengthen climate finance, and ensure that our systems are ready to use it well.

Our response requires an interconnected approach across the whole of government. This NAP will drive that approach, and will be embedded in our National Strategic Plan. But our response also needs to be tailored to the circumstances of individual atolls, islands and communities. That's why we will produce community action plans - local area plans for adaptation.

Climate change will affect every aspect of our lives. A warming ocean is likely to see changes in the fish stocks in our waters, and monitoring and protecting that resource, including through traditional knowledge, will be critical as will making agriculture more resilient while protecting our fragile environments. We will strengthen our infrastructure, utilities, energy, transport and communications sectors to respond to climate impacts. And, we will ensure that our healthcare and social services sectors are prepared, and improve our education system to give our children and youth the tools they need to face this crisis.

We will also continue to play our role in bringing peace to the rest of the world - lighting the way in the fight against climate change, and pushing the international community to take responsibility for keeping global warming under 1.5°C.

And we will remind them of their responsibility to address the loss and damage inflicted here in the Marshall Islands and across the planet as a result of the ongoing failure to end their pollution. Here at home, this National Adaptation Plan will play the role of our traditional stick charts, helping us to chart our course, guided by the swells and the stars. We cannot foresee every wave that may strike us, every gust of wind that may blow us off course. We must be prepared for the worst and hope for the best.

Following extensive community consultations that spanned islands and atolls across our large ocean state to ensure that Marshallese from all walks of life - our elders, our youth, our traditional and church leaders, women's groups and men's groups - could inform and shape this document, I am humbled, as your President, to present this national survival plan to you, and to lead you into a future where we don't simply survive, but instead thrive as a people.

I pledge to you that as we continue to take decisions and prepare for the changing world, we will continue to do so as one people, so our future reflects the collective self-determination of the Marshallese.

Ilo kautiej,

David Kabua

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Executive Summary

Introduction

The Republic of the Marshall Islands (RMI) is a large ocean, small island developing state located near the equator in the Pacific Ocean. RMI is a collection of 29 geographically dispersed coral atolls and 5 islands spread across over 2,000,000 km^2 of ocean. There are 24 inhabited atolls and islands, most of which are remote and lie merely two meters above sea level, on average. The country faces extreme risks as a result of climate change.

This National Adaptation Plan (NAP) aims to reduce the country's vulnerability to climate change impact; integrate adaptation strategies into national planning, policies, and programs; and outline a practicable adaptation pathway, from short to long-term, guiding towards the RMI's survival and viability. The challenges encountered are multifaceted and intertwined, and need a coordinated approach that encompasses analysis, planning, institutional and capacity development, and dedicated engagement with our communities.

The RMI also contends with socio-economic and environmental adversities, some of which are rooted in past colonial injustices. Our geographic isolation, limited natural resources, and heightened risks from natural hazards, are all magnified by climate change. Our NAP development process has centered both scientific insights and traditional knowledge in an inclusive, gender-sensitive, and transparent manner, engaging a broad spectrum of stakeholders, including international partners, to

ensure a holistic approach. Our culture of self-determination and resilience in the face of adversity is reflected in our plan for our survival.

We are committed to climate adaptation decision-making that respects our sovereignty and protects our human rights.

Our colonial legacies influence climate vulnerability. For example, the legacy of the nuclear weapons testing program forced many of our people to migrate to different islands that are unsuitable and more climate vulnerable. We do not want to perpetuate the subordination that has affected our country in the past, and instead will respect self-determination and human rights by centering climate adaptation decision-making in the hands of our communities and elected leaders. RMI leaders intend to face the looming threat of mid-century uninhabitability in a way that honors our people and culture, and their decision-making, pursuing a collaborative engagement with international partners without subordinating our decision-making and the needs and rights of our people.

This NAP is aligned with other global commitments like the UN Sustainable Development Goals, and the guidance of the United Nations Framework Convention on Climate Change (UNFCCC), and is a comprehensive approach not only to confront climate change but also to tackle the interconnected developmental challenges faced by the RMI.

Country Context

Indigenous culture is deeply ingrained in the RMI's landscape and oceans which are now threatened by climate change. Marshallese culture has a complex and rich relationship to land that is beyond what can be stated in this document. The depth of this relationship can be seen in the Marshallese language. For example, "aeloñ kein" which simply translates to "our islands", can be broken down further into "ae" meaning ocean, "loñ" meaning skies, and "kein" meaning land, or even more specifically, the trees, plants, and earth that make up that land. The Marshallese person belongs not only to the land, but also the surrounding skies and seas.

The RMI is particularly vulnerable to natural hazards like typhoons and sea-level rise. We face various climate challenges, including rising temperatures, droughts, and sea-level rise in our tropical country, which has two distinct seasons: a wet season from May to November and a dry season from December to April. Our climate is influenced by trade winds, the South Pacific Convergence Zone, and periodic El Niño events, and it has been following global warming trends. Average temperatures have been gradually increasing, especially since the 1980s, accompanied by reduced rainfall exacerbated by El Niño, sometimes leading to an 80% reduction in rainfall. Floods and storm surges are common, particularly during El Niño years. Typhoons are less common but devastating when they occur. The rising sea levels, exceeding the global average, pose a significant threat due to the low-lying nature of our islands, affecting coastal areas, freshwater sources, and land use. Saltwater intrusion in our fresh water lenses is a growing issue, emphasizing the urgent need for comprehensive climate adaptation measures, as local aquifers are highly sensitive to atmospheric and oceanic changes.

In the RMI's mixed parliamentary-presidential system the President, chosen by the Nitijela legislature, serves as the government's head. Traditional leaders are represented in the Council of Iroij, which can review legislation affecting cultural norms.

The economy relies heavily on external resources and imports, and is concentrated in the service sector, agriculture, and fisheries. Government efforts to diversify include boosting sustainable tourism and investing in renewable energy, with the aim of 100% renewable energy by 2050, though there are logistical challenges due to the country's isolation and geographic spread. Most employment is public sector-based, with many seeking opportunities abroad. Fisheries are pivotal for the RMI's economy and cultural identity. Our large Exclusive Economic Zone (EEZ) offers rich marine biodiversity, especially lucrative tuna species. Agriculture, although contributing less to GDP, is crucial for outer island livelihoods, with the government working to manage these sectors sustainably through organizations like the Marshall Islands Marine Resources Authority (MIMRA) and the Ministry of Natural Resources and Commerce (MNRC).

Image Supplied by Chewy Lin

Infrastructure in the RMI is diverse and managed by various ministries and state-owned enterprises. The Ministry of Works, Infrastructure, and Utilities coordinates key projects such as roads and coastal protections, outlined in a National Infrastructure Investment Plan with a budget requirement of $732 million from 2017-2026. The maritime sector is essential for inter-island transport and supporting livelihood activity in the neighboring atolls. While telecommunications have improved, issues like a digital divide persist. The Ministry of Environment and its EPA division are actively engaged in environmental protection, focusing on water quality and waste management. Challenges include water security and waste management due to geographic and climate-related constraints.

According to the 2021 Census, RMI has seen a 20% population drop, mainly due to migration to the U.S. The education and healthcare

sectors have improved but face resource and staffing constraints, with healthcare being less accessible in remote areas. Non-communicable diseases remain prevalent. Despite a Human Development Index (HDI) of 0.704, educational challenges persist, particularly in infrastructure and learning outcomes in outer islands.

Geopolitically, the Compact of Free Association (COFA) outlines a unique relationship between the RMI and the U.S. Additionally, the RMI works closely with a wide array of international partners, both bilaterally and through regional organizations like the Pacific Islands Forum. The RMI plays an influential role in multilateral fora, with a strong presence in the UNFCCC, Human Rights Council, and IMO, for example.

Policy and Institutional Arrangements

Many of our legislative acts and national plans already touch directly or indirectly on climate change, such as the RMI Maritime Zones Declaration Act 2016, Protected Areas Network Act 2015, and the National Strategic Plan 2020-2030. The enforcement and implementation of these policies requires further support, including funding. With the adoption of our Tile Til Eo 2050 Climate Strategy "Lighting the Way" in 2018 as well as our RMI NDC Partnership Plan, efforts to bolster RMI's resilience against climate impacts are already underway, with funding secured from the Green Climate Fund and other partners. The government, however, recognizes the need to build upon these efforts, particularly in light of the scale of projected future impacts related to climate change and implementation challenges.

Our Tile Til Eo Committee (TTEC) serves as the national body overseeing climate change response and disaster risk reduction. Co-chaired by the Minister of Environment and the Chief Secretary, TTEC directs and coordinates activities across multiple sectors, from emissions mitigation and adaptation planning to global reporting requirements. Its establishment in 2019 has strengthened coordination.

Community Impacts, Risks and Vulnerabilities

Climate change, manifested as rising sea levels, fluctuating temperatures, and inconsistent rainfall, has far-reaching consequences for our livelihoods and access to critical resources.

These changes affect critical areas such as fishing and agriculture, where men report declining yields. Women involved in handicrafts, also face challenges in sourcing materials, affecting their income. These shifts exacerbate pre-existing issues of food and water scarcity, putting more stress on already overburdened infrastructure, from roads to healthcare facilities.

Urban centers like Majuro and Ebeye are particularly vulnerable. They face not only climate-induced risks like coastal flooding but also challenges tied to rapid urbanization such as overburdened public services. Due to land elevations averaging below 6.5 feet (2m), even moderate sea level rises of 20" (0.5m) are projected to result in regular overwash events, which will challenge habitability. Internal migration from rural areas to cities further compounds these vulnerabilities.

Semi-urban communities, although benefiting from better service accessibility, face their own set of climate-related challenges, including groundwater flooding. Rural communities are most threatened by food and water scarcity, due to salinization of soils, saltwater intrusion into the freshwater lenses and shifts in agricultural and fishing conditions.

Across these diverse settings, the absence of detailed, accurate data hampers the effectiveness of climate adaptation strategies, highlighting the immediate need for a more integrated, data-based approach for long-term resilience.

Sectoral Impacts, Risks and Vulnerabilities

Climate change amplifies existing vulnerabilities across sectors. The challenges are deeply intersectional, requiring comprehensive, integrated, and inclusive approaches for mitigation and adaptation. From healthcare and education to fisheries and vulnerable populations, the need for immediate, climate-resilient planning and governance is urgent.

The RMI low-lying atolls and unique land tenure system make infrastructure sectors like utilities, energy, and transportation, particularly susceptible to climate impacts like sea-level rise and severe weather. Funding constraints, especially in remote atolls, amplify these vulnerabilities. Rising global temperatures and ocean acidification accelerate the deterioration of these critical systems, making the case for immediate, climate-resilient planning.

The healthcare system is also severely stressed by resource shortages and these will be exacerbated by climate change impacts. Already grappling with challenges like poverty, urbanization, and disease prevalence, the healthcare infrastructure faces additional burdens from the rise in waterborne and vector-borne diseases due to climate-related events. Malnutrition, attributable to disrupted food and water supplies, adds to healthcare delivery challenges. Although much work is currently progressed through the climate and health policy and workplan, there will be a need for further support. The nation's geographic spread complicates these issues further, highlighting the acute need for better-trained healthcare professionals who can reach all our communities.

The education and training sectors are likewise vulnerable. Existing challenges such as declining enrollment and logistical issues are exacerbated by climate change impacts like coastal erosion and increased disease spread. Extreme weather events pose a significant threat to school attendance and educational quality. There is an urgent need for climate-specific policies and curriculum development to prepare the coming generations for the challenges ahead – both for understanding the issues and developing appropriate skills for the future.

While fishing is a significant revenue source, with Majuro a key tuna transhipment port, it faces challenges like overfishing and climate change impacts on both commercial and local fisheries. Changes in ocean conditions could drastically affect fish distribution and abundance, threatening traditional fishing practices. Potential migration of tuna away from the RMI's Exclusive Economic Zone and the risk of illegal fishing add complexity and risk to this promising and developing sector.

Vulnerable populations, including women, youth, the elderly, and persons with disabilities, face heightened risks. Societal roles, existing inequalities, and limited resources make these groups particularly susceptible to the cascading effects of climate change. Gender-based violence and mental health issues are likely to worsen, while land tenure issues could lead to future disputes, especially as rising sea levels threaten to displace communities.

Our natural resources and commerce sectors face enormous challenges. Scarce freshwater

resources are further strained by climate impacts like droughts and rising temperatures, affecting agriculture, health, and traditional livelihoods.

Image Supplied by Webmedia South Pacific

The National Adaptation Pathway for Survival serves as a dynamic blueprint, outlining how the nation will respond from now until 2150. It embraces 5 key principles: effectiveness, efficiency, equity,

Our Adaptation Pathway for Survival: Short, Medium and Long Term

The National Adaptation Pathway for Survival serves as a dynamic blueprint, outlining how the nation will respond from now until 2150. It embraces five key principles: effectiveness, efficiency, equity, enablement, and sustainability, and is built to be flexible, accommodating evolving climate data and societal needs. The Pathway divides the timeline into key periods, each with decision points based on sea-level rise projections.

In the ***near term (2024 - 2040)***, our plan considers preparing the institutional frameworks to address climate change and prioritizes immediate, low-risk adaptation actions informed by current science. These include low technology community initiatives and nature-based solutions and infrastructural improvements, all nested within a legal framework that promotes quick implementation. The strategy ensures early measures that safeguard the most vulnerable communities and the Marshallese way of life.

The ***mid-century period (2040 - 2070)*** is a pivotal phase for the RMI. Decision Point 2 in this window will compel the nation to re-evaluate its

existing protective measures, based on new sea-level rise data and updated adaptation plans. Decisions will then need to be made about next steps, including which atolls can be sustainably protected in the longer term, and the necessity of planned relocations and the building of infrastructure in designated community hubs.

Between 2070 - 2100, sea levels are expected to rise to 20" (0.5 meters), triggering habitation responses and a comprehensive review of existing strategies.

Beyond 2070, two scenarios come into play. If sea-level rise is manageable, the government may continue to invest in protective structures for the existing communities. If not, then the focus will need to turn to discussions on planned relocation measures or seeking alternative land beyond the RMI.

Another critical year is **2150**, by which time a 6.5ft (2-meter) rise is currently projected. Whether it is practicable to provide for this or whether to look to other strategies including migration or seeking alternative land will have to be decided through the mid 2000s, prompting evaluations of ongoing protective measures, influencing choices between fortifying current communities or initiating relocations.

Atoll-specific strategies are also embedded in the plan. In urban centers like Majuro and Ebeye, the focus is on fortifying coastal barriers, and later planned relocation. Semi-urban atolls will see investments in both 'hard' and 'soft' protective infrastructure, while rural atolls will initially utilize nature-based and low-cost solutions. Decisions to pursue various measures at key points will depend on climate data updates, financial analyses, and community consultations.

Image Supplied by Webmedia South Pacific

Image Supplied by Webmedia South Pacific

The Cost of Adaptation

The cost of adaptation strategies to protect against sea-level rise in particular is substantial, with estimates ranging from USD 250 million for protection of individual specific areas to over USD 1 billion for comprehensive protection of both urban centers against a 20" (0.5m) sea-level rise. Raising and protecting an area against 6.5ft (2m) SLR (needed by 2150 on current projections) sufficient for the RMI's current population could exceed USD 5 billion. Semi-urban and intermediate centers have varying costs based on the extent of the adaptation needed and the investment available, ranging from USD 250 million to USD 2 billion for protection to 20" (0.5m) and 6.5ft (2m) SLR respectively. The RMI Government will evaluate the practicality and cost implications of these options, including with existing and potential funders.

The NAP and Our National Strategic Plan

The National Strategic Plan (NSP) is the country's comprehensive planning framework. The NAP will be integrated within the NSP as the primary plan for climate change adaptation and resilience. The NAP not only addresses the climate change objectives outlined in the NSP but also complements other policy documents and sectoral plans. The implementation of the NAP will require further synchronization, including with the establishment of a coordination implementing mechanism to guide investments and actions in line with broader NSP goals.

Implementation Strategy

The NAP Implementation Strategy has three overarching goals: (1) building adaptive resilience across human and ecological systems; (2) strengthening the enabling environment for NAP activities, and (3) adopting a self-determined approach that honors the country's heritage and benefits future generations.

These goals are set to achieve five high-level outcomes that focus on sectoral and community resilience, all-of-government and all-of-society commitments, and inclusivity in decision-making. Action plans have been devised for each outcome, covering key economic and social sectors, and emphasizing an integrated approach that involves government and societal stakeholders. These action plans are to be further developed into specific implementation plans by the respective lead ministries and agencies. Such implementation

plans will include setting schedules, securing resources, and engaging stakeholders. For Community Action Plans, this involves developing atoll-specific Local Area Plans for Adaptation (LAPAs) to meet national objectives.

Building an Enabling Environment to Support NAP Implementation

To successfully implement the NAP the government aims to create a comprehensive "All-Of-Government" and "All-Of-Society" approach, focusing on three core elements: (1) Policy and legislative foundations; (2) Effective governance and administration structures and; (3) Resource mobilization guided by sustainable development plans.

Notably, strengthening coordination and developing adaptation capacity in existing institutional arrangements to support implementation of the NAP is critical. Alongside of this there is a need for a comprehensive awareness program for the Marshallese population to understand the projected impacts of climate change, how they can prepare for them and how they can be involved in the critical decision-making which will be required to achieve equitable and sustainable outcomes for all Marshallese.

The complexity, cost and interconnectedness of the climate change issues and the extreme outcomes to be addressed, make it imperative that there be both institutional clarity and political focus on initiating arrangements for implementing the NAP. The Government has recently adopted the Sea Level Rise (SLR) Adaptation Policy as a precursor to preparing for NAP implementation in three key areas: technical development for SLR and monitoring climate impacts; addressing underlying institutional and cultural issues; and, establishing institutional arrangements to oversee and manage the NAP implementation.

Getting Everyone Engaged

In adopting an "All-Of-Society Approach" for implementation, we emphasize decentralized governance and are involving local communities, public-private partnerships, educational institutions, and marginalized groups such as women and youth. By hosting community forums and employing media outlets, the plan aims to foster participatory decision-making and raise awareness on climate risks. Special emphasis is placed on incorporating women's voices in decision-making and with targeted training aimed at enhancing women's skills and participation in leadership. Gender and human rights considerations are integrated across policies.

Moreover, the RMI government plans to engage communities across the society through extensive public awareness and educational campaigns. These include specialized climate change modules in school curriculums, training sessions for teachers and community leaders, and widespread media campaigns.

Mobilizing the Right Resources

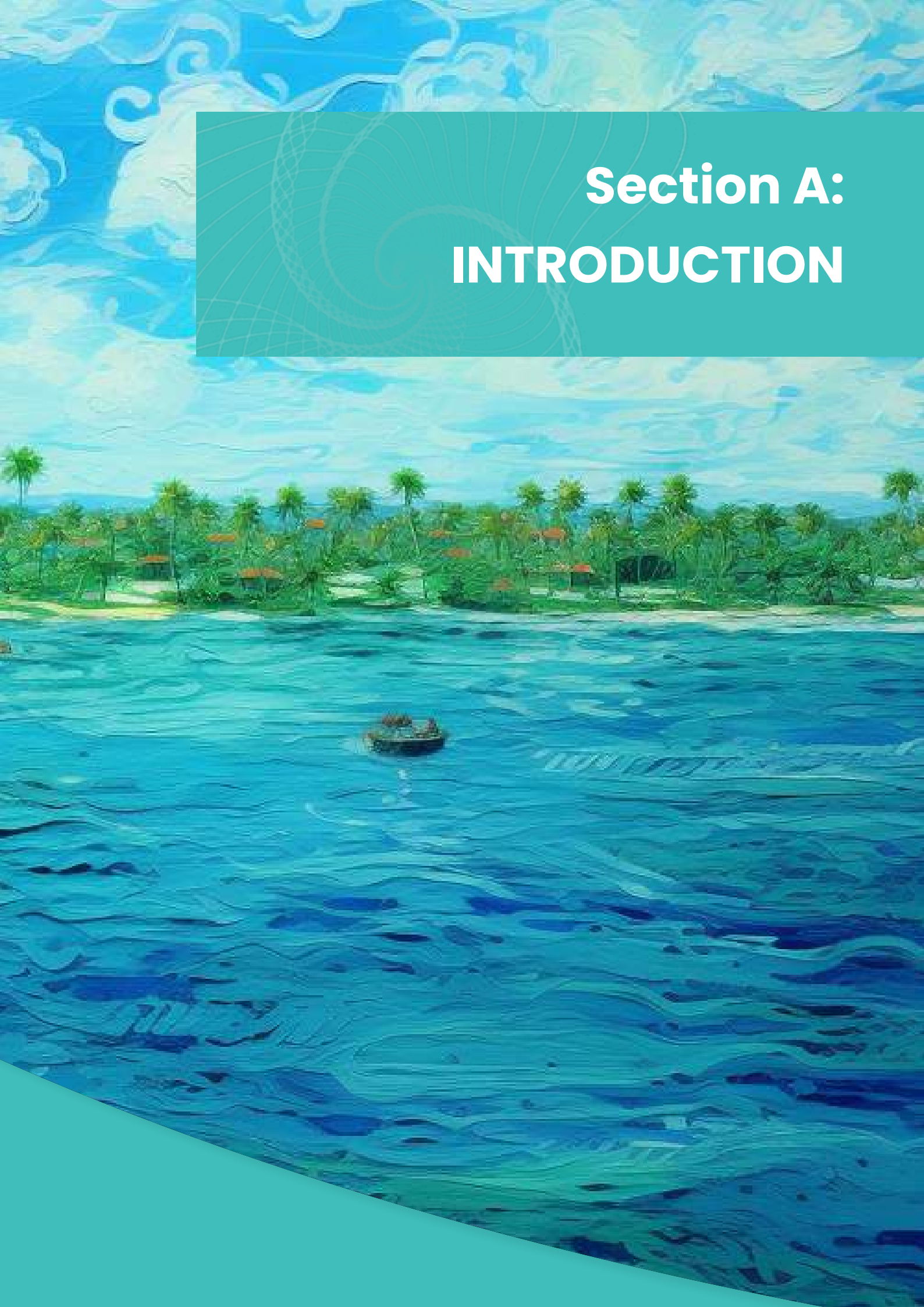
The RMI needs significant long-term funding for adaptation. We will primarily focus on two sources: international and regional support and domestic public finance. International sources like the Green Climate Fund and the World Bank are considered vital. Additionally, the ongoing negotiations with the U.S. on the Compact of Free Association may provide resources to adaptation efforts. While domestic revenues also play a significant role, the size of the economy is small compared to the scale of the adaptation challenge. The RMI also looks to innovate with regional collaborations, such as

partnerships with neighboring Pacific countries and global organizations. A multi-layered approach outlined in the NAP signifies RMI's comprehensive strategy to mobilize resources, from international funding and domestic revenues to innovative finance mechanisms, aimed at building a resilient future in the face of climate change.

Accountability and Reporting on Progress

The monitoring and evaluation (M&E) framework outlines a comprehensive approach to assess the effectiveness of various action plans, including sector, community, government and society action plans. The framework sets performance indicators that guide responsible ministries in measuring progress and introduces an additional level of accountability through designated M&E leads. A baseline provides initial data against which progress can be compared, a timeframe for implementation, and a suggested frequency for continuous evaluation are also outlined. The M&E framework is focused on a ten-year span starting from 2023 and recommends a midterm evaluation at the five-year mark and anticipates an update of this NAP based on experiences and emerging data from the 2024-2034 period.

Image Credits: Supplied by Webmedia South Pacific



Section A: INTRODUCTION

Section A: INTRODUCTION

1.1 Our NAP Vision

"Papjalmae" means preparing for unforeseen circumstances. In this case the climate crisis is the greatest unforeseen circumstance our country has experienced beyond the nuclear legacy.

Figure 1: Our NAP Vision overlain on the flag of the RMI, adopted in 1979 at the onset of self-rule on the island.

1.2 Guiding Principles National Self-Determination

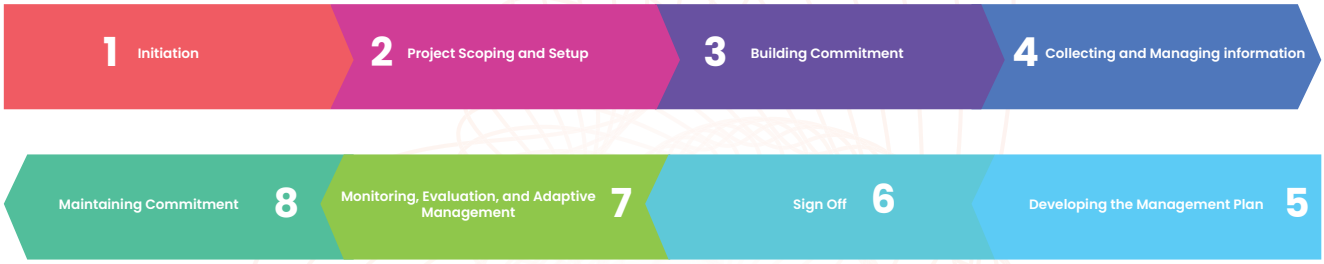
Self-determination and the right of RMI citizens to determine their responses to climate change supported by observations, local, indigenous knowledge, and science-based actions guides the NAP. A set of values-based principles founded on 'self-determination' and understanding the local situation was developed (Table 1). These guiding principles are incorporated into each part of the NAP process and will be used to inform the recommendations that stem from the NAP.

Table 1: Self-determined principles for the NAP

Principles Principle Title	Definition
Right to remain	The right of RMI citizens to remain in their homelands – and this right should be protected (to the extent practicable) – noting it will require transformative measures.
Right to self-determination	The right of RMI citizens to determine their responses to climate change supported by observation, knowledge, and science.
A resilience imperative	Resilience (physical and well-being) must be a fundamental focus across all sectors and areas of atoll development based on understanding of situations, identifying adaptation measures fit for purpose, and addressing the local context.
The need to address transformative measures	This, in turn, requires transformative thinking to be achieved and implemented.
Integrated adaptation	Accepting the complex and multi-dimensional scope of climate change and, coordinating across the sectors and developing the adaptive capacity to adjust to the changing situation.
Progressive adaptation	Monitoring climate impacts and building on progressive adaptation pathways and sustainable solutions over time.
Gender, social inclusion, and fairness	Maintaining a strong focus on gender equality, social inclusion, and fairness.
Technology and tradition	Embracing innovation and technology as well as traditional knowledge.
Lessons from the nuclear legacy	Learn from the level of trauma and environmental degradation that our islands and people experienced from the testing, which subsequently contributed to further vulnerability to climate change.

The Reimaanlok Approach: This is a vital aspect of development planning in the RMI, as all land in the country is under traditional ownership, which necessitates consultation with traditional landowners in order for any development to proceed. Despite the complexities, the RMI Government is committed to transparent and culturally respectful consultation processes. The Reimaanlok Framework, RMI's national approach to community-based conservation,

was adopted in 2008 and aimed to conserve at least 30% of marine and 20% of terrestrial resources in Micronesia by 2020. Since meeting its initial Micronesia Challenge goal, RMI has since set itself the target of conserving 50% of its coastal resources by 2030. This initiative focuses on sustaining biodiversity and livelihoods, enhancing community and ecosystem resilience, and is currently being implemented in five islands/atolls, with the goal of expanding its successful principles and processes to other sites.[1] The Reimaanlok Approach not only guides consultations for the National Adaptation Plan (NAP) but is expected to also play a crucial role in informing its implementation. The 8-step Reimaanlok Approach helps atoll communities in the Marshall Islands think globally and act locally. It employs community-based tools and approaches to articulate local objectives that translate to national, regional and international goals.



Overall Status of Reimanlok Community-based Resource Management Planning by Site - October 2020

Pending	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8
Kwajalein Rongerik Rongelap Ailinginae Bikini Enewetak Ujelang Erikub Jemo Taka Nadrikdrik Kili			Majuro - Buruon	Majuro - Ajeltake Likiep (R2R) Aur (R2R) Mejit (R2R) Lib (Ramsar Site)*	Ailinglaplap Jabat Maloelap Wotje Namu Arno Mili Bikar Bokak Wotho (R2R) Ailinglaplap-Bouj	Majuro -Bikirin Majuro-Drenmeo Majuro-Bokan Botin Majuro-Ene Kalamur Majuro-Woja Ultrik Ujae Lae Ebon (R2R)	Ailuk Namdrik Jaluit**	

*Lib marine survey to be conducted

**Jaluit Atoll Conservation Area Plan from 1999 needs to be revisited

Figure 2:Overall status of Reimaanlok Community-based Resource Management Planning[2]

Economic development and resilience are essential components of adaptation because a more prosperous society will have more resources, individually and collectively, to adapt to climate change. A vital strength of the Reimaanlok Framework is its underpinning objective of merging conservation practices from the biophysical sciences with traditional community-based atoll practices and processes to achieve mutually agreed outcomes. Consequently, the Reimaanlok Framework contains the necessary processes

[1] *Socio-Economic Monitoring (SEM) Surveys, completed as part of the Reimaanlok Process, have been completed for a number of atolls, including Aur, Likiep, Ebon, Maloelap, Ujae, and Utrok amongst others. The SEM Surveys are important for understanding the degree of dependence of the local community on the natural resources for both subsistence and income-generation. In addition to these Socio-economic Monitoring Surveys, completed Atoll Resource Management Plans exist for Lae, Ebon, Mejit, Wotho, Maloelap, Jabat, and Namu. These plans include recommendations to build socioeconomic resilience and ecological resilience. Embracing the views of community members, a series of recommendations are presented through the incorporation of the Local Early Action Plan (LEAP) processes to include "Community Climate Stories" and "Community Maps," in addition to introducing (over time) Climate Vulnerability Risk Assessments into the current Reimaanlok Process.*

[2] *Note that atolls have progressed further along the plan since October 2020 and to be formally reported.*

and practices to support the NAP process to determine coastal adaptation to climate change within atoll communities, particularly in the neighboring-islands[3].

1.3 Country Overview

As part of the of the Micronesian region, the Republic of the Marshall Islands (RMI) consists of two groups of atolls and islands in the Central North Pacific Ocean, about 3,200 kilometers (km) away from Honolulu and Tokyo[4]. 22 of the 29 atolls and 4 of the 5 small, raised coral islands are inhabited; the atoll islands are rarely more than 200 m in width, and almost all of the land is below 6.5ft (2 meters). The Marshall Islands has a moist, tropical climate, heavily influenced by the north-east trade wind belt. Annual rainfall varies considerably from north to south within the archipelago, with atolls in the south receiving 300–340 cm of rainfall annually, perhaps as much as three times more than northern atolls. The average annual temperature and monthly means are generally consistent at around 27°C, with a maximum daily variation of about 7°C[1]. Most of the RMI's approximately 42,000 persons (2021) live in the capital city, Majuro. About 92% of the population identifies as Marshallese, and more than 98% of its people speak the official local language.

The RMI has a unique and close relationship with the United States (US). In 1944, the US gained military control of the country from Japan and assumed administrative control under United Nations auspices as part of the Trust Territory of the Pacific Islands following the end of World War II. The country bears the enduring legacy of U.S. nuclear weapons testing. This testing, including the infamous Bikini Atoll tests, had devastating environmental and health consequences for the Marshallese people, leading to lasting impacts on their land and well-being. RMI's pursuit of nuclear justice, including compensation and environmental remediation, remains an ongoing issue in international diplomacy. In 1983, the RMI signed a Compact of Free Association with the US and gained independence in 1986 with the Compact's entry coming into force. Under this Compact, the US provided defense, subsidies, and access to social services, and in 2003, this agreement was amended to provide around US$70 million each year over the period 2004–2024[5]. Since independence, external assistance and grants have formed 60% of government revenue.

In addition to the reliance on external assistance, the RMI faces a variety of social vulnerabilities, much like many other Small Island Developing States (SIDS). Issues of geographical remoteness, a small, sparsely distributed population, distance to international import and export markets, and associated high costs of transportation, small domestic market, challenges of achieving

[3] *Socio-Economic Monitoring (SEM) Surveys, completed as part of the Reimaanlok Process, have been completed for a number of atolls, including Aur, Likiep, Ebon, Maloelap, Ujae, and Utrok amongst others. The SEM Surveys are important for understanding the degree of dependence of the local community on the natural resources for both subsistence and income-generation. In addition to these Socio-economic Monitoring Surveys, completed Atoll Resource Management Plans exist for Lae, Ebon, Mejit, Wotho, Maloelap, Jabat, and Namu. These plans include recommendations to build socioeconomic resilience and ecological resilience. Embracing the views of community members, a series of recommendations are presented through the incorporation of the Local Early Action Plan (LEAP) processes to include "Community Climate Stories" and "Community Maps," in addition to introducing (over time) Climate Vulnerability Risk Assessments into the current Reimaanlok Process.*

[4] *Subbarao, S. & Mucadam, R. (2015). Second National Communication of the Republic of the Marshall Islands. United Nations Development Program/Global Environment Facility. Suva, Fiji. URL:* https://unfccc.int/sites/default/files/resource/mhlnc2.pdf*[accessed 10/07/2019]*

[5] *US Department of State (2018). U.S. Relations with Marshall Islands.* URL: https://www.state.gov/u-s-relations-with-marshall-islands/*[accessed 15/07/2019]*

economies of scale of production, and very high energy costs, as well as few natural resources, all hinder economic development potential. The RMI heavily relies on imports – agricultural production is primarily subsistence-based, and small-scale industry is limited to handicrafts, tuna processing, and copra[1]. Although tourism is not a major source of foreign exchange, the industry accounts for about 10% of the local labor market. While many official basic indicator data are unavailable for the RMI (Table 1), using 2011 census data, it was estimated that 37% of the total population live below the "basic-needs income line"[6]. While 30% of residents in the two main urban centers (Majuro and Ebeye) are estimated below this line, these numbers could be double in the outer islands. Such deepening poverty, amidst "growing concerns over high unemployment, financial hardship, hunger, and poor nutrition", is noted in the context of a vulnerability to "transnational threats, natural disasters, and the potential effects of climate change."

The Marshall Islands face a risk of high impact cyclones, and the low-lying islands are susceptible to coastal floods and tsunamis[7]. Extreme heat and drought conditions also represent a high risk and have recently affected the islands. In late 2015/early 2016, below-average rainfall, exacerbated by El Nino Southern Oscillation (ENSO), induced local drought conditions and water shortages. EM-DAT data estimates that the drought affected more than half the population, with economic damages estimated at just under US$5 million[8]. "While this event remains the most severe disaster for the country, the risk from disaster in the RMI is high due to the combination of economic and physical vulnerability. With previous nuclear testing on some of the atolls having long made them uninhabitable[9], the nation's susceptibility to natural hazards is further exacerbated by climate change and variability. The risks faced by the Marshall Islands have been set out in several communications to the United Nations, including the Republic's Second National Communication to the UNFCCC (2015). The RMI is also noted for being the first country to submit an ambitious second Nationally Determined Contribution (NDC) under the Paris Agreement[10].

[6] *Johnson, J. (2016). ADB report: Poverty rate high in Marshall Islands. Marianas Variety online April 19 2016. URL:* http://www.mvariety.com/regional-news/88542-adb-report-poverty-rate-high-in-marshall-islands *[accessed 15/07/2019]*

[7] *GFDRR (2016). ThinkHazard! Profile for the Marshall Islands. URL:* http://thinkhazard.org/ *[accessed 15/07/2019]*

[8] *EMDAT (2019). Emergency Events Database. URL:* https://www.emdat.be/ *[accessed 15/07/2019]*

[9] *Dvorsky, G. (2019). Radiation Levels at the Marshall Islands Remain Disturbingly High. 15/07/2019. URL:* https://gizmodo.com/radiation-levels-at-the-marshall-islands-remain-disturb-1836382678 *[accessed 15/07/2019]*

[10] *Mead, L. (2018). Marshall Islands Becomes First Country to Submit Second, More Ambitious NDC. 28/11/2018. URL:* https://sdg.iisd.org/news/marshall-islands-becomes-first-country-to-submit-second-more-ambitious-ndc/

Figure 3: Map of the RMI

1.4 Why We Need a Climate Adaptation Survival Plan

- The Republic of the Marshall Islands' (RMI) has experienced warming of around 0.60C since 1980.
- Future trends in warming are obscured by the inability of climate models to simulate trends at sufficiently small spatial scales accurately. Warming is likely to take place at a rate slightly lower than the global average.
- Current emissions pathways are tracking between RCP 4.5 (2.7 degrees of warming) and RCP 2.6 (1.8 degrees of warming).
- The IPCC's AR6 report demonstrates that climate impacts will increase with every tenth of a degree of warming. Limiting warming to 1.5°C will avoid the worst impacts and loss and damage, which is already a reality for the RMI.
- RMI faces diverse risks from climate change; however, data and reliable model projections are lacking for all atolls, presenting challenges for decision-makers.
- Potential threats to human well-being and natural ecosystems include increased prevalence of heat waves, intensified cyclones, saline intrusion, wave-driven flooding, and permanent inundation.
- Biodiversity and the natural environment of RMI face extreme pressure, and the loss of some species of fish, coral, bird, and terrestrial species is likely without effective conservation measures.
- RMI faces a potential long-term threat from permanent inundation and wave-driven flooding, and some studies have suggested that many of its low-lying islands will become uninhabitable within the 21st century.
- Other research has suggested that the risk of large-scale net loss of land may previously have been overstated, and if natural processes and assets, such as coral

reefs, are conserved, human inhabitancy might be sustained over the long-term.

- RMI's population already lives in a dynamic ecosystem, to which it has adapted, but climate change is likely to increase its variability, pose new threats, and stress livelihoods.
- Communities will need support to adapt and manage disaster risks facing their wellbeing, livelihoods, and infrastructure. Geographic isolation and economic vulnerabilities will increase the challenges communities and decision-makers face.

Artwork by Jinghui Joy Huang titled "Our Culture, Our Pride"

1.5 The UNFCCC National Adaptation Process

For many countries like the RMI, national-scale climate adaptations that are led through existing governance structures, such as TTEC, require ongoing strengthened engagement and ongoing support from the international community. This includes significant resource allocations, and immediate and long-term commitments to develop resilient infrastructure and ensure sustainable livelihoods. Projections also tell us that the RMI must start building resilience and planning adaptation pathways to prepare for the coming decades because the window of opportunity to do so is closing.

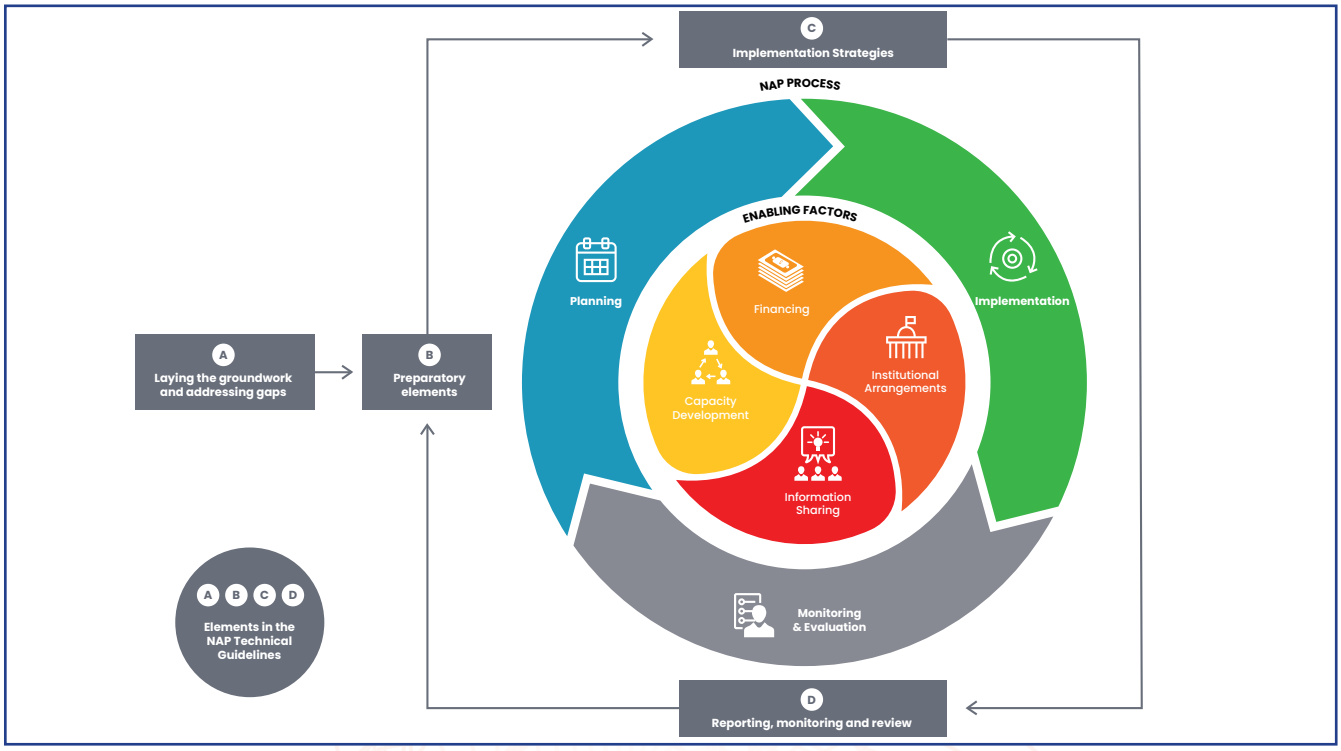


Figure 4: Summary of the formal UNFCCC NAP development process[11].

Parties to the 2010 UNFCCC 16th Conference of Parties (COP16) decided upon the Cancun Adaptation Framework. This includes a process for formulating National Adaptation Plans (NAPs), which are meant to assist countries in identifying medium and long-term adaptation needs and to develop and implement strategies and programs to address those needs.

The NAP process is designed to be country-driven, gender-sensitive, participatory, and fully transparent. The general components (Figure 2) include laying the groundwork and addressing gaps, preparatory elements, implementation strategies, reporting, monitoring, and review. This NAP document represents the third part of the process, which is the development and approval of the implementation strategies to guide the Government of the RMI.

The objectives of the NAP process are twofold. First, to reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience. Second, to facilitate the integration of climate change adaptation coherently into relevant new and existing policies, programs, and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate.

Practically, these objectives cover specific projects and programs aimed at decreasing vulnerability, enhancing adaptive capacity, and a broader evolution of national development where climate change considerations are mainstreamed into national governance processes. The RMI Government officially launched its NAP process in 2020, building on ongoing work and adaptation work in specific

[11] *Source: NAP Network, 2019*

1.6 How The RMI NAP Was Developed

The TTEC system and particularly the Adaptation Working Group of the TTEC was empowered to develop a self-determined NAP, providing formal oversight of the NAP development process on behalf of the Government of the RMI while the NDCP Working Group focused on ensuring that cross cutting areas were integrated into the adaptation development process[12]. These Working Groups contributed significantly to the process through detailed reviews and approvals of various scientific, technical, expert, and community reports, surveys, and studies that were undertaken from 2019 to the present[13].

This NAP represents the most decisive plan developed to date to address the climate change crisis at the national level. It aligns with and builds upon existing national plans and strategies which address climate change and seeks to incorporate the findings of gap assessments and studies to drive a comprehensive, holistic, and practical approach to climate change adaptation.

Image Supplied by Webmedia South Pacific

[12] *NDC-Partnership Working Group Report on Gender and Human Rights Analysis: Ensuring a gender-responsive National Adaptation Plan in the Republic of the Marshall Islands.*

[13] *NDC-Partnership Working Group Report on Gender and Human Rights Analysis: Ensuring a gender-responsive National Adaptation Plan in the Republic of the Marshall Islands.*

Image Supplied by Webmedia South Pacific

1.7 How The NAP Will Be Used

Government: For government agencies, the NAP provides a roadmap for integrating climate change adaptation into planning and policymaking across different sectors and levels of government. This can help strengthen and build upon mechanisms like the TTEC to ensure a coordinated and coherent approach to adaptation. NAPs can also provide a basis for engagement with other stakeholders, including civil society, businesses, and local communities.

1.7.1 By National Stakeholders

Supporting Sustainable Development: Without proper planning and implementation of adaptation measures, climate change challenges the achievement of the Sustainable Development Goals (SDGs). The NAP lays out the country's path to climate resilient development.

Enhancing Collaboration and Learning: The NAP aims to facilitate learning and collaboration between different government departments, levels of government, and non-governmental stakeholders. Sharing experiences and lessons learned through the NAP process can also enhance global knowledge on adaptation.

Civil Society: Civil society organizations (CSOs) can use the NAP to understand government priorities and strategies for adaptation, which can help them align their activities and advocacy efforts. They can also use the NAP to hold the government accountable for its commitments to climate change adaptation.

Business: For businesses, the NAP provides insights into the Government's plans for adapting to climate change, which can inform their risk management and strategic planning. For example, in specific sectors or regions identified as particularly vulnerable to climate change, businesses in those areas might need additional measures to manage their risks. Businesses can also identify opportunities to support and benefit from adaptation measures, such as developing new products or services.

Communities: Local communities can use the NAP to better understand the risks they face from climate change and the measures being taken to manage them. This can help them participate more effectively in local adaptation efforts. For example, working with the Government to improve coastal management against sealevel rise.

Research institutions: Such institutions can also use the NAP to guide their research agendas, focusing on the issues and questions most relevant to the country's adaptation needs.

Image Supplied by Webmedia South Pacific

1.7.2 By International Partners

Under the Paris Agreement, countries are encouraged to plan and implement adaptation efforts and report on these to the UNFCCC. The NAP process is an important part of meeting these obligations. More significantly, the NAP will help international actors, including donors and implementing partners, align with the RMI's self-identified needs and objectives rather than being driven by external agendas. Providing a comprehensive overview of the RMI's 'survival strategy' further enables partners to coordinate their efforts This can avoid duplication of effort and ensure that different initiatives are mutually supportive. It will also help to inform international donors and multilateral banks funding commitments for the implementation of the NAP by the RMI government. The GCF has reported that countries with approved NAPs are becoming more likely to move through administrative processes and receive funding at greater rates.

Another critical purpose of the NAP is to identify and often prioritize areas where the RMI may need support in terms of capacity building. This includes technical assistance, knowledge

transfer, or strengthening institutional capacities. It also provides a monitoring and evaluation plan to keep track of the effectiveness of adaptation measures. Lastly, as future partnerships are negotiated, the NAP will be essential for further policy dialogue between the RMI Government and its international partners. It is a concrete documentation of our country's adaptation needs, the effectiveness of measures to be undertaken, and areas where collaborative efforts will be beneficial.

Artwork by Joenathan Defan titled "Tomorrow"

1.8 NAP Scope, Bounds, and Limitations

The RMI National Adaptation Plan declares our commitment to confront the impacts of climate change head-on. In shaping our intentions, we recognize that some challenges can be met and solved, others avoided, and others require additional data and evidence for fair and equitable decision-making. While the NAP is aspirational, it is not a universal remedy; it operates within realistic barriers and limitations that merit careful consideration.

Adaptation planning in RMI differentiates between barriers and limits. Barriers refer to restrictions or constraints that may restrain our adaptive capacity and the range of adaptation options available, yet these are often resolvable. They encompass various institutional, governance, and political-economic constraints that may affect the RMI government's ability to adapt. Nevertheless, explicit high-level adaptation goals and innovative leadership can be vital to overcoming these barriers to adaptation.

Limits, on the other hand, represent thresholds beyond which adaptation is no longer possible. These may include ecological constraints that pose existential threats to RMI's survival goals, such as sea-level rise for low-lying atoll nations like RMI, creating significant limitations with unavoidable impacts from the loss of territory[14].

This first NAP focuses on a 10-year plan that includes setting conditions for future adaptation, identifying immediate community needs, and enhancing our evidence-based analysis to define and prepare for longer-term, resource-intensive adaptive actions in the 10-50+ year horizon. Prioritization of adaptation measures has been essential due to limited resources and considers factors like severity and immediacy of the risks posed, the number of people and communities affected, cost-benefit analysis, and the feasibility of implementation. Our vulnerability assessments have provided a sound basis for this prioritization.

Engaging various stakeholders, including government agencies, civil society, the private sector, and local communities through the TTEC coordination mechanism, has ensured that the NAP is relevant, effective, and widely supported. Grounding the NAP in national legislative and policy frameworks ensures its legitimacy and institutionalization into governance.

However, there are several constraints which must be highlighted. Securing sufficient funding is and will be a significant barrier, as is the case for many developing countries, including Small Island Developing States (SIDS). Technical challenges, such as the need to conduct complex vulnerability assessments and integrate climate change considerations across various sectors, also exist. There are challenges to effective inter-ministerial coordination and stakeholder engagement as learnt through the TTEC mechanism since its official set up in 2019.

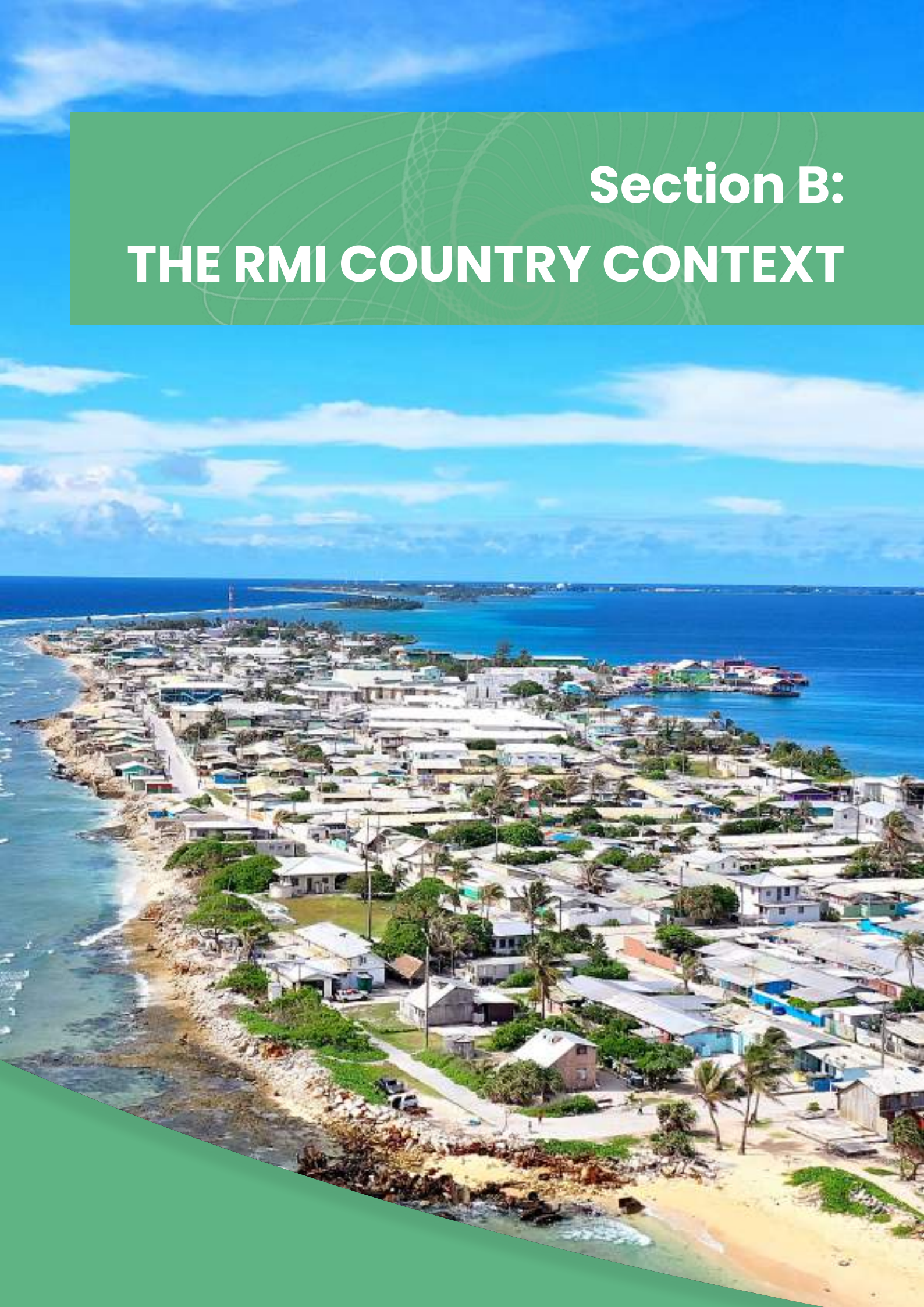
The uncertainty of climate impacts adds to the complexity, making it difficult to develop and implement effective adaptation strategies. This uncertainty also presents challenges in prioritizing adaptation measures.

The NAP, therefore, embodies a broad and complex scope with defined boundaries and constraints. It presents a robust response to climate change, recognizing the inherent challenges, barriers,, and limitations that frame our approach. With an understanding of these multifaceted elements, we are better positioned to navigate a future impacted by climate change, aligning our aspirations with achievable and firmly grounded realities.

[14] *IOM, 2023. Republic of the Marshall Islands, Climate Security Risk Assessment Profile. Climate Security Policy Brief.*

Image Supplied by Webmedia South Pacific

Section B:
THE RMI COUNTRY CONTEXT



Section B: THE RMI COUNTRY CONTEXT

2.1 Political Environment

Government in RMI is organized through a mixed parliamentary-presidential system. The President is the Head of Government, elected by the Nitijela, the legislative body, from among its members[15]. The legislative power is vested in the bicameral parliament, consisting of the Nitijela (lower house with elected members) and the Council of Iroij (upper house with appointed members), representing traditional leaders. This setup ensures a balance of powers and respect for traditional authority within a democratic framework. Regarding the national electoral process, the Nitijela, also known as the Parliament, consists of 33 members elected for four years in single-seat and five multi-seat constituencies. The electoral process adheres to universal suffrage for all citizens aged 18 and over. In turn, the President and cabinet form the executive branch of the government, balancing the legislative powers of the Nitijela. The elections are generally free and fair, and political competition is active with multiple political parties and independent candidates.

One unique aspect of the RMI's political system is the Council of Iroij (Chiefs). This is a 12-member body of tribal chiefs that serves a largely consultative role, particularly on matters concerning customary law and traditional practices. The Council of Iroij, often referred to as the "Council of Chiefs," is an advisory body in the governmental structure of the Republic of the Marshall Islands. It is designed to incorporate traditional authority within the modern, democratic governmental structure. This council links the country's traditional heritage and its contemporary political system. The Marshall Islands Constitution gives it the authority to review legislation passed by the Nitijela (Parliament) that affects customary law, traditional practices, or land tenure[16]. If the Council of Iroij objects to such a bill, it is returned to the Nitijela for reconsideration. This ensures that the traditional rights and customs of the Marshallese people are upheld and respected in the nation's law-making process.

Compact of Free Association (COFA)

The COFA between the RMI and the United States came into effect in 1986[17]. It established a special relationship that allowed the US to operate military bases on RMI territory, primarily on Kwajalein Atoll, while providing financial assistance, defense, and other benefits to the RMI[18]. Between 1986 and 2003, the US Government provided funding to the RMI, spent on infrastructure development, education, health, and other areas. The financial support continued through a renewed agreement in 2003, which promised the RMI funding

[15] *Institute of Island Studies, UPEI. 2007. Jurisdiction Project.* http://large.stanford.edu/courses/2018/ph241/castandea2/docs/upei-2007.pdf

[16] *Constitution of the Republic of the Marshall Islands. 1979.* https://rmiparliament.org/cms/phocadownloadpap/userupload/admin/ConstitutionoftheRepublicoftheMarshallIslands1.pdf

[17] *Congressional Research Service. The Compacts of Free Association. 2022.* https://crsreports.congress.gov/product/pdf/IF/IF12194/1. *Also see, USCIS. 2020. Status of Citizens of the Freely Associated States of the Federated States of Micronesia and the Republic of the Marshall Islands. https://www.uscis.gov/sites/default/files/document/fact-sheets/FactSheetVerifyFASCitizens.pdf. Also see, $OI. Compacts of Free Association. 2022.* https://www.doi.gov/oia/compacts-of-free-association

[18] *Congressional Research Service. 2020. The Freely Associated States and Issues for Congress.* https://crsreports.congress.gov/product/pdf/R/R46573/2

assistance over 20 years (2004-2023). The US also established a trust fund to sustain the RMI's economy after the Compact funding ended.[19] By 2023, this trust fund had grown to over $1 billion.

However, the sustainability of the fund and its ability to compensate for the cessation of direct Compact grants is uncertain, given the potential volatility of investment returns and the challenges facing the RMI's economy. The COFA also has significant implications for RMI citizens' migration rights.

The 2023 COFA renewal negotiations underscore the need for increased support. As per the stipulations, the Marshall Islands yield control of their surrounding waters and airspace to the U.S. military. The delicate balance this requires, between ceding such sovereign rights and maintaining local services such as education and healthcare, is a key component of these negotiations.

Image Supplied by Chewy Lin

An undisclosed amount is expected to be allocated towards a repurposed trust fund. This fund will allow the Marshall Islands to prioritize their needs, addressing the impacts of U.S. nuclear testing, ongoing U.S. military activities, and climate change. Additionally, the funding will back various initiatives crucial to the development and wellbeing of the island nation and its inhabitants. These initiatives include extending healthcare and education grants, funding climate change adaptation measures, and creating a museum and research facility dedicated to the history of U.S. nuclear testing. Infrastructure development on Kwajalein Atoll is also included in the funding commitments.

[19] *$OI. 2015. The Government of the Marshall Islands Contributes Additional $650,000 to Trust Fund for the People of the Marshall Islands.* https://www.doi.gov/oia/government-marshall-islands-contributes-additional-650000-trust-fund-people-marshall-islands#:~:text=The%20Trust%20Fund%E2%80%99s%20purpose%20is%20to%20contribute%20to,Amended%20Compact%20of%20Free%20Association%20expire%20in%202023.

Nuclear Legacy: The establishment of a National Nuclear Commission (NNC) under the 2017 National Nuclear Commission Act[20] reflected a renewed effort to ensure that the RMI's nuclear legacy is never forgotten. The NNC has a core nuclear justice mandate to coordinate the government's efforts to address ongoing, unresolved issues and challenges arising from the USA's nuclear weapons testing program. Efforts to address nuclear justice for Marshallese people have been ongoing for decades and must continue, especially with climate change impacts compounding threats such leakages from the Runit Dome, where nuclear waste has been stored.

Image Source: Business Insider(https://i.insider.com/5daf6aab045a3119eb2b536c?width =800& format =jpeg&auto=webp)

Diplomatic and Pacific Relationships: The RMI maintains cordial relations with its Pacific Island neighbors, collaborating on political, economic, environmental, and social matters such as climate change, sea-level rise, sustainable development and public health[21]. Shared history, cultural connections, and common challenges guide these relations. The RMI is an active member of a number of regional organizations, such as the Pacific Islands Forum (PIF), which facilitate dialogue and cooperation on climate change, fisheries management, regional security, and sustainable development.

[20] *RMI Pariliament. 2017. NATIONAL NUCLEAR COMMISSION ACT 2017.* https://rmiparliament.org/cms/images/LEGISLATION/PRINCIPAL/2017/2017-0034/NationalNuclearCommissionAct2017_1.pdf

[21] *$OS. 2021. U.S. Relations With Marshall Islands.* https://www.state.gov/u-s-relations-with-marshall-islands/

Image Supplied by Webmedia South Pacific

Exclusive Economic Zone and National Security: As a large ocean state, the RMI's EEZ is as much a part of its territory as its land, and threats to it have implications for national security and the economy[22]. As a member of the Pacific Islands Forum, the RMI endorsed the 2021 Declaration on Preserving Maritime Zones in the face of Climate Change-related Sea-level rise, signaling deep mutual commitment and a strong and decisive step to safeguard the homes and interests of the Pacific peoples, and maintain peace and security.

The RMI's EEZ, a jurisdictional space, affords the country control over its maritime activity, which is crucial for national security. It enables the management of potential threats such as illegal fishing, smuggling, and unauthorized military activities. RMI holds exclusive rights to explore, exploit, conserve, and manage living and non-living resources within 200 nautical miles of its coast. This jurisdiction affirms the country's authority over its maritime resources, thus bolstering its position in international agreements, treaties, and negotiations concerning marine conservation, climate change, and sustainable resource use.

Economically, the EEZ is a crucial asset for the RMI. The EEZ's abundant marine resources, including the world's largest tuna fishery, provide a significant source of income. The RMI benefits from the revenues generated by commercial fishing within its EEZ, especially through licenses sold to foreign vessels. Nevertheless, it's essential to recognize the challenges associated with managing an EEZ. The RMI's vast area and limited resources make monitoring, control, and surveillance of the EEZ a considerable task. Illegal, unreported, and unregulated (IUU) fishing can

[22] *Pacific data hub. 2021. Republic of Marshall Islands Exclusive Economic Zone (200 Nautical Miles).* https://pacificdata.org/data/dataset/republic-of-marshall-islands-exclusive-economic-zone-200-nautical-miles

lead to significant economic losses. Furthermore, climate change, with its potential to disrupt fish migration patterns, poses substantial risks to the sustainability of the marine resources within the EEZ. As such, the RMI and other Pacific Island nations engage in regional cooperative efforts to manage and protect their valuable maritime resources within their respective EEZs.

Image Supplied by IOM

2.2 Economic Context

Economic Growth and Standard of Living: The RMI is a lower-middle-income country with a GDP per capita of US$4,171 in 2021[23]. Approximately 20% of the population of RMI has been reported to live on less than US$1 a day. Based on WHO and UNICEF statistics, as of 2015, 77% of the population has access to improved sanitation facilities, 12% to shared facilities, and 4% to other unimproved facilities. Due to the geographic spread of the islands and atolls, the capability of providing government services is constrained, and costs are high due to logistical challenges[24].

The small market size, geographical remoteness, and dispersion of the atolls limit the growth of the private sector. The remaining national income is derived from the service sector, royalties from the fisheries sector, small-scale handicrafts, and subsistence agriculture. The industry is limited to the processing of coconut products and tuna[25]. The US Government provides financial and technical assistance under the Compact, and other development partners (ADB, World Bank, Republic of China Taiwan) also support the RMI economy. Total official development assistance received in 2016 was $57 million, accounting for 32% of the national income.

[23] *World Bank, 2021*

[24] *UNICEF & Australian Aid. (2016). A Snapshot of Water and Sanitatoin in the Pacic 2015 Sub-Regional Analysis and Update.*

[25] *Economic Policy, Planning and Statistics Office (EPPSO), Office of the President, .(2018, June). REPUBLIC OF THE MARSHALL ISLANDS, STATISTICAL YEAR BOOK, 2017. Pacific Environment Data Portal. Republic of the Marshall Islands.*

Gross Domestic Product (GDP): As per the World Bank, RMI's GDP in 2019 was about $216 million. The GDP growth rate fluctuates based on various factors, such as external aid flows, public spending, and extreme climate conditions. Since 2015, the economy has been improving, growing by 1.9 percent in 2016 and 2.5 percent in 2017, primarily due to infrastructural spending[26]. In 2018, RMI's GDP growth rate was 3.6%, according to the World Bank. The Gross National Income (GNI) per capita, a measure often used to gauge living standards, was $6750 in 2019, according to the World Bank[27].

Artwork by Mailynn Bias titled "The Sunken Horizon"

Employment Rate: A key economic and social challenge in RMI is the limited number and variety of employment opportunities, though the public sector provides many formal jobs. According to 2011 census data, unemployment is not high (4.7%), but there is a low labor force participation level – only 41% of people aged 15 or older are actively working[28]. Accurate unemployment figures are challenging to obtain due to the significant informal and subsistence economy. However, per the most recent data from the International Labour Organization (ILO), the unemployment rate was approximately 36% in 2018.

Key activities and outputs of the **Trade and Investment** Division are as follows: Develop and improve the quality and quantity of manufactured products; improve packaging and labeling to be more attractive and to meet all export requirements; and increase domestic consumption of local products. Others are to

[26] *Gong Yang, & Davis. (2019). Development Finance Assessment for Republic of The Marshall Islands, Leveraging finance for sustainable development. UNDP*
[27] *World Bank Open Data. (2023)*
[28] *GCF. (2019a).*

increase exports of niche/value-added products, ensure export products meet international requirements, have smooth and efficient permit processes, and facilitate trade by ensuring RMI meets import and export standards.

The RMI National Export Strategy (NES) vision is to transform the RMI into a globally competitive export-driven economy with diversified high-value-added products and services targeting new markets to provide better employment opportunities and generate higher incomes. To achieve this vision, the potential impacts from climate change must be understood and managed. The Office of Commerce, Investment and Tourism (OCIT) also supports the commerce sector and has wider functions and powers designed to catalyze economic and social development. The OCIT goal is to stimulate private sector economic activity to increase employment and sustainable Foreign Direct Investments (FDIs), boost the local economy, and significantly enhance tourism, fisheries, and micro, small, and medium-sized enterprises.

Visitors to the RMI are limited but have steadily risen over the last 20 years, from approximately 4,700 in 2000 to 5,550 in 2007 and 10,771 in 2019. Tourism accounts for just under 10% of gross domestic product[29]. The tourism industry employed just over 600 Marshallese in 2015, equivalent to an estimated 5.5% of the country's workforce[30]. The main tourism activities have generally been diving and sport-fishing[31]. Travel to the RMI is largely by airlines, although two to three cruise ships visit each year, plus a small number of unrecorded high-spending yacht visitors[32].

The RMI's diversification strategy focuses on several key areas: The RMI has identified tourism as a potential growth area, given its rich history and natural beauty. Efforts are being made to develop sustainable, culturally respectful, and environmentally friendly tourism. Challenges to tourism development include the RMI's remote location and limited infrastructure. The RMI's large exclusive economic zone (EEZ) is rich in marine resources, particularly tuna[33]. The country is working to leverage these resources more effectively through licensing fees and value-added activities such as processing and transshipment. Regional cooperation through bodies like the Parties to the Nauru Agreement is key to this strategy. The Government has also sought to improve food security and reduce reliance on food imports through support to the agricultural sector. This includes initiatives to enhance crop production, develop agroforestry, and support smallholder farmers.

A vibrant private sector is crucial to job creation and economic growth. Efforts to improve the business environment include reforms to regulations, improving access to finance, and initiatives to foster entrepreneurship. Given its abundant sunshine and wind, the RMI sees renewable energy, particularly solar and wind power, as a potential area for development. This can reduce the country's reliance on expensive imported fossil fuels, create jobs, and contribute to climate change mitigation. The RMI also sees overseas employment as an important part of its economic strategy, particularly in the United States. This provides valuable employment opportunities for the Marshallese, and remittances are an important source of income. This diversification strategy requires

29 *Pacific Tourism Organization (2020)*
30 *Pacific Tourism Organization (2020)*
31 *Collison and Spear (2009)*
32 *Strategic Tourism Development Plan 2020-2024, Government of the RMI (2019)*
33 *World Bank. (2021). Republic of the Marshall Islands Maximizing opportunities, enhancing sustainability COUNTRY ECONOMIC MEMORANDUM AND PUBLIC EXPENDITURE REVIEW. Retrieved from* https://elibrary.worldbank.org/doi/abs/10.1596/36124

substantial support in terms of infrastructure development, capacity building, policy reforms, and investment. Implementation can be a significant challenge, given the RMI's capacity constraints and vulnerability to external shocks, including climate change.

2.3 Social and Cultural Context

Population: The 2021 census shows that the number of people living in the RMI has declined, affecting both rural atolls and urban centers, suggesting an end to decades of continuous population growth in the two main urban atolls. Emigration to the United States is increasing, given that the Compact of Free Association (COFA) allows Marshallese citizens to work and study in the United States without a visa[34]. The preliminary results from the 2021 Census (Table 2) display a trend of population reduction across all atolls since 1988, with a 20% reduction for the whole country (53,158 down to 41,523 inhabitants[35]).

Table 2: 2021 Census compared to previous census results. The population decrease between the 2011 and 2021 census is also indicated: Yellow: 0-25%; Orange: 25-50%, Red: 50-75%; Purple: >75%.

	1988 Census	1999 Census	2011 Census	2021 Census*	% Change 2021 to 2011
Marshall Islands	43,380	50,840	53,158	42,465	-20.1
Ailinglaplap	1,715	1,959	1,729	1,179	-31.8
Ailuk	488	513	339	235	-30.7
Arno	1,656	2,069	1,794	1,144	-36.2
Aur	438	537	499	317	-36.5
Bikini	10	13	9	-	
Ebon	741	902	706	469	-33.6
Enewetak	715	853	664	296	-55.4
Jabat	112	95	84	75	-10.7
Jaluit	1,709	1,669	1,788	1,403	-21.5
Kili	602	774	548	416	-24.1
Kwajalein	9,311	10,902	11,408	9,895	-13.3
Lae	319	322	347	85	-75.5
Lib	115	147	155	119	-23.2
Likiep	482	527	401	234	-41.6
Majuro	19,664	23,676	27,797	23,182	-16.6
Maloelap	796	856	682	401	-41.2

[34] *Duke, M. R. (2014, May 22). Marshall Islanders: Migration Patterns and Health-Care Challenges. Retrieved from* https://www.migrationpolicy.org/article/marshall-islanders-migration-patterns-and-health-care-challenges

[35] *Economic Policy Planning and Statistics Office of the Republic of Marshall Islands, Population and Housing Census 2021 (PHC 2021), version 01 of the licensed datasets (March 2023), provided by the Pacific Data Hub - Microdata Library.* https://microdata.pacificdata.org/index.php/home

Mejit	445	416	348	230	-33.9
Mili	854	1,032	738	494	-33.1
Namdrik	814	772	508	300	-40.9
Namu	801	903	780	526	-32.6
Rongelap	-	19	79	-	
Ujae	448	440	364	310	-14.8
Utrik	409	433	435	264	-39.3
Wotho	90	145	97	89	-8.2
Wotje	646	866	859	802	-6.6

Human Development: The latest HDI report[36] for the Republic of the Marshall Islands (RMI) was for 2019, in which the RMI had an HDI value of 0.704[37]. This report puts the country in the high human development category, placing it at 117 out of 189 countries and territories. The HDI value measures the country's average achievement in human development. A higher HDI signifies that the country is showing steady progress in human development compared to previous years but still has room for improvement, especially compared to other countries with a very high human development index. Here's what the HDI value represents regarding the three HDI components for the RMI: As of the 2019 report, the RMI had a life expectancy of 73.0 years. In 2019, the expected years of schooling in the RMI was 12.7 years, and the mean years of education was 9.5 years. However, in 2019, the RMI's GNI per capita (based on purchasing power parity) was $3,995.

Education: The Ministry of Education (MoEd) oversees the education sector within the RMI and delivers education through the Public School System (PSS). Some private schools operate within the RMI. The Division of the Secondary and Vocational Education runs the MoEd technical and vocational training (TVET) programs. Non-formal TVET programs are available through the National Training Council (NTC) and via government funding for non-governmental and private sector training providers. The CMI and the University of the South Pacific provide post-secondary education. The RMI Scholarship program allows a small percentage of students to access colleges and universities outside the RMI. A degree program in teacher training is available on the island.

There is a plan for the school system to deliver education under four pathways: life skills (focused on self-sufficiency on islands), technical vocation, further education, and military. At present, funding is being sought to implement this. The 85 schools of the PSS enrolled 12,237 students in 2015-2016. As of July 2016, the PSS employed 852 teachers and supporting personnel. In addition, the PSS also has chartered and oversees 26 private schools that enroll 3,126 students. Additionally, preschool programs are being piloted under a multisectoral early childhood development project. This is intended to increase access to adequate and quality maternal and child health services, create opportunities for early stimulation and learning,

[36] *The HDI value is a measure of the country's average achievement in human development. A higher HDI signifies that the country is doing well in terms of longevity, education, and income indices.*

[37] *Pedro Conceição. (2020). Overview Human Development Report 2020, The next frontier Human development and the Anthropocene. UNDP. United States. Retrieved from* https://www.undp.org/sites/g/files/zskgke326/files/migration/tr/UNDP-TR-HDR-OVERVIEW-EN-2020.pdf

pilot a social protection system and support for families with young children. Further, it aims to address the limited affordability of nutritious diets, especially for children in vulnerable families (World Bank, 2019).

The country faces several challenges in providing quality education to all its children. The net enrollment rate in primary education in the RMI is high at approximately 94%. The adult literacy rate is also relatively high, at about 98%[38]. However, learning outcomes are a significant concern. Only around 23% of Year 6 students met the minimum proficiency level for reading, and approximately 24% met the minimum proficiency level for numeracy[39]. Despite high enrollment rates, regular school attendance can be challenging, particularly in the outer islands. This situation is due to various factors, including geographic isolation, limited resources, and socio-economic issues. Dropout rates, particularly at the secondary level, are a concern. Only around 33% of students who started grade 1 reached grade 12[40].

Another challenge is the quality and training of teachers. School infrastructure is also a concern, particularly in the outer islands. The government devotes a considerable proportion of its budget to education. However, limited resources and capacity constraints are substantial challenges in delivering quality education to all children. The RMI has made strides in improving education access for girls and children with special needs, but challenges remain.

The number of school-age children is expected to remain constant for the immediate future and potentially go up if the PSS successfully reduces the number of school dropouts and truancy.

Healthcare:

The Ministry of Health and Human Services (MOHHS) is the state health agency that provides health care services and strategy and policy for the people of the RMI. The following table provides an overview of the healthcare facilities (Table 3):

Table 3: Healthcare Services Data in the RMI

Type of health care facility	Urban Area	Rural/outer islands
Hospitals	2	0
Health centers (HC)	4	49 (2HC in outer islands vacant/no HA {2021})
Private clinics	1	
'177' Health centers	2	4
Total	**9**	**53**

[38] *Marshall Islands - World Bank Gender Data Portal. (2018). Retrieved from* https://genderdata.worldbank.org/countries/marshall-islands

[39] *Pacific Community Educational Quality and Assessment Programme. (2019). Pacific Islands Literacy & Numeracy Assessment 2018 Regional Report. Pacific Community.* https://research.acer.edu.au/ar_misc/31

[40] *ADB. (2015). 2015 ANNUAL REPORT, ASIAN DEVELOPMENT BANK, SCALING UP TO MEET NEW DEVELOPMENT CHALLENGES. Pacific Community. Retrieved from* https://www.adb.org/sites/default/files/institutional-document/182852/adb-annual-report-2015.pdf

The hospitals are equipped to provide mainly primary and secondary care and are limited in offering tertiary care. Patients needing additional care, such as dialysis, must go out of the country, and these referrals consume a large portion of the health sector budget. Health centers in the outer islands are managed through the Outer Islands Health Services Division of the Bureau of Primary Health Care Services. Their focus is on preventative, promotion, and essential clinical care services. Some clinics have continuous staffing issues. Medical and public health staff provide outreach to the health centers on the outer island and within the community. There is a schedule of 21 two-week clinics on each island per year, but this is difficult to achieve due to capacity, transport, and weather. There are two hospital laboratories on the RMI with limited capacity.

Image Supplied by Webmedia South Pacific

Priority diseases have been identified for testing in-country, but samples must be sent to one of two referral laboratories in Hawaii or further afield for all other specialist testing and other communicable diseases. There is limited mental health support available in the RMI. The Mental Health Care team at Majuro Hospital consists of only one psychiatrist servicing the country and no institutions for persons with mental disabilities. However, there is a limited holding unit at Majuro Hospital for those suffering an acute mental health crisis. In addition, the 177 Health Care Program Clinics provide healthcare services on the four atolls affected by nuclear testing, including the Department of Energy (DOE) clinic that provides medical services to nuclear patients under the DOE. One private clinic provides limited clinical services for the residents of Majuro.

Regarding training for health professionals, the Department of Nursing and Allied Health at the College of the Marshall Islands (CMI) provides a two-year Diploma in Nursing and a Certificate in Public Health. All other tertiary health training takes place remotely or off-island. The MOHHS developed an initial National Climate Change and Health Action Plan (NCCHP) in 2012 in collaboration with the World Health Organization (WHO). However, there was insufficient funding, capacity, and coordination to deliver this plan. In 2019, a climate change section was formed, and in 2022, the National Climate Change and Health Policy and Revised Action Plan (NCCHPv2) was passed (Government of Marshall Islands, 2022). It sets out three main goals: improved health protection against climate-related risks, enhanced community resilience and improved well-being, and an integrated approach to climate change and health adaptation. This feeds into the health pillar of the National Strategic Plan 2020-2031(EPPSO, 2020).

Overall, the RMI health sector has seen significant improvements over the years, but several challenges persist due to its geographical remoteness, scattered population, and limited resources. Access to healthcare services varies significantly. While the capital Majuro and Ebeye have hospitals providing a range of services, healthcare access in the outer islands is limited, often comprising of health centers and dispensaries with basic services[41]. There is a shortage of healthcare professionals in the RMI, with approximately 1.3 physicians per 1,000 people and 3.3 nurses and midwives per 1,000 people[42]. NCDs such as heart disease, diabetes, and cancer are significant health issues, accounting for an estimated 76% of all deaths in the RMI in 2016. Infant and under-5 mortality rates have decreased but remain relatively high compared to global averages. In 2019, the infant mortality rate was approximately 21 deaths per 1,000 live births, and the under-5 mortality rate was approximately 25 deaths per 1,000 live births[43]. The RMI has generally high immunization coverage rates; in 2019, about 90% of infants received the DTP3 vaccine, which protects against diphtheria, tetanus, and pertussis[44]. The country's total health expenditure was about 14.3% of GDP in 2017, indicating a substantial investment in health relative to the size of its economy[45].

Culture and Internal Affairs: Marshallese culture is deeply rooted in the land and the ocean, with a saying "jolet jen anij" that emphasizes

[41] *United Nations Children's Fund, Situation Analysis of Children in the Marshall Islands, UNICEF, Suva, 2017*
[42] *World Bank Open Data. (2023).*
[43] *ibid*
[44] *United Nations Children's Fund, Situation Analysis of Children in the Marshall Islands, UNICEF, Suva, 2017*
[45] *World Bank. 2019. "World Development Indicators." URL:* http://data.worldbank.org/data-catalog/world-development-indicators

the islands' significance as the most precious gift. Traditionally, Marshallese society had clear gender roles, but there is an ongoing need for improvement in women's involvement in political and economic activities[46,47].

The culture has withstood colonization and displacement[48], transitioning from German influence to Japanese and then United States governance, before gaining independence in 1986.

Image Supplied by Webmedia South Pacific

The RMI's cultural history has been marked by displacement from historic nuclear testing, especially affecting the Bikini, Rongelap, Enewetak and Utrok communities. Climate change adaptation efforts must consider this history of Marshallese people being forcibly relocated and permanently losing islands[49,50].

The richness of Marshallese culture encompasses matrilineal traditions, community values, and

[46] *Kattil-De Brum Tonie K.- 2018 "Women of the Marshall Islands and Environmental Change: Agency and Power in Resource Management" Thesis for MES - University of Waikato, NZ*

[47] *RMI-MoCIA - May 2018 "Gender Equality - Where do we stand?"*

[48] *Displacement: The movement within a State and/or across international borders of people who are forced or obliged to leave their homes or places of habitual residence due to sudden-onset natural hazards and/or slower, cumulative pressures occurring in the context of climate change.*

[49] *Embassy of the Republic of the Marshall Islands to the United States of America. (n.d.).*

[50] *Barker 2013: 61*

a close relationship with land and sea. The dominant Christian religion has influenced social norms and community life. Indigenous knowledge, including traditional practices in fishing, agriculture, ecosystem management, and decision-making, offers insights into resource management, food security, and participatory governance. Modern challenges exist in balancing cultural preservation with modernization, addressing social issues, and managing the impacts of globalization and climate change. Climate change's threat to Marshallese culture and identity is especially significant, as it directly endangers the low-lying atolls that comprise the nation and serve as a foundation for identity and social organization.

The Ministry of Culture and Internal Affairs (MoCIA) plays a pivotal role in preserving and promoting Marshallese culture. Its vision is to "preserve, protect, and provide for the cultural and social rights of the people of the Marshall Islands." The MoCIA comprises nine divisions and seven overarching programs, including electoral administration, local government, human rights, child rights, disability coordination, and more. The Community Development Division (CDD) aims to improve the quality of life through social and human rights programs, targeting the most vulnerable, such as women, children, youth, persons with disabilities, and senior citizens. It is also involved in ongoing work to draft, implement, monitor, and report on national policies serving marginalized persons' interests in the RMI.

The MoCIA's three-year Strategic Plan for 2021 to 2023 outlines several key focus areas. It emphasizes the importance of efficient and fair elections, reflecting the need for democratic decisions around climate change that consider local views. It calls for improving the operation of local government, considering that climate change impacts are highly localized. The plan also underlines the need for up-to-date registration for births, deaths, and marriages, recognizing this as crucial for planning in an uncertain future, especially with the growing challenges of climate change. Furthermore, the Strategic Plan includes measures to prevent child abuse and neglect, reflecting concerns about family dispersion across islands or overseas. It details comprehensive procedures for adopting children, acknowledging that adoption might remain significant due to various social factors like dislocation, migration, livelihood stresses, and teenage pregnancies. It emphasizes the preservation of the historic and cultural heritage of the RMI, stemming from the fear that displacement or destruction due to climate events could lead to a loss of identity and culture.

A holistic development approach is advocated to facilitate the Marshallese people's physical, spiritual, intellectual, and social productive development. This becomes even more crucial in the context of the climate crisis, encompassing areas like education, health, and livelihoods. The plan's commitment to increasing the role of women in national development emphasizes the need for women's voices in decisions, especially for successful adaptation to climate change. Lastly, the plan calls for increased efforts to inform, educate, and entertain the people of the RMI effectively, including better connectivity to atolls and effective public broadcasting to raise awareness and educate about climate matters.

Image Supplied by IOM

2.3 Technological and Infrastructure Contexts

Infrastructure in the RMI comprises the fundamental physical facilities and systems providing the services and facilities necessary for the economy and society to function (Table 4). It comprises roads, bridges, schools, hospitals, ports, airports, water supply, wastewater, solid waste, electrical grids, telecommunications, and "hard" climate change adaptation measures (such as seawalls). The infrastructure asset base of the RMI is generally managed under the oversight of the Ministry of Works, Infrastructure, and Utilities (MWIU). However, there are connections to other key agencies, including the Ministry of Health (responsible for health facilities), the Ministry of Education (responsible for school facilities), and the Ministry of Transport and Communications (MTICT) (responsible for regulatory oversight of air and sea transport, and telecommunications).

Several state-owned enterprises also have control over infrastructure assets and services, including Air Marshall Islands Inc.; Kwajalein Atoll Joint Utilities Resources Inc. (KAJUR); Majuro Atoll Waste Company; Majuro Water & Sewer Company; Marshalls Energy Company Inc (MEC); Marshall Islands Shipping Corporation (MISC); Marshall Islands National Telecommunications Authority (NTA); Office of Commerce, Investment, and Tourism; and the RMI Ports Authority.

The RMI National Infrastructure Investment Plan (NIIP 2017-2026) (RMI, 2017) has been developed as part of the strategic planning framework, which is founded on the Strategic Development Plan Framework and National Strategic Plan (NSP). The NIIP forms the priority infrastructure development goals for ten years between 2017 and 2026. The total investment proposed for the identified priority projects equals $732 million, including project management costs, institutional projects, and infrastructure maintenance for the strategic infrastructure areas. Accountability for

implementing the NIIP is the responsibility of the MWIU in coordination with the Chief Secretary Office and Project Management Unit. MWIU works closely with each relevant implementing ministry, agency, or state-owned enterprise and with the Ministry of Finance and Foreign Affairs, which acts as the interface with bilateral and multilateral development partners that support the financing of the NIIP-related projects.

Table 4: Access to Infrastructure Elements by Community (82 communities in total)

Infrastructure Element	Majuro Communities with Access to Element (out of 11)	Neighbouring Island Communities with Access to Element (out of 71)
Airport	10	25
Dock	3	7
Boat for community use	Unknown	51
Phone	11	19
Internet	11	6
Mobile Phone	11	11
Radio (VHF and HF)	11	71
Solar Power	11	64
Electricity	11	9

Coastal Protection: Coastal Protection is overseen by MWIU, focusing on developing and maintaining assets such as sea walls. The goal is to shield private and public assets from climate hazards like erosion, storm surges, king tides, and sea level rise, thereby reducing the risk of damage. One current example is the construction of a 450m long seawall near the new stadium on Majuro, with a budget of $1 million, to counter indirect impacts from the existing seawall.

The purpose of coastal protection is not only to preserve existing infrastructure but also to enhance the adaptability of national and local government agencies to climate change, boost disaster risk reduction, and encourage resilient investments. Specific benefits will be rendered to communities residing near vulnerable coastal areas and the RMI population and economy.

MWIU is in the process of implementing a new Building Code for RMI, which will establish minimum standards such as finished floor levels and wind loads. Mapping Majuro for these minimum requirements is underway based on specific risks in different areas.

With funding from international partners through PREP II, MWIU is engaged in the Ebeye Coastal Protection Engineering Design and Construction Supervision project. This initiative will establish a 2.1km coastal protection system on Ebeye's western coastline. A final design has been selected following extensive community consultation, with mobilization and construction work to commence as soon as practicable following the signing of a formal construction contract. This project forms part of a broader Climate Resilient Coastal Protection Project aimed at enhancing early warning systems and

minimizing climate change effects.

Additionally, MWIU is exploring locations for sea walls around Majuro as part of the RMI Urban Resilience Project, supported by the World Bank. Strategies such as "Hold the Line, Advance the Line, Managed Realignment, or No Active Intervention" are under consideration. A holistic approach is being emphasized to ensure that future investments align with long-term adaptation plans, potentially including relocation, thereby fostering cross-sectoral action.

Transportation: Transportation in the RMI plays an essential role in connecting the nation's 29-atoll territory. Given the dispersed geography, various means of transport, including sea, air, and land, are vital for economic development, international trade, tourism, and overall quality of life[51,52].

The ***maritime sector*** is a cornerstone of the RMI's transportation system. There are several seaports, with the largest in Majuro. Government-subsidized shipping services offer crucial inter-island transportation for people and goods. Local Government councils usually oversee the Outer Island seaports, but the lack of proper facilities can lead to damage or loss during goods transfer. An ambitious project funded by the World Bank aims to enhance safety and efficiency in maritime infrastructure, taking climate change into account[53,54]. A roadmap prepared by the MTCIT outlines strategies for sustainable domestic maritime transportation, including emission reduction and connectivity improvement. There are even innovative plans for traditional sailing canoes funded by the German Government to revive Marshallese navigation traditions.

Image Supplied by IOM

[51] *UN. 2022. Permanent Mission of the Republic of the Marshall Islands to the United Nations.* https://www.un.int/marshallislands/marshallislands/country-facts

[52] *CIA. 2023. Marshall Islands.* https://www.cia.gov/the-world-factbook/countries/marshall-islands/

[53] *ST. 2019. Marshall Islands: profiling a key shipping player.* https://www.ship-technology.com/analysis/marshall-islands-and-the-shipping-industry/

[54]

Air travel provides vital connections both domestically and internationally. The national airline, Air Marshall Islands, operates domestic flights, but international connections are limited to locations like Hawaii, Guam, and Fiji. The primary gateway for international flights is the Amata Kabua International Airport (AKIA) in Majuro, overseen by the RMI Ports Authority. Outer Island airports are generally unsealed, demanding additional maintenance. Three outdated planes service these areas, highlighting the need for further investment and infrastructure enhancement[55,56,57,58]. The importance of air services to the outer islands in terms of social and economic linkages cannot be underestimated[59].

Land transport is the primary mode of mobility within the islands for both people and goods. The MWIU is responsible for developing and maintaining roads, including storm drains and the sole bridge on Majuro. Roads are limited, and less than ten percent are paved, but land transport plays a crucial role in tourism and first-mile/last-mile connectivity for transport hubs roads[60]. On Ebeye, land transport falls under the Public Works division, while other outer atolls and islands' road maintenance is the responsibility of each respective Local Government. Vehicles are commonly used in Majuro, while bicycles and walking remain common elsewhere.

The challenges faced in the transportation sector are significant and multifaceted[61]. Services can be infrequent, and travel times are long due to large distances between islands. Additionally, maintenance problems have historically plagued air operations. Transportation infrastructure, including ports, airports, and roads, is susceptible to damage from climate-related impacts, such as tropical storms and high waves. There are also challenges in coordination and planning for long-term service levels.

However, transportation infrastructure and service improvements can positively impact the RMI's economy. The MWIU, MTCIT, RMI Ports Authority, and other governmental bodies are responsible for different aspects of transportation and work towards development and proper maintenance. A coordinated approach is necessary, as seen in the USD 33.12 million RMI Maritime Investment Project and the strategic plans for domestic maritime transportation.

Telecommunications: The primary provider of telecommunications services is the Marshall Islands National Telecommunications Authority (NTA), a state-owned entity[62]. It provides various services, including telephone, internet, and

55 *APC. 2019. REPUBLIC OF THE MARSHALL ISLANDS PORT AUTHORITY.* https://www.pacificports.org/republic-of-the-marshall-islands-port-authority/

56 *List of airports in the Marshall Islands. (2022, March 27). In Wikipedia.* https://en.wikipedia.org/wiki/List_of_airports_in_the_Marshall_Islands

57 *Luan. 2022. THE AIRPORTS IN MARSHALL ISLANDS: A COMPREHENSIVE GUIDE.* https://traveltastic.blog/the-airports-in-marshall-islands/

58 *FlightConnections. 2021. Airports in Marshall Islands.* https://www.flightconnections.com/airports-in-marshall-islands-mh

59 *AMA. 2023. Welcome to AIR Marshall Islands.* https://www.airmarshallislands.net/

60 *CIA. 2022. Field Listing; Roadways.* https://www.cia.gov/the-world-factbook/field/roadways/

61 *World Bank. 2021. Marshall Islands: New Climate Study Visualizes Confronting Risk of Projected Sea Level Rise.* https://www.worldbank.org/en/news/press-release/2021/10/29/marshall-islands-new-climate-study-visualizes-confronting-risk-of-projected-sea-level-rise

62 *World Bank. 2021. Digital Republic of the Marshall Islands Project (P171517).* https://documents1.worldbank.org/curated/en/869991611289543219/pdf/Project-Information-Document-Digital-Republic-of-the-Marshall-Islands-Project-P171517.pdf#:~:text=The%20majority%20government-owned%20Marshall%20Islands%20National%20Telecommunications%20Authority,and%20international%20telecommunications%20services%20in%20the%20Marshall%20Islands.

cable TV. Mobile phone coverage in the RMI has improved significantly in recent years, although coverage may still be limited or nonexistent on some of the more remote atolls. The International Telecommunication Union (ITU) reported a mobile-cellular telephone subscription rate of 18.5 per 100 inhabitants in 2019. Internet connectivity is also challenging due to the RMI's geographical isolation and dispersed population. According to the ITU, between 2018 and 2022, the annual average percentage of individuals using the internet in the RMI was approximately 38%[63,64,65]. This indicates a significant digital divide, with many people unable to access the internet due to lack of coverage, affordability, or digital literacy. In recent years, the RMI has made strides in improving internet connectivity. In 2020, the country was connected to the wider world through its first submarine fiber optic cable, which links Majuro with Kwajalein Atoll and the global internet.

The Ministry of Transportation, Communications and Information Technology (MTCIT) oversees telecommunications services, carrying out the National Information Communication Technology Policy. This policy emphasizes open and competitive markets, modern regulation, non-discrimination, universal service for remote areas, and optimal resource usage. Marshall Islands National Telecommunications Authority (NTA), a state-owned entity, is the sole provider of telecommunications services in the RMI. NTA's mission is to offer efficient connectivity to all Marshallese people. Established in 1987 and privatized in 1991, NTA delivers 4G services in central islands and has plans for 5G by 2024. It provides internet through DSL and fiber optics to major areas and has installed solar-powered Demand Assigned Multiple Access (DAMA) systems in 70 schools. These systems, though affected by environmental factors, are maintained regularly.

Connections to Starlink are being made across the RMI for more stable connections, especially in outer atolls. The main data backbone comes from the HANTRU-1 submarine cable from Guam, installed in 2009, providing a 6 Gbps link. An onward cable connects Majuro to Ebeye with 2 Gbps capacity, but no current backup systems exist. NTA's MHTV+ platform offers 4K HDR IPTV services with 45 channels and On-Demand access. They have also implemented an Emergency Cellular Broadcast system, reaching up to 20 thousand people, and operate an HF radio base for emergencies. The communication services and infrastructure are considered dated, with NTA exploring new solutions for emergency preparedness. One major project by MTCIT involves creating a Digital Platform for data collection, including migration data and climate change studies. This will aid in planning and support for various RMI projects. Additionally, international partners are supporting the Pacific Regional Connectivity Program aims to bring high-speed internet to the region through submarine fiber-optic cables, with construction expected to be completed by 2023. This connection will likely increase bandwidth and reduce latency, enhancing internet access for the country's residents.

Energy and Power Generation Sector: RMI's energy strategy is encompassed in National Energy Policy and Action Plan (2016), and the

63 *Tradingeconomics. 2023. Marshall Islands - Individuals Using The Internet (% Of Population).* https://tradingeconomics.com/marshall-islands/individuals-using-the-internet-percent-of-population-wb-data.html

64 *Indexmundi. 2021. Marshall Islands Internet users.* https://www.indexmundi.com/marshall_islands/internet_users.html#:~:text=Internet%20users%3A%20total%3A%2029%2C290%20percent,of%20population%3A%2038.7%25%20%28July%202018%20est.%29

65 *Kemp, S. 2022. DIGITAL 2022: THE MARSHALL ISLANDS* https://datareportal.com/reports/digital-2022-marshall-islands

Electricity Roadmap. The aim of the RMI National Energy Policy to implement renewable energy and energy efficiency measures to achieve 20% renewable energy by 2020 has not been fully met though progress has indeed been made. Although over 95% of RMI's energy still relies on diesel, the policy also strives to reduce vulnerability to climate change by shifting from oil to renewable energy sources. The policy proposes investments in technology, infrastructure, human resource development, policy, and financing to decrease dependence on diesel through significantly increasing renewable energy. The Electricity Roadmap covers four types of systems: grids for Majuro and Ebeye, mini-grids, hybrid solar-PV systems, and individual solar home systems or standalone power systems.The government has set a target to reach 100% renewable electricity by 2050.

Image Supplied by Webmedia South Pacific

The National Energy Office (NEO) guides policy development and implementation activities in the sector. The Marshall Energy Company (MEC), a state-owned enterprise, is the sole electric power provider responsible for electric power in Majuro and two outer-island regional centers, Jaluit and Wotje. MEC also manages the retail diesel supply in RMI for generating and transmitting electricity in certain atolls. KAJUR is the sole provider for generating and transmitting electricity in Ebeye, with both MEC and KAJUR under a Combined Utility Board of Directors.

The National Energy Policy's goal for the outer islands is to ensure all development through renewable energy sources. NEO and MEC's partnership has led to more than 3,100 solar home systems installed throughout the RMI, offering a total PV capacity of over 580kW. Additionally, they've partnered with PSS to install solar PV systems in six primary schools in the outer island atolls.

The RMI's energy sector is in a transition phase, with robust plans and policies to reduce dependence on diesel and enhance renewable energy sources. The collaboration between governmental offices, state-owned enterprises, and international support underscores a concerted effort to achieve sustainable energy goals, align with global agreements, and mitigate vulnerabilities related to climate change.

The RMI has historically been heavily dependent on imported fossil fuels for electricity generation; this has significant economic implications, with fuel imports accounting for up to 25% of total import expenditure. Over 90% of the population has access to electricity[66,67,68,69] largely because most of the population resides in high-access urban areas like Majuro and Ebeye, compared to outer islands. The RMI has significant potential for solar and wind energy generation and has made strides toward harnessing these resources. The current installed solar PV capacity stands at 3.5 MW. The country has implemented measures to improve efficiency, such as upgrading power plants and distribution systems and promoting energy-efficient appliances[70].

The RMI's **Nationally Determined Contribution (NDC)** sets ambitious goals for reducing greenhouse gas (GHG) emissions. The commitment is to reduce economy-wide GHG emissions by 32% below 2010 levels by 2025, with additional targets of 45% by 2030, and achieving net zero emissions by 2050. In 2010, national emissions were estimated at around 116kt CO2-e; in 2016, it was approximately 121 kt CO2-e (excluding fishing). The electricity sector accounted for 47% of national emissions in 2016. Consequently, to achieve the stated overall national emission reductions, diesel usage in this sector will need to be at least 65% below 2010 levels by 2030, assuming all others sectors meet their reduction targets.

The challenge is that the demand for electricity services is expected to rise concurrently. The government must also ensure that electricity remains affordable for all consumers in an equitable way. While renewable energy can reduce fuel costs, we must also consider the increased equipment maintenance and replacement expenses.

Efforts to minimize losses in electricity supply, promote energy efficiency, and encourage behavior change can reduce the need for extensive investment in generation equipment, leading to overall cost savings. Transitioning to renewables will reduce emissions and decrease our reliance on imported fossil fuels, thus reducing our vulnerability to oil price shocks. This shift towards utilizing local solar and wind resources enhances our energy security and resilience in the face of global oil price fluctuations. Moreover, ensuring that our infrastructure remains resilient to the growing risks posed by climate change is crucial. This includes improving the reliability of grids on Majuro and Ebeye and enhancing system serviceability on the outer islands.

66 *Macrotrends. 2023. Marshall Islands Electricity Access 1999-2023.* https://www.macrotrends.net/countries/MHL/marshall-islands/electricity-access-statistics

67 *$OE. 2020. Marshall Islands Energy Snapshot.* https://www.energy.gov/eere/articles/marshall-islands-island-energy-snapshot-2020

68 *IRENA. 2022. Energy Profile: Marshall Islands.* https://www.irena.org/-/media/Files/IRENA/Agency/Statistics/Statistical_Profiles/Oceania/Marshall%20Islands_Oceania_RE_SP.pdf

69 *Ritchie, H. and Roser, M. 2022. Marshall Islands: Energy Country Profile.* https://ourworldindata.org/energy/country/marshall-islands

70 *World Bank. 2021. Republic of the Marshall Islands.* https://thedocs.worldbank.org/en/doc/3f5eff0253b00386e9ef80d0e95b4d5e-0070012021/original/RMI-Country-Insert-A4-DIGITAL.pdf

Table 5: Targets for the RMI electricity sector, derived from RMI's Nationally Determined Contribution (NDC) targets under the UNFCCC Paris Agreement

		NDC TARGET % REDUCTION GHG ECONOMY WIDE	NATIONAL EMISSIONS (KT CO_2-E/ YEAR) (EXCL FISHING)[5]	TARGET % REDUCTION GHG ELECTRICITY	ELECTRICITY (KT CO_2-E/ YEAR)	DIESEL USE MILLION USG/YEAR
2010 (baseline)	Actual	0	116	0	60	5.84
2016		–	122	–	57	5.6
2025	Target	32%	79	50%	30	2.9
2030		45%	64	65%	21	2.0
2050		100%	0	100%	0	0

Table 1: Targets for the RMI electricity sector, derived from RMI's Nationally Determined Contribution (NDC) targets under the UNFCCC Paris Agreement

2.4 Environment and Infrastructure

The Ministry of Environment (MoE) was established in 2018. Its role is to enhance or strengthen collaboration and coordination in the protection of the environment, conservation, restoration, and sustainable use of natural and genetic resources. This includes the safeguarding of related cultural resources, and the utilization of sustainable and renewable energy. Further, it is mandated to address mitigation and adaptation to climate change impacts and natural hazards, including through increased communication within government and stakeholders and enhanced implementation of existing Acts. The Environmental Protection Agency (EPA), one of three divisions of MoE, was established in 1984 with the mandate to preserve and improve the quality of the environment. EPA now sits under the MoE and is a statutory authority consisting of an independent Board with broad policy functions and mandates related to environmental management as set out in the National Environmental Protection Act of 1984 and the Coast Conservation Act of 1998. Under the EPA's purview are reviewing the impacts of water quality, land and coastal management, conservation, waste and pollution, environmental information management, education, and awareness of societal activities.

Water, Sanitation, and Waste: Like many atoll nations, the RMI faces significant challenges regarding freshwater resources and water security. Its unique geographic characteristics, small size, remote location, low-lying atolls, and human impacts such as population growth and climate change drive these challenges. Freshwater resources in the RMI are limited and primarily depend on rainfall, which replenishes thin freshwater lenses - layers of fresh groundwater that float atop denser seawater in the porous coral atoll. These lenses are highly vulnerable to over-extraction and pollution. Most of the population relies on rainwater harvesting

as a significant source of drinking water. Most households have rooftop catchment systems linked to storage tanks. However, the capacity and quality of these systems can vary widely, and during periods of drought, they may not provide adequate supply. The public water supply in Majuro and Ebeye is sourced from freshwater lenses and rainwater catchment, but the supply is intermittent, often limited to a few hours a week[71]. This water is also subject to quality issues.

Freshwater resources are vulnerable to contamination from human activities, including inadequate sanitation systems and waste disposal. The high population density in Majuro and Ebeye may exacerbate these issues. Climate change poses significant threats to water security in the RMI. Rising sea levels can increase the salinization of freshwater lenses, while changes in rainfall patterns, including drought and intense rainfall events, can impact rainwater supplies and water quality. With support from international partners, the RMI Government has been implementing various measures to improve water security. These include infrastructure improvements, such as upgrading water supply and distribution systems, increasing storage capacity, and improving sanitation facilities. There are also efforts to enhance water management practices, including water conservation and demand management, and to build resilience to climate change impacts.

Over 50% of the population had access to basic sanitation facilities in 2017[72][73][74][75], but water scarcity remains an issue. The water supply in the RMI varies across different islands and is managed by various agencies. Majuro Water and Sewer Company (MWSC) provides water to Majuro Island, sourced from airport catchment, roof runoff, and groundwater. However, the system is constrained by a failure rate of 40%. Ebeye Island relies on a desalination plant, while the outer islands depend on rainwater or shallow wells. The 'Addressing Climate Vulnerability in the Water Sector' (ACWA) Project, launched in 2021, aims to enhance rainwater harvesting and storage across the RMI. Drought response includes 54 seawater reverse osmosis plants, a vital initiative in a region where water scarcity can be acute, particularly during drought conditions.

Wastewater management in Majuro includes a saltwater reticulated system run by MWSC, with only a third of urban households connected. In Ebeye, a system utilizing saltwater has been plagued by low pressure and sewage line infiltration. Many outer atolls lack adequate facilities, relying on ill-maintained pits and septic tanks. Projects and trials, such as composting toilets, are underway to conserve water and prevent sewage leakage.

Solid Waste Management is a multifaceted challenge in the RMI. Solid waste comprises household and commercial waste, including food waste, packaging, and hazardous materials such as used oil and batteries. In Majuro, waste is disposed in open dumps like the Batkan dump, with minimal treatment or segregation.

71 *The Republic of the Marshall Islands: state of the environment report 2016. Apia, Samoa : SPREP, 2016*

72 *PRIF. 2021. Sanitation Options for Pacific Island Countries: Vanuatu and Republic of Marshall Islands.* https://www.theprif.org/sites/default/files/documents/PRIF_SanitationReport_V7.pdf

73 *FAO. 2020. REPUBLIC OF THE MARSHALL ISLANDS FOOD SECURITY PROFILE.* https://www.fao.org/3/cb3975en/cb3975en.pdf

74 *Indexmundi. 2021. Marshall Islands - Access to basic sanitation services.* https://www.indexmundi.com/facts/marshall-islands/access-to-basic-sanitation-services

75 *UNICEF. 2021. In the Pacific, thousands of people will still lack access to safe water, sanitation and hygiene in 2030 unless progress increases – warn WHO, UNICEF.* https://www.unicef.org/pacificislands/press-releases/pacific-thousands-people-will-still-lack-access-safe-water-sanitation-and-hygiene

Outer atolls often dispose of waste through burning or burying[76]. Recycling initiatives have been increasing, especially for materials like aluminum cans and plastic bottles. The Majuro Atoll Waste Company (MAWC) oversees solid waste management in Majuro, collecting household waste and green waste, but faces challenges such as limited landfill capacity and structural deficiencies in incineration facilities. A composting facility in Laura and recycling efforts, including container disposal legislation since 2018, contribute to waste management improvements. In Ebeye, the Kwajalein Atoll Local Government (KALG) manages waste collection and disposal, but is facing environmental and leachate problems.

Image Supplied by the Marshall Islands Journal

2.5 Natural Resource Context

2.5.1 Fisheries

RMI fisheries is critical to the country's ecology, economy, and livelihoods. The extensive coral reefs and vast oceanic territory support diverse marine species. Tuna is particularly abundant in the region, including skipjack, yellowfin, bigeye, and albacore, making the waters of the RMI one of the richest tuna grounds in the world[77]. Additionally, the reef ecosystems provide habitats for other species valuable to local subsistence fisheries, such as grouper, snapper, and reef-associated sharks. Commercial fishing, particularly for tuna, is a significant part of the RMI's economy (Table 6). The RMI's Exclusive Economic Zone is part of the Parties to the Nauru Agreement (PNA), which controls the world's largest sustainable tuna purse seine fishery[78]. Under the PNA's Vessel Day Scheme, the RMI sells fishing days to foreign fishing vessels, providing significant revenue. Fishing is not just

[76] *The Republic of the Marshall Islands: state of the environment report 2016. Apia, Samoa : SPREP, 2016*

[77] *Marshall Islands Marine Resources Authority, Annual Report 2021. (2021). Retrieved from* https://www.rmimimra.com/media/attachments/2022/12/19/fy2021-mimra-annual-report.pdf

[78] *Marshall Islands Marine Resources Authority, Annual Report 2021. (2021). Retrieved from* https://www.rmimimra.com/media/attachments/2022/12/19/fy2021-mimra-annual-report.pdf

an economic activity in the RMI but also crucial for local livelihoods and food security.

Many Marshall Islanders engage in subsistence fishing to supplement their diets and income. This is particularly important in outer atoll communities, where employment opportunities are limited, and imported food can be expensive and of lower nutritional value. Fishing is also a key part of the local culture and traditional knowledge, with techniques passed down through generations. Challenges include overfishing, particularly by distant-water fishing nations, climate change impacts on fish stocks and coral reefs, and access to better data to manage fisheries sustainably. On the other hand, the RMI has significant opportunities to increase the benefits gained from its fisheries, such as through value-adding catch processing, increasing local participation in the commercial fishing industry, and sustainable aquaculture.

The RMI has an EEZ of about 2,131,000 km2 with a land area of about 181 km2, making it the fourth largest EEZ amongst the other Pacific Island countries (excluding the Territories) and the 19th largest EEZ in the world. About half of RMI's EEZ borders international waters to the north, and the other half borders three other Pacific Island nations (Federated States of Micronesia, Nauru, and the Republic of Kiribati) to the south.

The Marshall Islands Marine Resources Authority (MIMRA) is the agency responsible for managing the fisheries resources for the RMI. MIMRA operates per the Marshall Islands Marine Resources Act 1997. As set out in section 119 of the Act, the mandate of MIMRA covers both the inshore coastal and offshore fishery resources in the 200 nautical mile EEZ and any RMI-flagged vessels fishing outside the RMI EEZ. MIMRA's mission is to facilitate the sustainable and responsible use of marine resources in the RMI.

One of the key connections in the RMI that MIMRA relies upon in the fisheries sector is the RMI Ports authority responsible for developing, maintaining, and operating all seaports. The RMI has two wharves in Majuro, Uliga Dock (domestic) and Delap Dock (international), and one in Ebeye.

Table 6: Fishing revenue for 2019-2021.

Source of Revenue	2021 Revenue (USD$)	2020 Revenue (USD$)	2019 Revenue (USD$)
VDS	$26,027,040	$28,112,074	$28,143,896
Fishing Rights	$3,629,878	$3,579,787	$2,314,357
Licensing and registration of fishing vessels	$2,164,040	$2,300,800	$2,573,000
Transshipment fees	$347,000	$319,000	$538,000
Fishing violation fines and fees	$600,000	$100,000	$200,000
Observer fees	$610,450	$660,594	$766,760
Others	$39,113	$127,584	$73,253
Total Revenue	**$33,417,481**	**$35,199,839**	**$34,609,266**

Oceanic fisheries: The contributions of tuna to the economy are so substantial that RMI is termed 'tuna-dependent' (Bell et al., 2021). Significantly, 95% of all tuna caught from the jurisdictions of the 22 Pacific Island countries and territories comes from the combined EEZs of these 10 SIDS, and access fees paid by industrial fishing fleets provide an average of 37% (range = 4-84%) of their government revenue (excluding grants). For the RMI in 2021, access fees to commercial fisheries via the VDS were approximately US$31 million, representing 47.8% of government revenues. The main commercial fishing method in the RMI is purse seine, with skipjack tuna being the prominent species, comprising 93% of the total, followed by yellowfin tuna (6%) and bigeye tuna (1%)3. Longline and pole-and-line fishing also occur within the waters of tuna-dependent Pacific SIDs, but, in general, and particularly in the RMI, they make minor contributions to the economy compared with purse-seine fishing. In addition to the revenue generated by the fishery vessels operating in the RMI EEZ, the RMI has developed significant shore-based facilities[79].

The Majuro port is the only designated port for transshipment in the RMI, and it is a major regional hub for purse seine transshipment. Majuro is the second busiest port in the world after Busan in South Korea based on the number of foreign vessel visits (1168) and the first in the world in terms of foreign fishing vessel hold size (943,000 m3)[80].

Coastal fisheries: The coastal fishery resources and activities are deeply rooted in Marshallese culture and provide employment and nutrition. The per capita seafood consumption in the RMI is estimated to be between 38.9 and 59.0 kg per person per year (Gillett, 2016). Coastal waters are defined by the Zones Declaration Act 2016 and extend out to 12 nautical miles around all atolls and islands (defined in the Act as "the Territorial Sea") and out to 50 nautical miles around Majuro, Arno, and Kwajalein atolls (Special Management Areas). Inshore fisheries areas are protected for artisanal and game-fishing and are defined as the sea and seabed to a distance of 5 miles from the atoll baseline.

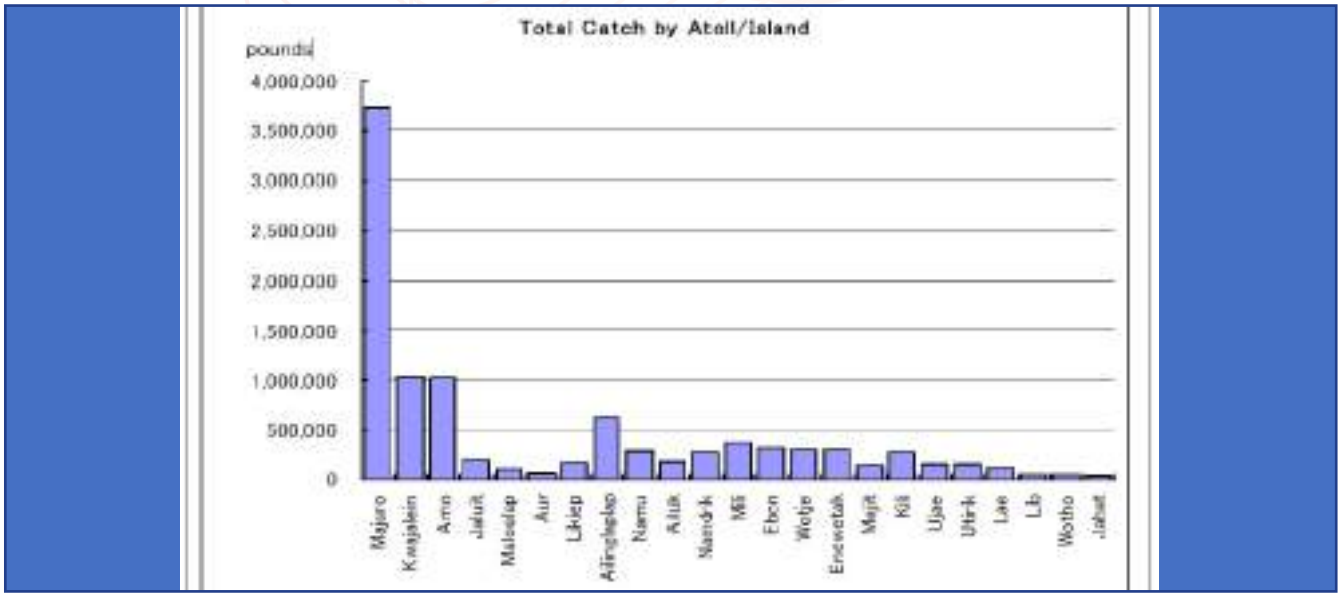


Figure 5: Volume of fish catches on the Island

[79] *Examples include the Marshall Islands Fishing Venture longline Fish Base that processes fresh chilled tuna and the Pan Pacific Foods loining plant processing skipjack from the purse seine fishery.*

[80] *Hosch et al, 2019*

Much of the catch (Figure 5) is sold through the Outer Islands Fish Market Centre in Majuro, the Kwajalein Atoll Fish Market in Ebeye, and Fish Bases located at Aur, Maloelap, Arno, Jaluit, Wotje, Likiep, Namu and Ailinglaplap. The Fish Bases supply locally caught fish to the Fish Markets in the two urban centers of Majuro and Ebeye. *Ciguatera* is an issue, and research continues on causes of *ciguatera* fish poisoning on outer islands to safeguard the supplies at the Fish Markets and Fish Bases.

There are four companies engaged in the export of crustaea (*Paguristes, Calcinus elegans, Pusiostoma mendicaria, Ophiocoma scolopendrina*); giant clams (*Tridacna derasa, Tridacna maxima, Tridacna squamosa, Hippopus hippopus*); live corals; and aquarium fish (*Pomacanthidae, Serranidae, Labridae, Microdesmidae*). The commercial viability of farming and marketing black pearls, giant clams, soft and hard corals, and small volumes of ornamental fish has been demonstrated. Public sector support via technical assistance for mariculture development has been significant over the years, and several initiatives have been implemented with the support of government, bilateral, and international agencies. MIMRA operates giant clam hatcheries on Arno and Likiep and a hatchery at Woja on Majuro. The Woja hatchery provided black-lipped oyster spat to local farmers but is being renovated to produce giant clams.

2.5.2 Agriculture

Agriculture was traditionally a key component in the RMI economy, emphasizing permanent crops and plantations. However, by the 2011 national census, there has been a steady decline and loss of engagement in agriculture, with only 52% of households raising crops. Among these households, 42.2% were growing crops for subsistence, 10.2% for both income and subsistence, and just 0.2% for income alone. Although that census considered 64% of the total land area of the RMI to be arable, only 11% of the RMI was used for crop production then. The Ministry of Natural Resources and Commerce (MNRC) is responsible for Agriculture, Forestry, Quarantine, and Trade and Investment.

Currently, agricultural production (excluding fisheries) represents a relatively small proportion of the RMI economy (around 4% of GDP) but is a critical source of livelihood, especially on the outer islands. The principal commercial crops are coconuts and breadfruit. Copra, the dried-out meat of coconuts, currently accounts for only about 1% of GDP. Copra processing is done primarily through the Tobolar Copra Processing Authority (Tobolar), a State-Owned Enterprise. Tobolar guarantees the purchase of all coconuts harvested in the RMI and is responsible for collecting, transporting, and processing the raw material, paying farmers for their produce, and selling the final products. The Government provides a significant subsidy to Tobolar.

Consequently, the value chain of copra and coconut plantations rehabilitation and replanting continues to be championed as key pathways to promote economic development and income generation. The NSP 2020 also identifies that while there is some underutilized land in the RMI, which offers potential for increased output of agricultural food crops, this is limited, and soil conditions are generally poor. The agricultural sector is a key focus area for the MNRC to improve the resilience of the Marshallese, which is identified as one of the five strategic areas supporting the economic development pillar of the NSP 2020. Relevant legislation and policy include a food security policy, a trade policy, an export strategy, the Marshall Islands Organic Farmers Association (MIOFA) Strategy, a Forest Action Plan, and an Agriculture Sector Plan.

These plans generally address food production, security, and ecosystem services for the nation. Several programs are being implemented by MNRC that are underway to respond to and adapt to climate change. This includes moving from introduced agricultural practices associated with planting root crops like kumara and taro to traditional practices, such as replanting coconut trees, breadfruit trees, and pandanus trees, as the root crops are labor-intensive and more susceptible to droughts, poor soil, and sea level rise. One of the MNRC's physical assets is the newly remodeled nursery in Delap District on Majuro Atoll. The purpose of the nursery is to promote food security and plant conservation through seedling production and distribution in Majuro, and the provision of agricultural equipment and services[81]. MNRC has also been working on a program to establish five nurseries on the outer atolls, with one currently established on Ebeye doing well, alongside one in Arno due to proximity to Majuro, so the products can easily be transported and sold.

Artwork by Hazel Peter titled "Cheers"

The agriculture division also works closely with stakeholders and supports capacity building in developing and promoting sustainable, improved small livestock management practices. Forests are also important to the RMI, with 70% of the RMI covered in forestry (Forest Inventory and Analysis – FIA 2008 and 2018). The RMI's natural tropical forest ecosystems

[81] *From April to December 2020, the nursery distributed 4,980 seedlings and supports work by MNRC to encourage households to establish home gardens. However, interest in this program has dwindled in recent years.*

are traditionally used in wood production, food production through agroforestry, trees in home gardens, and non-timber forest products (notably pandanus fiber). However, these areas are generally under-examined with data and information gaps regarding biodiversity, importance, socio-ecological functions, uses, traditional management, and geographical information. Available information was developed only in established plots, which may not fully capture the state of forests and forestry management in the RMI. These forests play essential roles in food security and climate change mitigation, providing coastal stabilization, windbreaks, and habitats for many species.

The activities of the quarantine division are critical to the ongoing health of the RMI's natural biodiversity and agricultural activities, as well as current and future export and trade activities. The division conducts quarantine inspections and law enforcement on all incoming aircraft and vessels to the RMI. In addition, with the Division of Agroforestry, the division performs surveys and monitoring of pests. The quarantine division's core objectives are to prevent the introduction and further spread of injurious pests and diseases into and within the RMI and to safeguard agriculture, livestock, and the RMI's natural biodiversity.

2.6 Legal and Policy Context

The main substantive legislation relevant to national planning for climate change adaptation are: The RMI Maritime Zones Declaration Act 2016 I, The Protected Areas Network (PAN) Act (2015), The Coast Conservation Act 2008, The Marshall Islands Marine Resources Act 1997; The Historic Preservation Act 1991; The Planning and Zoning Act (1987); The National Environmental Protection Act (NEPA) 1984 and its Environmental Impact Assessment (EIA) Regulation (Section 21); The Land Acquisition Act 1968.

Historically, several national-level policies, plans, and strategies have mentioned climate change as a primary driver of development decisions for the RMI. In practice, however, implementation gaps, lack of necessary resources, and faulty designs of progress indicators for accountability have slowed progress in climate resilience building.

The National Strategic Plan (NSP) 2020-2030, based on the Vision 2018 format, provides a comprehensive framework for development but lacks specific actions and measures. Its effectiveness relies on a monitoring and evaluation framework. The Nationally Determined Contribution (NDC) of 2018 outlined ambitious emissions reduction targets, and the RMI became the first country to submit an updated NDC. These targets align with the National Energy Plan and National Climate Change Policy goals. The RMI Strategic Development Plan Framework 2003-2018 (Vision 2018) set forth key drivers for development, including socioeconomic self-reliance, environmental sustainability in the face of climate change, and supporting neighboring islands' livelihood and well-being. These drivers align to advocate, raise awareness, and educate on climate change and resilience building in the National Strategic Plan 2020-2030. However, no specific policy is dedicated to increasing climate awareness and knowledge.

Several policies have included consideration of climate change adaptation. The Tile Til Eo 2050 Climate Strategy aims to achieve net-zero greenhouse gas emissions and 100% renewable energy goals by 2050 while accelerating adaptation and resilience measures. The National Oceans Policy and Implementation Plan provides a roadmap for marine resource management, and the Water and Sanitation Policy and Proposed Action Plan serve as a framework for climate-resilient water sector development. The 2011 National Climate Change

Policy Framework emphasizes the need for education, awareness, and community mobilization to prepare for climate change's negative effects. However, implementation has been limited, and the National Adaptation Plan (NAP) is expected to drive the implementation of this policy. While there is no specific policy on information management and services, the National Disaster Management Office has developed the Bok Am Melele (BAM) information management strategy, which is yet to be implemented. Efforts to improve information management for resilience and support the implementation of BAM are underway.

In 2018, the RMI became the first country to submit an updated (second) NDC formally. The NDC aims to achieve an economy-wide GHG emissions reduction of at least 32% below 2010 levels by 2025 and at least 45% below 2010 levels by 2030, as well as an indicative target to reduce its emissions by at least 58% below 2010 levels by 2035 with the aspiration to achieve net zero emissions by 2050. The RMI's emissions peaked in 2009 and have been decreasing since, in alignment with its National Energy Plan and National Climate Change Policy goals. In 2010 (baseline year for the RMI), total emissions were approximately 185 Gg CO^2–e, just 0.00001% of global GHG emissions[82].

Disaster Risk Reduction and Risk Management: Due to their geographical location and features, RMI's atolls are highly vulnerable to various natural hazards, including typhoons, droughts, and sea-level rise due to climate change[74]. These hazards threaten the country's critical infrastructure and sustainable development[74]. The RMI has developed policies and frameworks for disaster risk reduction (DRR) and disaster risk management (DRM) in response to these challenges. The *Joint National Action Plan for Climate Change Adaptation and Disaster Risk Management (JNAP)* was developed in 2014 and outlines a unified approach to addressing climate change adaptation and disaster risk management[83,84]. The JNAP was never implemented although its goals were taken into the NAP development. The *National Strategic Plan* acknowledges climate change and disaster risk as significant challenges and emphasizes the need for sustainable and resilient development[85,86]. It also highlights the need for strong partnerships and cooperation at the local, national, regional, and international levels to address these challenges.

The National Disaster Management Office (NDMO) coordinates disaster response and recovery efforts in the RMI[87,88]. With a new DRM law 2023, the Office will work closely with other government departments and local and international partners to manage and reduce disaster risks and promote resilient development. Lastly, the RMI is a signatory to the Framework for Resilient Development in the Pacific[89] and the Sendai Framework for Disaster Risk Reduction[90],

82 *World Bank (2020a)*

83 *RMI. 2014. Republic of the Marshall Islands Joint National Action Plan for Climate Change Adaptation & Disaster Risk Management 2014 - 2018.* https://faolex.fao.org/docs/pdf/mas170016.pdf

84 *UNEP. 2014. Joint National Action Plan for Climate Change Adaptation and Disaster Risk Management 2014–2018.* https://leap.unep.org/countries/mh/national-legislation/joint-national-action-plan-climate-change-adaptation-and-disaster

85 *PRIF. 2020. Marshall Islands National Strategic Plan 2020 to 2030.* https://www.theprif.org/media/106

86 *RMI. 2021. RMI National Strategic Plan.* https://rmi-data.sprep.org/dataset/rmi-national-strategic-plan

87 *DEVEX. 2020. . National Disaster Management Office (NDMO - Marshall Islands).* https://www.devex.com/organizations/national-disaster-management-office-ndmo-marshall-islands-150648#:~:text=The%20NDMO%20is%20responsible%20for%20disaster%20risk%20management,and%20objectives%20of%20National%20DRM%20strategy%20are%20achieved

88 *RMIEDP. 2021. NDMO Strategic Plan.* https://rmi-data.sprep.org/dataset/ndmo-strategic-plan

89 *PIF. 2020. The Framework for Resilient Development in the Pacific.* https://www.forumsec.org/frdp/

90 *UNDRR. 2015. What is the Sendai Framework for Disaster Risk Reduction?* https://www.undrr.org/implementing-sendai-

which provide guidelines and support for national efforts.**mage Supplied by Webmedia South Pacific**

2.7 Institutional Governance Of Climate Change

The *Tile Til Eo* Committee (TTEC) provides national oversight of the RMI response to climate change and the reduction of climate and disaster risk for the well-being of its people[91]. It directs agencies and recommends to the Cabinet through the Chief Secretary on climate change policy, resilience to climate and disaster risk, and reporting against global climate change and disaster reduction conventions.

Image Supplied by IOM

The scope of its oversight is through accountable agencies and includes: (i) Mitigation of emissions and related energy, transportation and waste planning and implementation - including the monitoring of national policies and NDC targets; (ii)Adaptation to climate change and disaster risk planning and implementation - including the National Adaptation Plan with a focus on the well-being of the Marshallese people in the face of climate change and disasters (iii) Receiving Assessments and Special Reports from IPCC and analyzing and responding to their impact on RMI; (iv) Addressing processes and reporting requirements under the UNFCCC and Paris Agreement including National Communications, Biennial Update Reports, Technology Needs Assessments and Nationally Determined Contributions and others; (v) Addressing other global and regional climate and disaster risk platforms for their application to RMI and the regional Framework for Resilient Development in the Pacific; (vi) Promoting the application

framework/what-sendai-framework

[91] *C.M. 124 (2019). Reformation of the Tile Til Eo Committee*

of resilience measures and the reduction of climate and disaster risk in sector practices and development planning through the NSP and sector plans, strategies and policies; (vii) Development and monitoring of integrated policy for climate change and climate and disaster resilience in RMI; (viii) Coordination of technical and political dialogue and messages both internal and to the global discussion.

The Environmental Advisory Council (EAC), established under the National Environmental Protection Act Rev 2003, oversees environmental issues and the Environmental Protection Authority (EPA) activities. The TTEC sits in parallel with the EAC, focusing on climate change. The work of the TTEC is conducted through Working Groups and Task Forces as appropriate, making recommendations to the TTEC. Each Working Group or Task Force is headed and convened by an accountable agency. The TTEC has established Working Groups for Mitigation, Adaptation, and the RMI NDC-Partnership.

The functions of the Mitigation Working Group include: the implementation of the Electricity Roadmap; Maintenance of the National Energy Policy and Action Plan; Awareness campaign and activities to promote energy conservation and energy efficiency; Promotion of enhanced use of renewable energy technology and phase-out of fossil fuels; Collection, compilation, and analysis of relevant energy data for other activities such as GHG inventory and advice on policies on conservation, prices, and others; Development of mitigation components for national reporting processes; and Development of policies and actions in other sectors including transportation and waste.

The functions of the Adaptation Working Group include: the development and preparation of RMI's National Adaptation Plans; Facilitating national awareness of adaptation issues; Facilitating and promoting adaptation measures through all sectors; Advice on RMI's adaptation communication; Developing adaptation components of national reporting processes; Facilitating integration of traditional knowledge in adaptation measures and activities; Facilitating national discussions on adaptation options based on sound scientific data and information; and Ensuring community participation from all islands and groups in discussions involving adaptation measures intended for them.

The functions of the RMI NDC Partnership Working Group include: Representing the interest of the Global NDC Partnership (and any funding source) in the Mitigation and Adaptation Working Groups; Providing/developing integrated cross-cutting inputs and services to the Mitigation and Adaptation Working Groups, including Women's issues and gender, Human rights, Vulnerable groups, Youth and children, Health services, Education services, Outer island engagement, Capacity building, Climate financing and financial services, Global leadership, Monitor implementation of RMI's Climate Strategies.

Within the Ministry of Environment, the Climate Change Directorate (CDD) reports to the Minister on all climate change topics, including adaptation. The CCD is also coordinating and supporting adaptation planning and implementation by other ministries and agencies in the government.

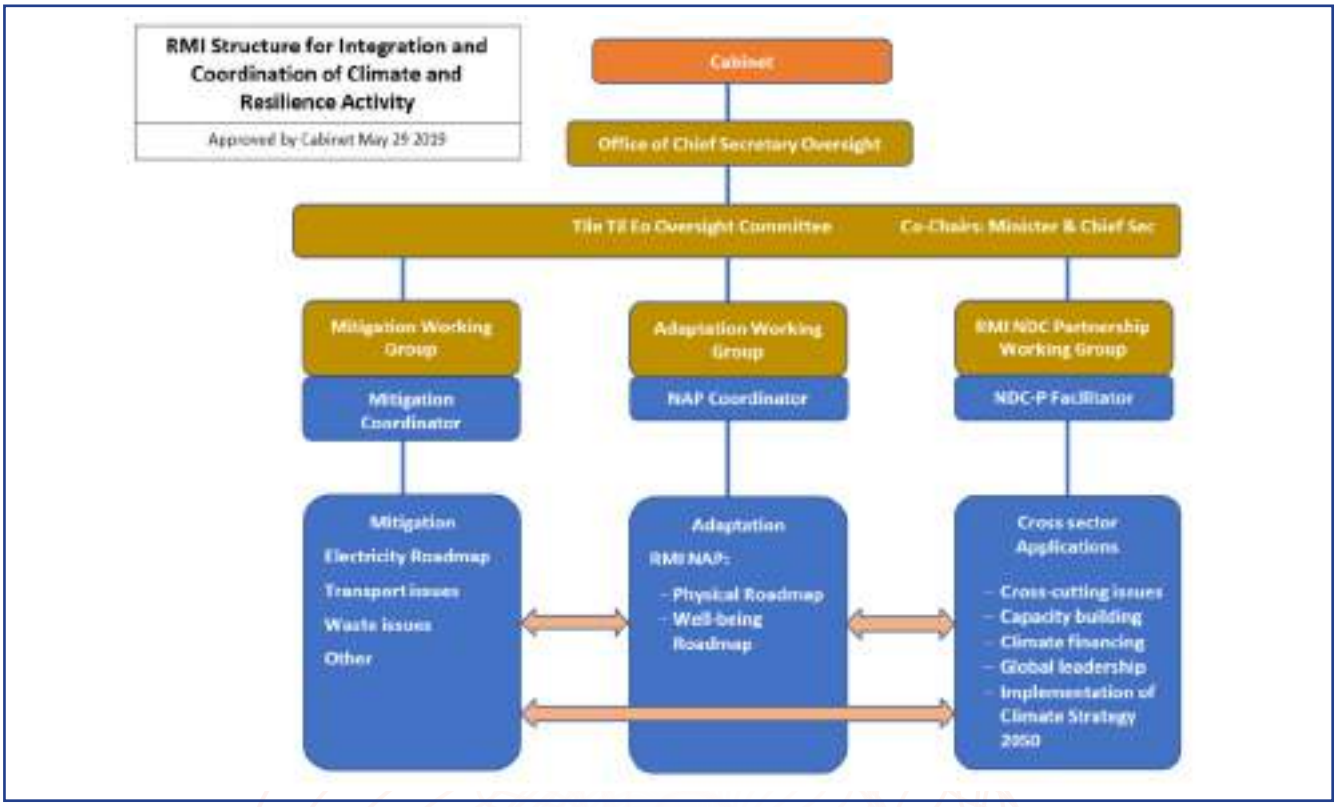
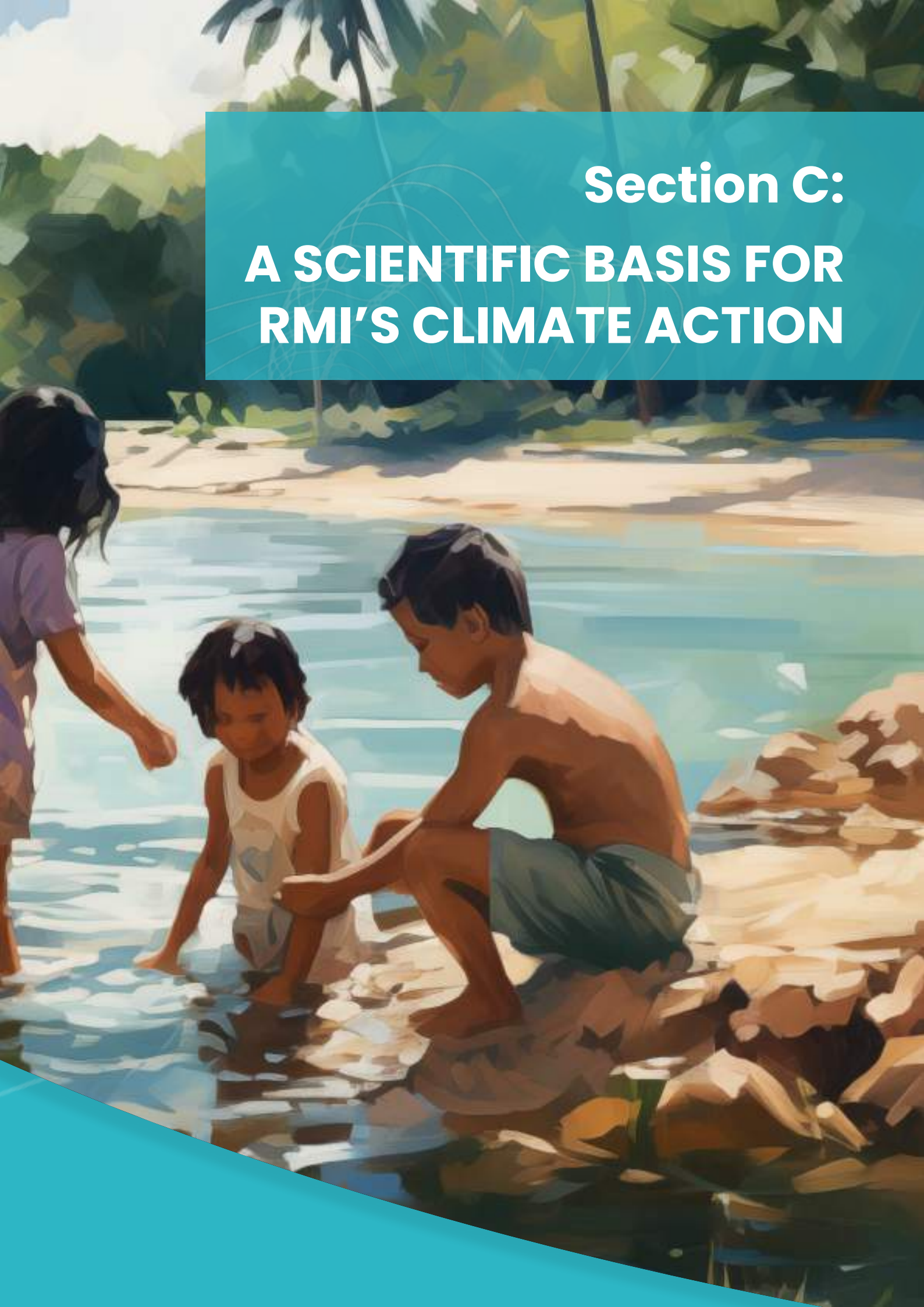


Figure 6: Tile Til Eo Structure

Several ministries are nationally involved in various climate change policy and management aspects. Five ministries serve on all three Working groups, attesting to their larger responsibilities and greater expectations on the national climate change front: Environmental Protection Authority (AWG, MWG), Ministry of Natural Resources and Commerce (AWG, MWG), Ministry of Works, Infrastructure and Utilities (AWG, MWG), Ministry of Transportation, Communication and Information (AWG, MWG), Ministry of Culture and Internal Affairs (AWG, NDC-P). The NDC-P Facilitator is part of all three WGs to attend to multiple cross-cutting issues, and the Climate Envoys can participate in all three WGs when appropriate for them to do so.



Section C:

A SCIENTIFIC BASIS FOR RMI'S CLIMATE ACTION

Section C: THE SCIENTIFIC BASIS FOR RMI'S CLIMATE ACTION

3.0 Climate Baseline

The RMI has a warm, tropical climate year-round, with average temperatures around 27°C and annual precipitation of approximately 350 cm. Two seasons are recognized: a wet season between May and November and a drier season between December and April. Climate is governed by the trade winds and the South Pacific Convergence Zone (SPCZ) movement[92]. Year-to-year variability in climate is also strongly influenced by El Niño conditions, which bring drought conditions to the RMI[93]. Figure 7 shows the most recent climatology for observed temperature and precipitation across the seasonal cycle for the latest climatology, 1991–2020. There are relatively constant temperatures around 80-82°F (26.7-27.8°C), but significant changes in precipitation occur between the dry and wet seasons. In addition, there is a considerable difference between the northern atolls, which receive less than 50 in (125 cm) of rain each year and are very dry in the dry season, and the atolls closer to the equator, which receive more than 100 in (250 cm) of rain each year. Historically, average air temperature has increased by 0.3°C per decade in Kwajalein since 1960 and by 0.12°C per decade in Majuro since 1956, and the number of hot days and nights have increased at both locations. Rainfall has decreased by 30 mm per decade in Kwajalein since 1960 and by 77.4 mm per decade in Majuro since 1956. In addition to the long-term observed decrease, the main driver of rainfall in the RMI is the El Niño-Southern Oscillation (ENSO). Following severe El Niño events, rainfall can be reduced by as much as 80%, with the dry season beginning earlier and lasting longer. As a result, drought remains a common hazard in the RMI, in the northern atolls.

[92] *Linacre, E. & Geerts, B. (1998). Movement of the South Pacific Convergence Zone. URL:* http://www-das.uwyo.edu/~geerts/cwx/ notes/chap12/spcz.html

[93] *The NextGen projections for the Pacific region under CMIP5 are expected to be available from late 2021. These will provide an update on the PACCSAP 2014 projections referenced in this profile. The process for providing the new NextGen CMIP6 projections for the Pacific is still in the planning phase.*

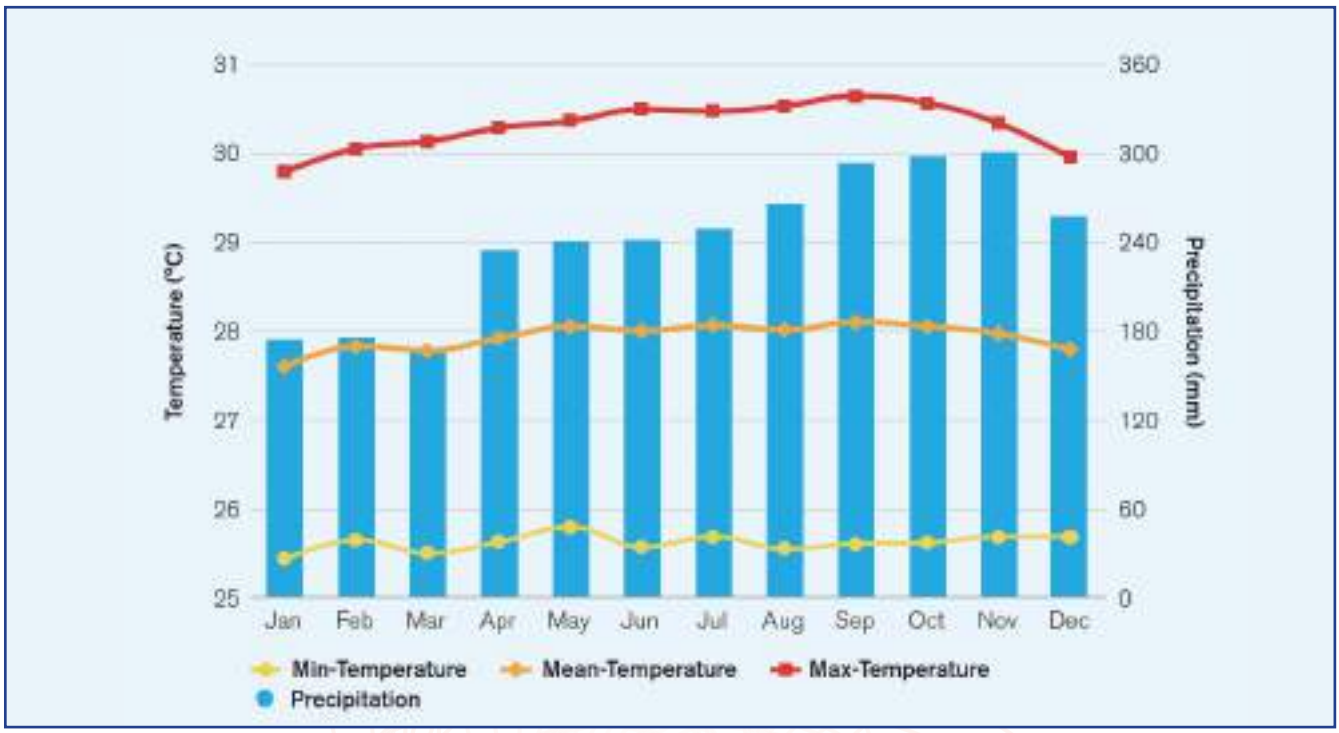


Figure 7: Average monthly mean, maximum, and minimum temperatures and rainfall in the Marshall Islands, 1991-2020[94].

Evidence suggests that warming trends across the islands are consistent with global warming trends[95]. There have been observed increases in the annual and half-year mean temperatures at Majuro (southern Marshall Islands) since 1955 and at Kwajalein (northern Marshall Islands) since 1952, which are statistically significant at the 5% level. Maximum and minimum temperature trends at Kwajalein are much stronger compared to Majuro, although it seems that the rate of change has been faster at Majuro. Additionally, the frequency of Warm Days for the region has increased while the number of Cool Nights has decreased at Majuro and Kwajalein. Historical warming shows a significant increase in the rate of warming post-1980, suggesting that over the subsequent 40-year period, the climate in the vicinity of the RMI warmed by approximately 0.6°C.[23] Evidence also suggests a decreasing trend in annual rainfall at Majuro, statistically significant at the 5% level, since 1954.[23] This could be due to a shift in the mean location of the ITCZ away from Majuro and a change in the intensity of rainfall associated with the ITCZ. There has also been a decrease in the number of Very Wet Days since 1953. Notable inter-annual variability associated with the El Nino-Southern Oscillation (ENSO) phenomenon is evident in the observed rainfall records for Majuro since 1954 and Kwajalein since 1945. The remaining annual, seasonal, and extreme rainfall trends at Majuro and Kwajalein show little change.

3.1 Extreme Weather

Floods, Typhoons, and Storm Surge

The RMI is affected by rapid onset (typhoons and floods) and slow onset (droughts) natural

[94] *World Bank, 2022, Climate Risk Country Profile: Marshall Islands*

[95] *Subbarao, S. & Mucadam, R. (2015). Second National Communication of the Republic of the Marshall Islands. United Nations Development Program/Global Environment Facility. Suva, Fiji. URL:* https://unfccc.int/sites/default/files/resource/mhlnc2.pdf

hazards. Typhoons (Figure 8) are relatively infrequent, with an average of 22 per decade being recorded between 1977 and 2011, with 18% of these typhoons developing into severe events (i.e., Category 3 or stronger). Low-intensity "nuisance' and intense 'severe' flooding in the RMI are primarily caused by (a combination of) extreme water levels, waves, and rainfall (Figure 8). These are mainly due to nuisance flooding caused by high (king) tide levels inundating low-lying land and wave overtopping of the immediate shoreline and low-lying land due to moderate or large trade and locally generated waves coinciding with high tide levels. Severe and damaging flood events are caused by occasional large swell wave conditions caused by distant storms causing elevated water levels (wave set up) over reef flats, wave over wash and widespread inundation over islet land areas, and typhoon events resulting in raised sea levels (storm surge) and large wave conditions, causing wave-set up over the reef flats, wave over wash and widespread inundation over islet land areas.

Figure 8: Causes of coastal flooding in the RMI (Deltares 2022c).

Rare precipitation events are often referred to as events of a certain return level, and the 5-day cumulative rainfall indicator focuses on the maximum rainfall amount over any 5-day period that can be expected once in an average 25-year period. Changes in this indicator may significantly impact infrastructure and endanger life and property through direct physical effects and perhaps water quality issues. As such, any significant changes in the heavy rainfall event's magnitudes must be understood. Based on recorded 5-Day Cumulative Rainfall for 1986–2005 and projected 5-Day Cumulative Rainfall 25-year Return Level by 2050 under all RCPs of CIMP5 ensemble modeling for the Marshall Islands, it is noted that compared to the historical value, there is a minor increase (<10%) but these are associated with great uncertainty. Future projections as illustrated in Figure 9 highlight the projected change in annual maximum 5-day rainfall of a 25-year return level. Projected median changes seem to be small initially, then increases closer to 2100, but the range of rainfall change is very broad. Further contextualization and monitoring is therefore required going forward.

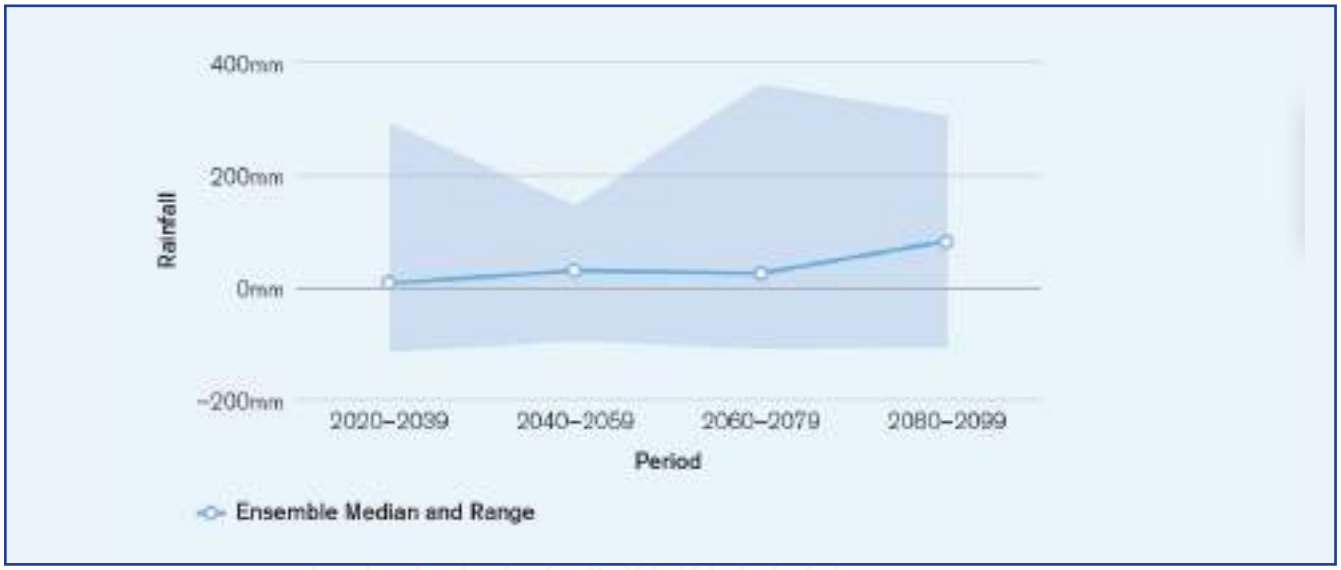


Figure 9: Projected change in annual maximum 5-day rainfall (25-year return level)

Typhoons (tropical cyclones) have historically affected the Marshall Islands. The tropical cyclone archive of the Northern Hemisphere indicates that between the 1977 and 2011 seasons, 78 typhoons developed within or crossed the Marshall Islands EEZ, and 18% of these became severe events (Category 3 or stronger). This represents an average of 22 typhoons per decade, although there is large interannual variability.[96] Typhoons were most frequent in El Niño years (50 typhoons per decade) and least frequent in La Niña years (3 typhoons per decade); the neutral season average is 18 cyclones per decade. Although there have been notable recent storms, such as Bavi and Nangka in 2015, Tropical Storm Zelda in 1991 remains on record for causing significant damage to homes and livelihoods, affecting almost 6,000 persons. In 1997, Typhoon Paka caused US$80 million of damage to crops and affected 70% of houses on Ailinglaplap Atoll, and it is estimated that during a 20-year period, typhoons in the Marshall Islands caused an average USD 63 million per typhoon.[28]

Between 1979 and 2015, eighteen significant flooding events have been recorded in Majuro and classified into six categories[97]. Three of these categories are associated with wave/swell generation in North Pacific, South Pacific, and tropical storms or typhoons, respectively, and three with lagoon side inundation that can occur from swell penetration into the lagoon and locally generated waves, both coinciding with high tides. The occurrence and magnitude of high (king) tide events are primarily influenced by the astronomical tide, ENSO effects on mean sea level, and underlying mean sea-level rise. The highest astronomical tides in the RMI tend to occur around the equinoxes. Significant inundation events due to long-period swell or typhoons have tended to cause extensive damage on a particular atoll or group of atolls in the RMI, historically, around every 10 to 20

[96] *Australian Bureau of Meteorology and CSIRO (2014). Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports. Pacific-Australia Climate Change Science and Adaptation Planning Program Technical Report, Australian Bureau of Meteorology and CSIRO, Melbourne, Australia. URL:* https://www.pacificclimatechangescience.org/wp content/uploads/2014/07/PACCSAP_CountryReports2014_WEB_140710.pdf

[97] *Ford et al., 2018*

years. Significant flooding impacts from long-period swell waves, often generated by distant mid-latitude storm events, occurred over 7-8 December 2008[98] and between 27 November and 4 December 1979[99].

The severity of flooding depends on its cause and the geomorphological features of an island that influence flooding processes. These features, such as the reef platform elevation and island berm height, are not static but dynamic landforms that evolve due to erosion and (reef) accretion (Figure 10). The width and elevation of the reef platform strongly influence the amount of wave energy reaching the shore and, hence, the potential for coastal flooding. Wide, shallow reef flats covered by healthy coral ecosystems effectively reduce waves.

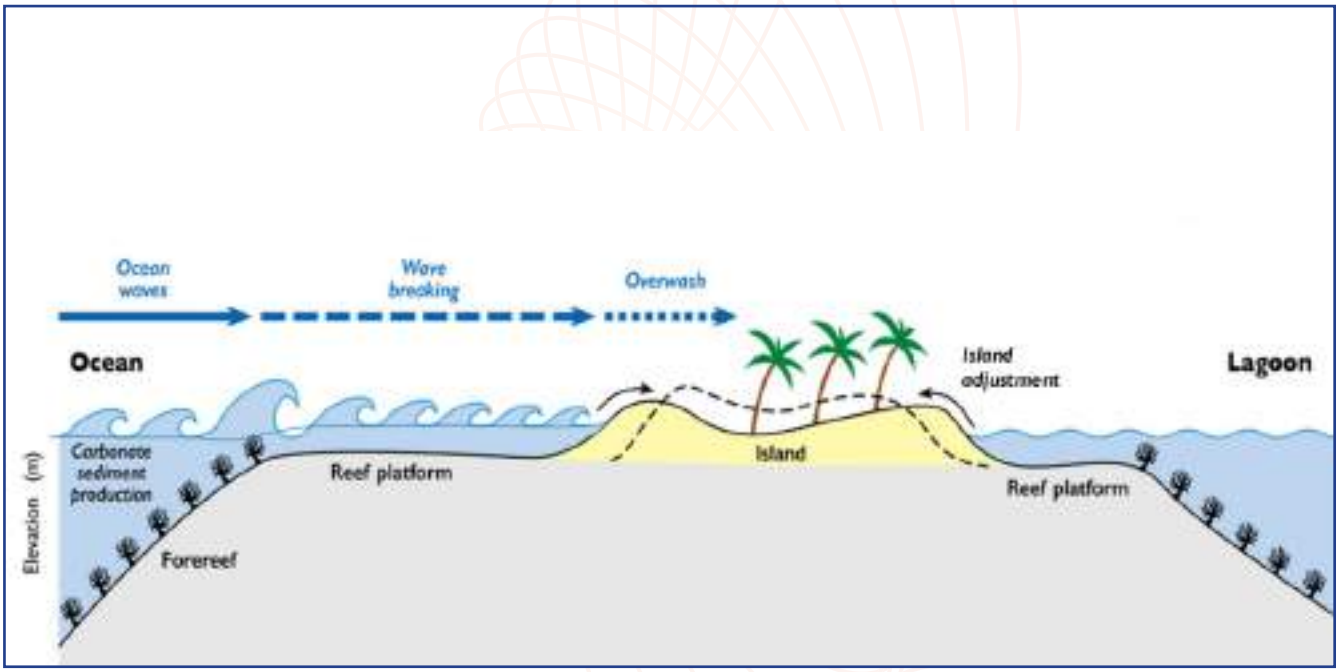


Figure 10: Wave and sedimentary processes on an atoll island [100]

The exposure of islands to wind and waves depends on their geographic location. In the RMI, islands heavily exposed to the northeastern trade winds and resulting swells are more prone to coastal flooding. Islands can be sheltered from these waves by the atoll rim (Figure 11, left panel) or other islands (Figure B.3, right panel). In Majuro, southwest-facing islands (e.g., Laura) are less vulnerable than northeast-facing islands (e.g., Djarrit and Rongrong) due to sheltering by the atoll rim. Djarrit is again less vulnerable than Rongrong because of sheltering by the neighboring atoll Arno.

[98] *Hoeke, et al. 2013*
[99] *Spennemann 2002*
[100] *Masselink & Kench 2021*

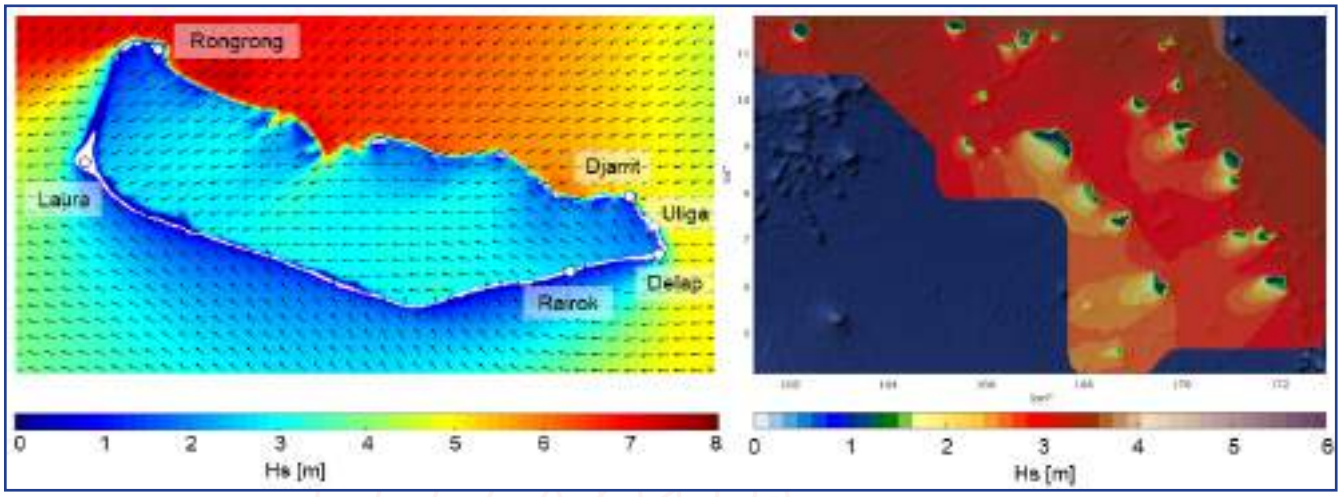


Figure 11: Varying degrees of wave exposure within Majuro Atoll (left panel; red indicates large waves while blue indicates small waves) and for the RMI (right panel; darker red indicates larger waves and yellow indicates smaller waves). Source wave hind-cast data: (SPC, 2020).

Because of the low topography of all RMI atolls (less than 9.8 ft - 3m in height), sea level rise remains one of the country's most important climate change impacts, and its threat is increasing. Sea level rise is measured by one tide gauge located on Majuro Atoll. The observed mean sea level in Majuro increased by 5.04 in (128 mm) between 1993 and 2018. This is higher than the observed global mean sea level rise (3.2 in - 81 mm) during that period. Measured sea level rose in Majuro by 0.14 in (35 mm) per decade for the period 1968–2018, increasing to 0.19 in (49.2 mm) per decade over the period 1993-2018 (NOAA, 2019)[101] (Figure 12).

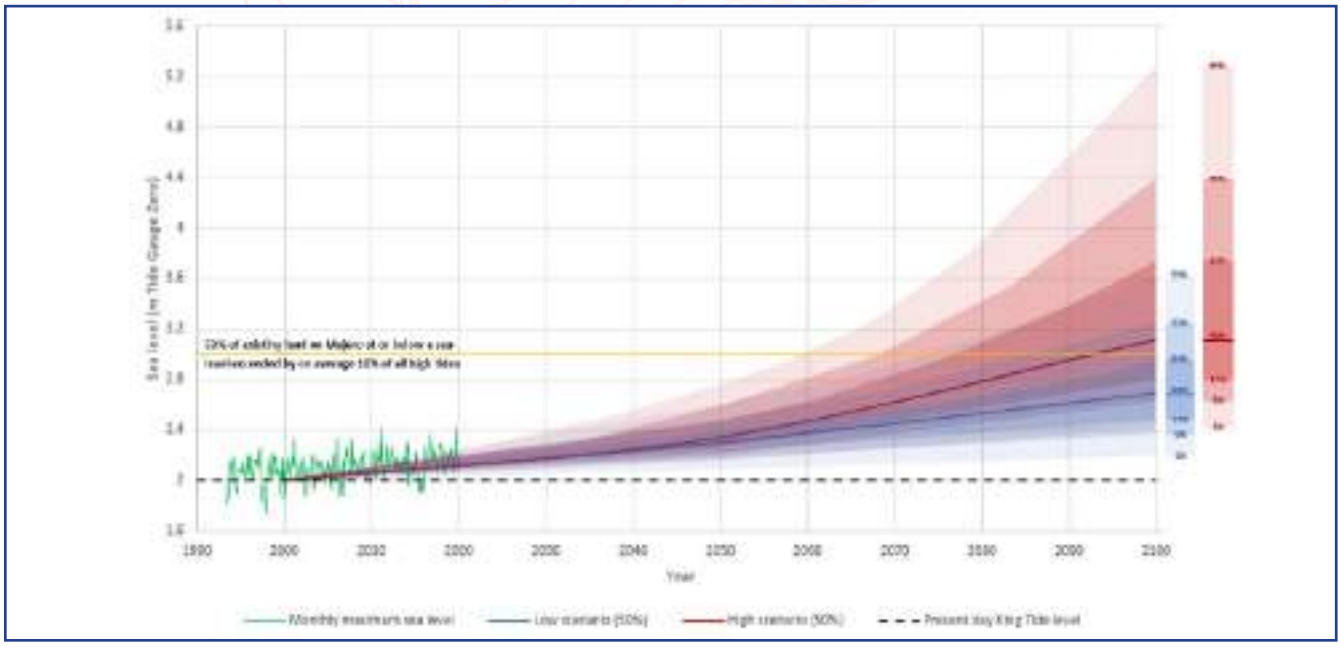


Figure 12: Sea level observations and projections for Majuro (Bamber et al., 2019).

[101] https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level

RMI is not in a seismically active area, and its narrow continental shelf limits the generation of high tsunami waves, but extremely active seismic zones in the Pacific can generate earthquakes and tsunamis capable of traveling great distances. The Pacific Catastrophe Risk Assessment and Financing Initiative 2011 estimated the average annual loss related to typhoons and tsunamis/earthquakes to be around 1.7% of gross domestic product (i.e., $3 million). They estimated that in the next 50 years, RMI has a 50% chance of experiencing a loss exceeding USD 53 million and a 10% chance of experiencing a loss exceeding USD 160 million.

Heat Waves

Heat waves are defined as a period of 3 or more days when the daily temperature remains above the 95th percentile.[22] This becomes highly likely as the RMI approaches 2100. The RMI regularly experiences relatively high temperatures, with a mean annual temperature of around 27.6°C and the highest in September at an average of 27.7°C. Ensemble-based yearly mean temperature anomalies in the Marshall Islands are projected to reach even up to 3.1°C by 2100 (Table 2), with a projected ensemble mean change in the maxima of the daily maximum temperature of 3.3°C, compared to the historical mean. By 2100, the projected change in the Heat Index 35 for the Marshall Islands is 356.25 days per year by the 2090s, under RCP8.5 (Figure 6b) – this Index represents a change in the total count of days where the daily mean heat index rose above 35°C relative to the reference period (1986–2005). While noted instances of Heat Index 35 may be primarily found in monsoon regions and some subtropical locations with high humidity,25 in general, the values vary between 0 and +150 days. The projected change for the Marshall Islands likely signals the potential for extremely uncomfortable conditions, with local impacts and repercussions. However, it is noted that further research is required to understand better the implications of climate change and its interaction with the ENSO phenomenon for its future regime and potential heat waves.

An additional factor for consideration is the potential for marine heat waves. Research has shown that "from 1925 to 2016, global average marine heatwave frequency and duration increased by 34% and 17%, respectively, resulting in a 54% increase in annual marine heatwave days globally".[102] While such research has not explicitly identified the Marshall Islands under threat, the consequences of these trends may be severe for marine ecosystems in the region, which are adapted to survive under very stable temperature regimes and the livelihoods dependent on them.

Drought

Drought events in 2013 and 2015 affected 27,384 persons, just over half of the then current total population of 59,000 people, [2] with an estimated economic damage cost of around US$5 million.[6] Drought can be expressed in many ways, from simple precipitation deficits to complex estimates of remaining soil moisture. The Standardized Precipitation Index (SPI)[9] drought projections for very low and very high emissions (RCP2.6 and 8.5), and for both the northern and southern Marshall Islands, show that the overall proportion of time spent in drought is expected to decrease under all scenarios. However, it should be noted that complex processes relating to rainfall projections, including the limited consensus

[102] *Oliver, E. C., Donat, M. G., Burrows, M. T., Moore, P. J., Smale, D. A., Alexander, L. V., . . . & Holbrook, N. J. (2018). Longer and more frequent marine heatwaves over the past century. Nature communications, 9(1), 1324. URL:* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5893591/

of future ENSO influence for the region, hinder the confidence of these projections of drought frequency and duration. Another lens through which to view drought risk is the Standardized Precipitation Evapotranspiration Index (SPEI), widely used today as a global measure for drought monitoring over various cumulative time intervals (Figure 13). The likelihood for severe drought analyses the frequency at which prolonged dry conditions are expected. Projections suggest that southern atolls are more likely to face severe drought compared to northern atolls in the Marshall Islands in the near long term.

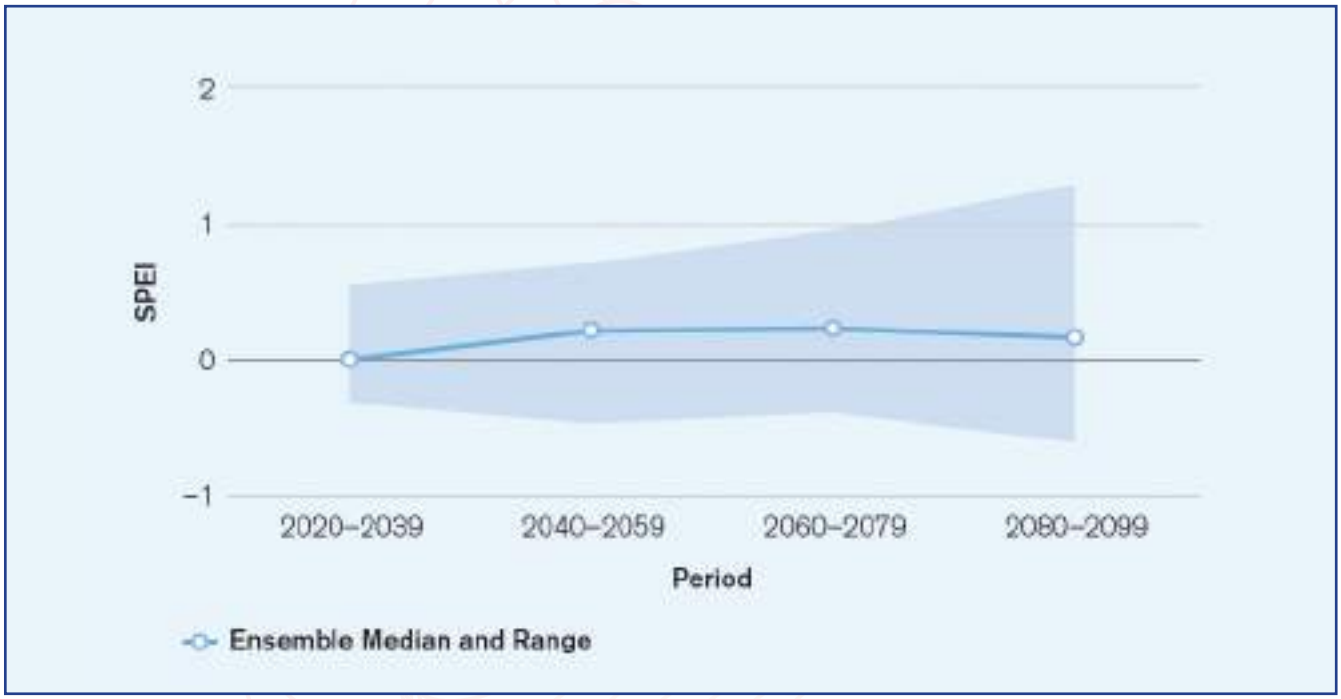


Figure 13: Project change in Annual Mean Drought Index for RMI.

3.2 Future Climate Forecasts

Weather and climate in the Pacific region are controlled by the location of the Inter Tropical Convergence Zone (ITCZ) and the South Pacific Convergence Zone (SPCZ) and are affected by ENSO events, which are and will continue to be the major cause of year-to-year climate variations in the Pacific. El Niño events will be warmer, although projections regarding the frequency and intensity of future ENSO events are inconsistent. ENSO-driven rainfall changes are expected to intensify in the central-east equatorial Pacific and the western equatorial Pacific. Extreme El Niño events may become more common, and El Niño-driven rainfall variations near the equator may be enhanced under global warming.

The IPCC's sixth assessment report uses a new set of scenarios derived from the RCP scenarios, the Shared Socioeconomic Pathways scenarios (SSPs). However, downscaled information for the RMI based on the latest generation of climate models and the SSPs scenarios were unavailable when this NAP was developed, so the RCP scenarios and 5th generation of climate models are used instead.

Based on the global climate models used for the IPCC's Fifth Assessment Report, The Australian Bureau of Meteorology and CSIRO identified the best models for the Pacific Small Island Developing States (P-SIDS) and produced climate projections for different countries. Although a range of climate scenarios[103] was used, this summary provides the projections for the low-emission scenario (RCP2.6) and the high-emission scenario (RCP8.5), including the two intermediate scenarios (RCP4.5 and RCP6.0). These projections are for 2090 or 2100, but the impacts will continue after that, particularly sea level rise. Each scenario provides a projected sea level rise over time with a range of confidence levels. Figure B.5 shows the mid-point expected sea level rise for the three emissions scenarios adjusted for RMI conditions.[104]

The following is the summary of climate projections. Under a very low emission scenario (RCP2.6) (this scenario is still possible, but emissions are currently off track), Average air temperature will increase by 1.4°F (0.8°C) by 2090, and Annual rainfall will increase by 3% by 2090. Others are current extreme rainfall events (5% probability of occurrence in any one year) will have a 12.5% probability of occurrence in any one year in Kwajalein and an 11.1% probability of occurrence in any one year in Majuro; Rainfall during these extreme events will increase by 6mm in Kwajalein and 9mm in Majuro by 2090 and; Sea level will rise by 1.35 ft (41 cm) by 2090.

Under a low emission scenario (RCP4.5): Average air temperature will increase by 2.7°F (1.5°C) by 2090; Annual rainfall will increase by 5% in Kwajalein and by 3% in Majuro by 2090, and Sea level will rise by 1.58 ft (48 cm) by 2090.

Under a high emission scenario (RCP6.0), Average air temperature will increase by 3.4°F (1.9°C) in Kwajalein and 3.2°F (1.8°C) in Majuro by 2090; Annual rainfall will increase by 5% in Kwajalein and Majuro by 2090 and; Sea level will rise by 1.61 ft (49 cm) by 2090.

Under a very high emission scenario (RCP8.5): Average air temperature will increase by 5.6°F (3.1°C) in Kwajalein and 5.4°F (3.0°C) in Majuro by 2090; Annual rainfall will increase by 14% in Kwajalein and by 8% in Majuro by 2090; Current extreme rainfall events (5% probability occurrence in any one year) will have a 20% probability of occurrence in any one year in Kwajalein and a 16.7% probability of occurrence in any one year in Majuro; Rainfall during these extreme events will increase by 1.3 in (32 mm) in Kwajalein and 1.2 in (30 mm) in Majuro by 2090 and; Sea level will rise by 2.13 ft (65 cm) by 2090.

If the melting of Greenland and Antarctic ice sheets continues at the current rate or accelerates, sea level in Kwajalein and Majuro, respectively, may rise by between 4.0-4.4 ft (1.22-1.33 m – intermediate scenario) and 10.7-11.2 ft (3.26-3.43 m – extreme (very low probability but physically possible scenario)) by 2100. Sea level rise combined with wave action and extreme sea level events is currently the dominant feature of climate change projections within the RMI. They will result in more frequent and intense coastal flooding and land overtopping, key climate determinants for atoll/island habitability, as they directly affect land usage and water resources.

103 *These scenarios are generated by combining outputs from different climate models and are presented as an average (mid-point) value with a confidence range. They are periodically updated with improvements in simulations of the SLR processes and their rate of change. Their application is reviewed in the "Climate Science Stocktake and Gaps for the RMI NAP Report CCD" NAP Support Team/CCD - August 2021*

104 *The most recent updated projections were prepared in 2021 resulting in a new series of scenarios designated SSP. The differences between the RCP and the SSP series are nominal out to 2090. The SSP series has not yet been updated for RMI conditions and so the RCP series is presented here. In due course the SSP series should be adopted once adjusted for RMI conditions – as for any future adjustments from IPCC.*

Saltwater Intrusion: Freshwater lens (FWL) on RMI's small low-lying atoll islands will experience an increasing threat of salinization[105]. This phenomenon is prompted by threats like high tides, particularly king tides, decreased rainfall, large wave events, and sea-level rise. Rising temperatures could cause the reservoir's already limited freshwater resources to evaporate more quickly. The freshwater lens that floats above a mixed saltwater base will be elevated because of sea level rise, and its slope and head will also increase. This is likely to cause an increase in lateral saline mixing, increased evaporation through pits and wells, increased loss of fresh water by coastal leakage, saline water being brought within reach of coconut and other tree crop roots or well and pump intakes, and an overall reduction in the supply of fresh water[106]. Human actions such as contamination, over-extraction, and island modification pose further risks.

A study on Roi-Namur Atoll examined conductivity (salinity) in groundwater wells in response to severe rainfall and seasonal patterns[107]. Tidal lag and efficiency, dependent on the shoreline distance, were demonstrated. Responses of the nearshore aquifer to an island over wash event were tracked. Freshwater outflow patterns and saline boundaries of the FWL were outlined using ERT profiles, while depth-specific geochemical pore water measurements affirmed the fresh-saline water boundaries. Submarine Groundwater Discharge was also calculated relative to tidal fluctuations. The research showed that the timing of various threats significantly influenced their impact on the FWLs. High tides caused the greatest rise in groundwater and salinity levels, allowing saltwater intrusion into the FWL, whereas low tides permitted freshwater expulsion into the lagoon. Large rain events quickly freshened groundwater wells, though conductivity recovery was slower. An overwash event led to temporary groundwater and salinity level increases. Groundwater and salinity levels also mirrored the falling trend in Mean Sea Level during an El Niño-Southern Oscillation event. These findings underscore the atoll aquifer's sensitivity to atmospheric and oceanic influences and highlight the FWL's vulnerability to climate change-induced rainfall and sea level alterations. Worryingly, this is likely the case across many of RMI's low-lying atolls.

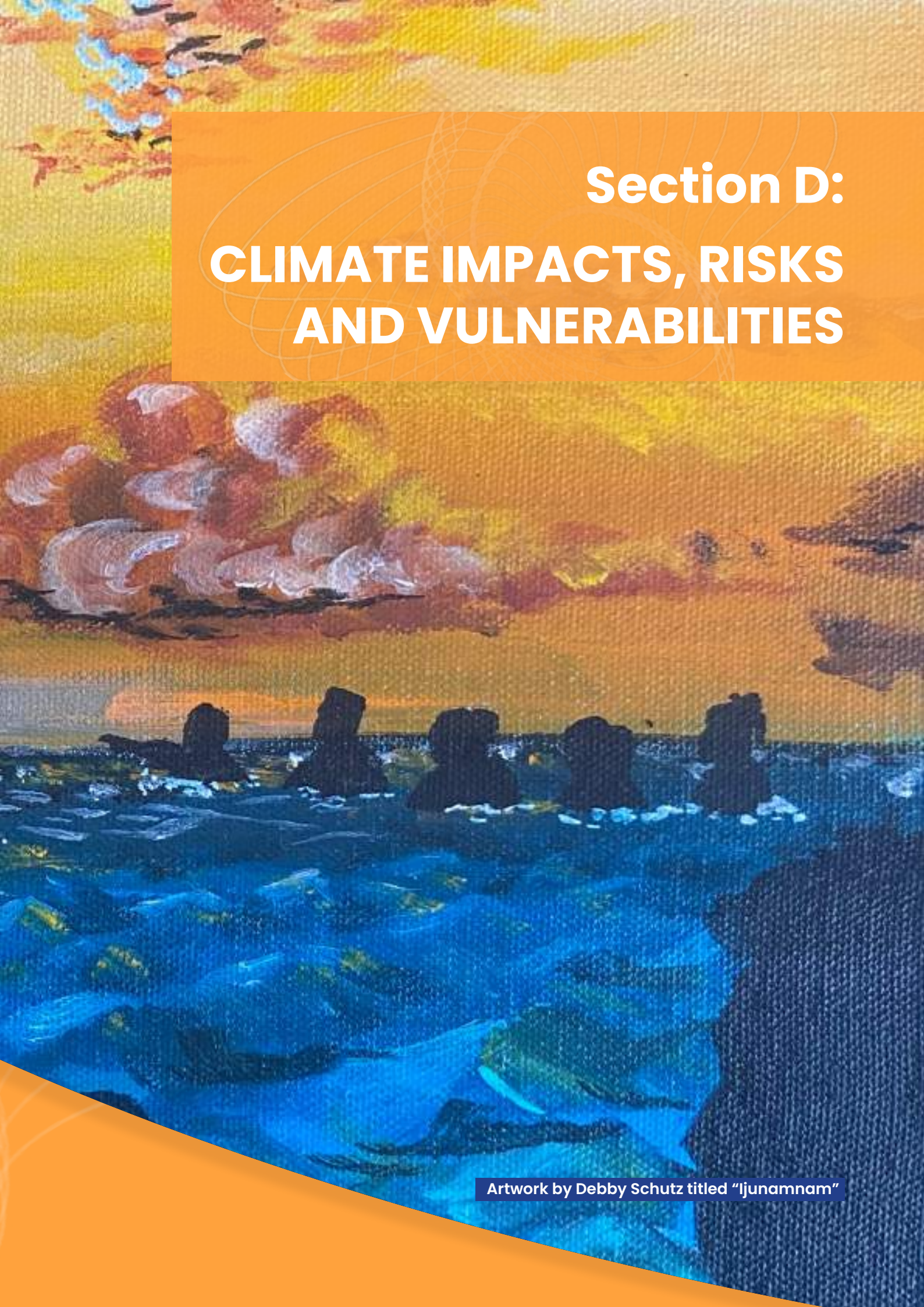
[105] *Oberle FKJ, Swarzenski PW, Storlazzi CD. Atoll Groundwater Movement and Its Response to Climatic and Sea-Level Fluctuations. Water. 2017; 9(9):650.* https://doi.org/10.3390/w9090650

[106] *World Bank. (2021, June). Climate Risk Country Profile, Marshall Islands. World Bank. Retrieved from* https://reliefweb.int/report/marshall-islands/climate-risk-country-profile-marshall-islands

[107] *Hinkel, J. et al., 2014. Coastal flood damage and adaptation costs under 21st-century sea-level rise. *Proceedings of the National Academy of Sciences*, 111(9), 3292-3297.*

Section D:

CLIMATE IMPACTS, RISKS AND VULNERABILITIES



Artwork by Debby Schutz titled “Ijunamnam”

Section D: CLIMATE IMPACTS, RISKS AND VULNERABILITIES

4.0 Introduction

Vulnerability is defined by the third report of the International Panel on Climate Change (IPCC) as the degree to which a system is susceptible to and unable to cope with adverse effects of climate change, including climate variability and extremes[108]. Vulnerability combined with exposure to climate hazards forms an overall picture of risk (as shown in Figure 14)[109].

A holistic assessment of climate impacts and vulnerabilities in the RMI depends on understanding science-based measures as well as the lived experiences of climate impacts by people and communities.[110] Both are equally important to maximize meaningful adaptation opportunities.

We consider communities' views of their impacts and vulnerability as central to designing adaptation strategies. Communities perceive, interpret and react to climate impacts and risks[111] based on lived experiences, cultural beliefs, media coverage, and political attitudes[112]. The highest political body in the Marshall Islands, the Parliament, is named after the term "Nitijela." In the context of this report, we use the term "nitijela" to refer to community lived experiences and indigenous knowledge. "Niti" means "to bring together," while "jela" refers to understanding, which means when we come together, more understanding and knowledge sharing is possible. What this terminology demonstrates is the importance of community engagement – that lived experiences are a valuable form of indigenous science.

Climate impacts and risks are also scientifically measured and evaluated using climate models, statistical analysis, and scientific studies. This may include assessments of potential impacts such as changes in temperature, sea-level rise, extreme weather events, and other climate-related changes[113].

Assessing climate vulnerability through a sectoral approach is essential. Different sectors, such as agriculture, water supply, energy, and health, are affected by climate change in distinct ways. Rising temperatures and altered rainfall patterns may necessitate varying responses in these areas. A sectoral approach helps to identify these unique challenges and formulate tailored response strategies. Allocating resources effectively is vital in addressing climate vulnerabilities, and a sectoral

108 *BECA Consultants, 2023*

109 *Shah et al. 2013*

110 *Full details in the International Organization for Migration, Jo-Jikum, Marshall Islands Conservation Society, The University of Melbourne, and Wutmi United Together Marshall Islands. 2023 "My heritage is here" : Report on Consultations with Communities in the Marshall Islands in Support of the Development of the National Adaptation Plan. International Organization for Migration: Majuro.*

111 *Van der Linden, S., 2015. The social-psychological determinants of climate change risk perceptions: Towards a comprehensive model. Journal of Environmental Psychology, 41, 112-124.*

112 *Weber, E. U., 2010. What shapes perceptions of climate change? *Wiley Interdisciplinary Reviews: Climate Change*, 1(3), 332-342.*

113 *Hinkel, J. et al., 2014. Coastal flood damage and adaptation costs under 21st-century sea-level rise. *Proceedings of the National Academy of Sciences*, 111(9), 3292-3297.*

analysis allows us to prioritize and deploy resources efficiently. Alignment with existing policy and regulation is another key benefit of a sectoral approach. Since policies are often structured around specific sectors, assessing climate vulnerability in this way implements changes which are more feasible. Additionally, it enables sensitivity to local conditions and variations within a country, accommodating specific vulnerabilities and adaptive capacities in different regions. A sectoral perspective also allows us to understand how sectors interconnect and influence each other, providing a holistic view of system resilience.

This approach also recognizes the social and economic considerations linked to different sectors, offering insights into how climate change might affect various parts of society differently. Using the best available data for each sector and area results in more accurate and actionable insights.

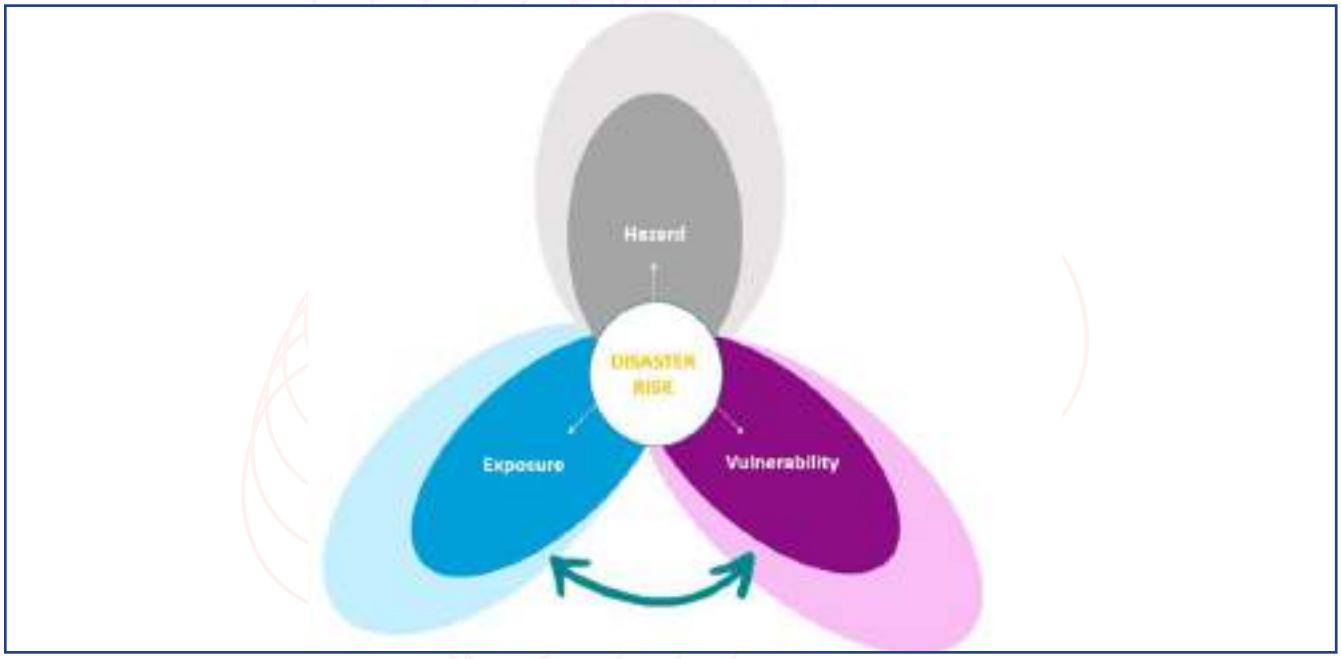


Figure 14: How disaster risk increases as risk components – hazard, exposure, and vulnerability – increase. Source: Adapted from World Bank (2013).

4.1 Vulnerabilities of Spatially Dispersed Communities

In keeping with this Marshallese philosophy, this NAP draws on findings of significant and unprecedented consultations with RMI communities. Methods were developed for the local context and deployed over more than 120 days of site visits across 15 atolls and islands to hear from some 1,362 people, about 3% of the national population. Those consulted included vulnerable populations and underrepresented groups (persons with disabilities, women, youth, migrants, deportees, private sector, etc). Findings demonstrated that the Marshallese are not passive victims of these changes. They are responding in the best ways they can, but these responses are constrained by poverty and a lack of access to services. They are thoughtful about what forms adaptation might take to ensure they can remain in the islands they call home.

4.1.1 The Lived Experience of Climate Impacts and Risks in Communities[114]

The people of the RMI strongly aspire to continue living in their homelands, which is sustained by their access to place-based natural resources. These factors are key to their sense of place and security. ***"This is where our ancestors lived and where they're buried. This is our home that's been blessed by those before us. We will die here"***, for example, and ***"my heritage is here"***.

This aspiration is threatened by climate change. ***"My aspiration is to see a future where everyone can work together to come up with solutions for our country to address issues like climate change impacts, corruption, land issues, have better medical care, better educational opportunities, and more."*** People are observing changes in their environments, including rising sea levels, increasing air temperatures, and increasing drought and more erratic rainfall. These observations have been made in every atoll, and by women, men, and youth (Figure 15). These environmental changes are having widespread and significant impacts on their lives. These impacts will amplify as emissions increase if there is no adaptation to help avert or minimize them.

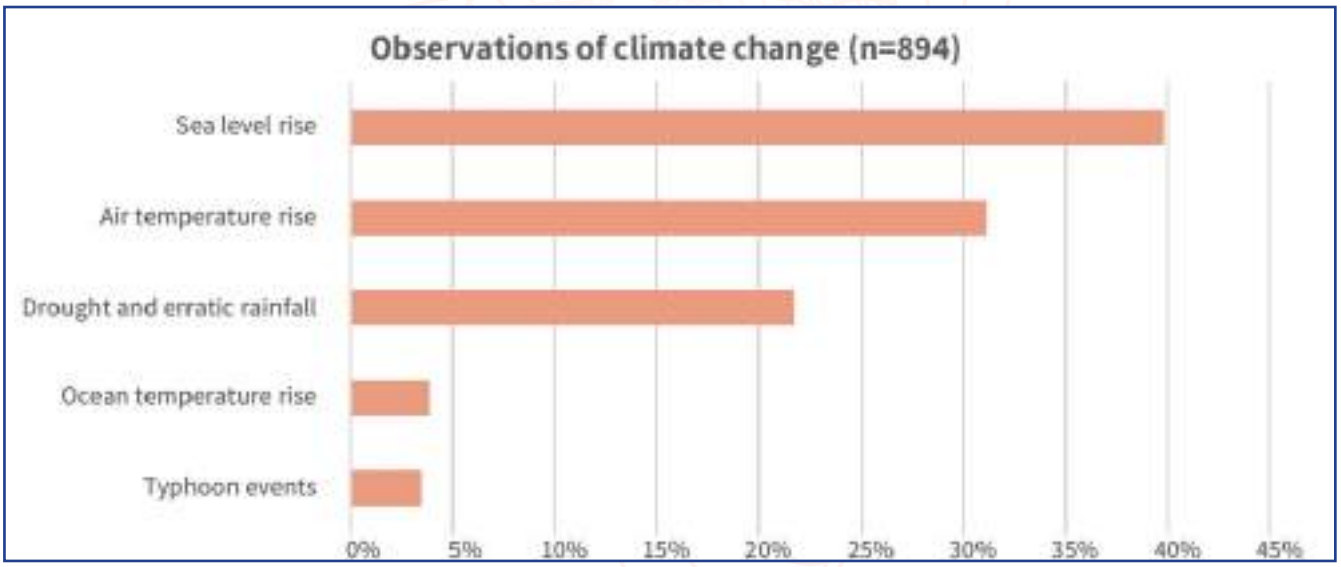


Figure 15: Most frequent community observations of climate change

Sea-level rise was the main observation of communities (40%) and was reported in all islands, though its relative importance varied from island to island. Many people observed that high tides were more frequent and that sea levels were higher during king tides.

Air temperatures were also said to be hotter than in the past, and approximately 31% of communities identified this change. More women than men mentioned hotter air temperatures. Drought arising from more erratic rainfall and hotter temperatures was mentioned by 22% of community members. Men were much more likely than women to report an increase in drought and rainfall, because men are responsible for harvesting tree crops, gardening, and maintaining livestock, where the effects of

[114] *Excerpt quotes in this section are from the My Heritage Is Here Report.*

drought are most felt. A consequence of less rain and drought reported on many islands is increasing dust.

The most frequently mentioned impact (Figures 16 and 17) is on livelihoods[115] (>33%), with more men than women reporting negative impacts since they are responsible for more of those aspects of households that depend on climate-sensitive natural resources. But, the consequences of these impacts on livelihoods are felt more acutely by women who make many handicraft goods. In many of the islands where copra is produced and sold, income from production was said to be falling due to increasing heat and salinization of soils, reducing the production of coconuts, and because the time it takes for the supply of nuts to recover after droughts has increased as droughts have become more intense. These problems were reported in Ailinlaplap, Ailuk, Arno, Mejato, and Wotho.

"I was born and raised here. The changes I've seen from the effects of climate change are very disturbing. The pandanus won't even be ripe yet and half of the fruit will fall out. It wouldn't be harvest season yet the color of the fruit changes. The wells don't have that much water anymore. There's a lot of coastal erosion. We wonder why we have to go out so far in the ocean to fish and we hear that it's because the heat is making the fish go into deeper, cooler waters".

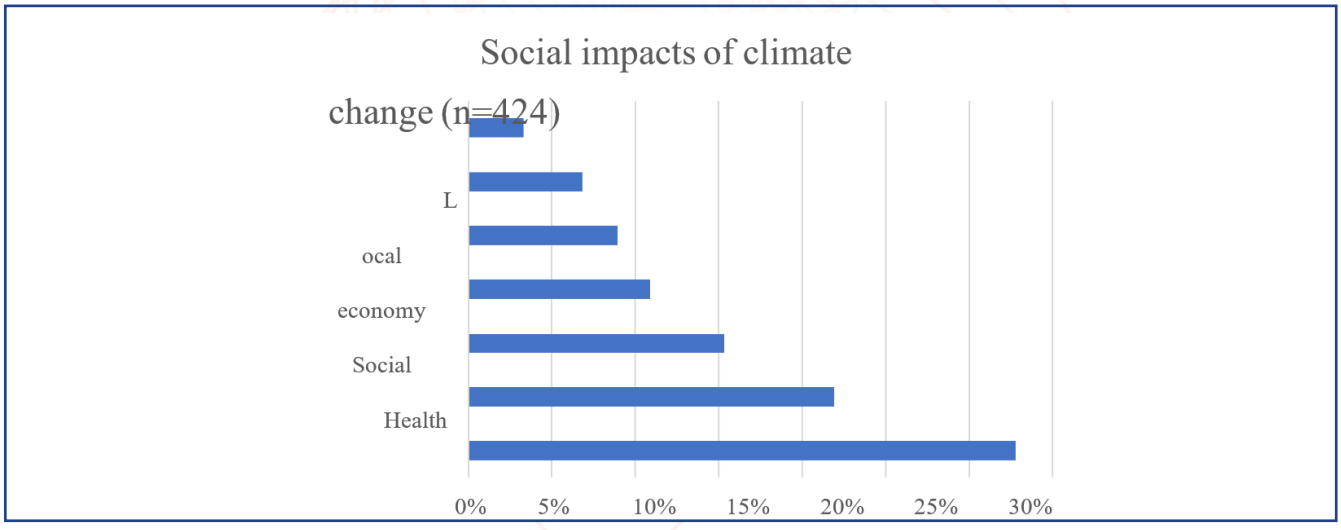


Figure 16: Most frequently mentioned Climate impacts

Women across the RMI earn income from producing and selling handcrafts (amimono). In every island where this is the case, women reported that droughts and sea-level rise also affect some of the species used to make handicrafts, such as copra and pandanus, and shells harvested from the shore. Women reported needing to travel further to collect these materials. The problem of supply was compounded by the increasing challenge of accessing these resources due to greater heat: many women said the weather was now too hot during the day for copra harvesting or shell collection and must now be done in the evening

[115] *The category of 'livelihoods' encompasses all the activities that secure a means of living, be they from subsistence activities or the sale of goods, services, or labor.*

(from 4 p.m. onwards), which is also when they are expected to care for children and prepare the evening meal. The combined effect of these changes is that fewer handicrafts are produced, some are no longer made, women's incomes have decreased, they face exhaustion from daily chores and family commitments, and they experience more family conflicts. These impacts are expected to increase as emissions continue to grow.

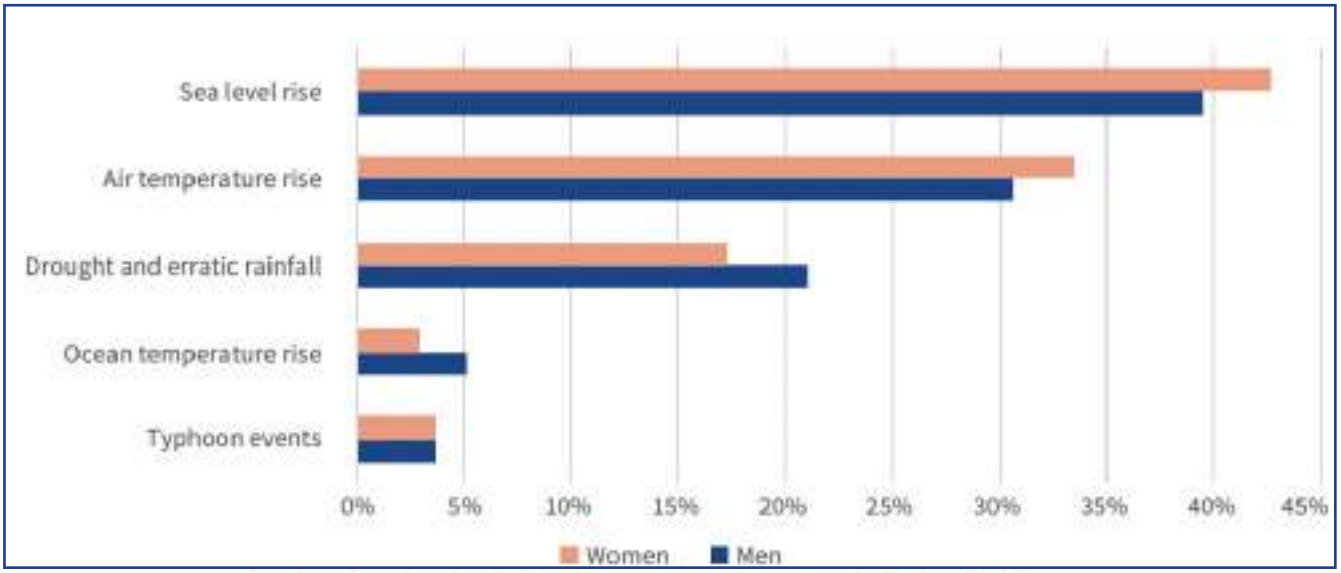


Figure 17. Most frequently mentioned impacts of climate change by gender

Only 4% of community members thought ocean temperatures were also rising – mostly fishermen and women reported associated changes such as stronger currents, coral bleaching, and coral and fish migration to deeper or cooler waters. A similar number of people suggested changes in typhoons, though this was reported in only a few atolls and islands and was always about a past typhoon that was considered particularly bad.

Yet fishers in almost all atolls reported increasing challenges catching fish, with falling catches and/or increasing effort per unit so changes in the marine environment are also affecting livelihoods. The degradation of reefs, a decrease in fish in nearby warmer waters, migration of species to deeper and cooler waters, and less predictable fish behavior all mean fishers must go further to catch fish. This increases the demand for boats, and with rising fuel costs (US$12/gallon) fishing has become more costly. There are also safety implications, given seas are thought to now be rougher and less predictable. In Jaluit and Likiep, changes in tides, sea levels, and waves have made harvesting of clams more dangerous, and it has also made travel to islands within the atolls to harvest clams and other resources more difficult.

These changes and the reduced supply of plant food mean that communities rely more on imports to meet their food needs. At the same time, diminished sales of copra, fish, and handicrafts reduce income to purchase foods. Many households struggle to buy what they need, significantly exacerbated by supply-side constraints associated with limited shipping and markets; for example, a 20lb bag of flour is $40 in some atolls.

These challenges pose social and health risks. ***"There is a lot of trauma and stress [among heads of households] caused by not being able to provide for their families. These stressors result in social issues such as domestic violence and substance abuse."***

Food security[116] was the second most frequently mentioned area of impact (25% of community members). Here, too, men more than women report food security as a concern, again because in most households, much food is supplied from the local environment, and this is the responsibility of men. Increasing heat, decreasing and more variable rainfall, and increasing salinity of soils and groundwater from incursions of seawater are all said to be reducing the health and yield of key food crops such as bananas, breadfruit, coconuts, limes, pandanus, swamp taro, tomatoes, and watermelon.

In Ailuk, people report that tapioca can no longer be grown, and in Wotho, villagers report that breadfruit now ripens up to two months earlier than usual in dry years, is smaller, and rots faster after harvest. Increasing heat also means people spend less time harvesting and planting crops during the day and spend more on expensive, less healthy, imported foods.

This also intersects with the nuclear legacy. Many women in Enewetak are concerned about the health implications of consuming marine species, given their fears of sea-level rise causing greater contamination from radiation leached from the Runit dome.

Impacts on water security[117]**:** About 15% of communities are concerned about water security. Few atoll communities rely solely on groundwater and rainwater harvesting for all their water needs; most rely on reverse osmosis units to meet some of their water needs. Some islands had acute water security challenges. Wotje residents resort to drinking well water, which is typically used for cleaning only and for drinking only as a last resort due to safety concerns and increasing salinization. Salinization of groundwater was commonly reported, including in Wotho, where there are 14 wells that are increasingly contaminated by salt water due to sea-level rise and reduced rainfall.

Impacts on infrastructure: RMI's infrastructure, which already faces severe constraints and challenges, is now being impacted by climate change. This includes power and water supply, transport, and communications.

In many atolls, roads, and houses are damaged by flooding during high tides – with water coming both over the coast and also rising from the ground, including in Ailinglaplap, Wotho, Wotje, Kwajalein and Majuro. Salinity and flooding damaged power lines, leading to several-day electricity cuts and damaged houses and rainwater tanks (58% of households in Majuro Atoll get their drinking water from rainwater tanks). Typhoons cause significant damage to houses, food plants, and livestock in Enewetak and housing, roads, seawalls, and power lines in Kwajalein. The docks in Ailinglaplap and Arno have been progressively destroyed through rust after successive high tide events, so much so that the dock in Ailinglaplap is no longer in use, and people now load and offload goods off the shore, which is more time-consuming. This is the same in almost all other rural communities. Erosion damages roads, including Ailinglaplap,

[116] *Food security is the reliability of access to enough nutritious food, either from subsistence activities, transfers from family and friends, or purchases.*

[117] *The reliable supply of sufficient quantities of safe water for human consumption*

Ebon, Likiep, Ujae, and Wotho. In many atolls, the road being damaged is the one that leads to the airport, and in Kili and Wotho, there is episodic flooding of the airstrip itself. Rates of erosion are high. For example, in Ebon, more than three feet of coastal land has been lost in the past ten years. Erosion has destroyed graves in Arno and Majuro, and in Majuro, erosion threatens Laura Beach, one of the few places where children can swim.

Flooding restricts people's access to key services, including walking to school in Ajeltake-Laura, Majuro, and Wotje. In Kwajalein, water shortages and flooding both cause schools to close. The impacts of flooding on mobility are more pronounced for people with physical and mental disabilities, who often lack support to move around when there are high tides and floods. Schools are at risk from erosion and flooding, including in Wotje and Enewetak. In Enewetak, women in particular, are concerned about the safety of school children during typhoons, given the school is close to sea level and on the northern side of the island where typhoons do most damage.

Image Supplied by the Marshall Island Journal

Impacts on health: Health impacts from climate change are driven primarily by high air temperatures and water scarcity but are exacerbated by extremely limited health services, especially in rural atolls. Community members believe that higher temperatures and drought are impacting their health: dust in the air caused by low rainfall has increased cases of eye infections. Dust also ends up in the water tanks and contaminates drinking water that is already scarce; a lack of good drinking water has increased cases of diarrhea (including among children), especially when people try to save water by not washing their hands; and

participants described higher rates of heat stress, with people reporting feeling dizzy and weak. These problems were pronounced in Ailuk, Ailinglaplap, Arno, Enewetak, Kwajalein, Wotje, and Wotho.

In Ailinglaplap, people report increased cases of fish poisoning (ciguatera). In Kwajalein, people get sick because of poor nutrition, and heat and water scarcity led to cases of dehydration. In Majuro, high tides create unhygienic conditions because of their effect on the sewage system; they disperse rubbish and increase mosquitoes. These events often result in outbreaks of vector-borne diseases (for example, dengue, chikungunya, Zika virus) that can spread to the rest of the country, causing fatalities and having high costs to public health.

Climate change also affects mental health because it increases stress levels in people's lives. Women are particularly vulnerable as they are responsible for preparing food and are increasingly expected to contribute financially to households, which most do through making and selling handicrafts. Women are increasingly worried about the consequences of not meeting their expectations, including, in the most extreme cases, domestic abuse.

"There is no time to be ignorant because, even in a small island like ours, we cannot ignore the immense changes, most of which are not encouraging. To build resilience, we need to harmonize not just with nature but with each other". Page 27 My heritage is here report.

Impacts on social life: More women than men report that there are the social implications of climate change, such as decreasing social interactions due to heat, which is forcing people to spend more time inside and less time out socializing and exercising. This impact of heat was reported across many atolls. Isolation is compounded by increasing tensions within some communities over scarce resources. In Wotje, there is growing competition for seed stock and water resources. In Jaluit, community members are experiencing conflicts and tension between other families and communities as resources become scarce, and in Ailuk, less income and a negative impact on livelihoods are causing some land disputes.

"I can see the change through the social climate amongst the community. It used to be so peaceful and the atmosphere amongst the people was calm. Now there's more hatred and social isolation in the community. They don't take care of their siblings and they're arguing over land now. You can tell everything is starting to change". Page 22 My heritage is here report.

4.2 Projections of Physical and Environmental Impacts on Communities

The scale of the impacts on communities will vary based on historical settlement patterns defined by environmental constraints. Traditionally, residential and community buildings have been located on the larger atolls, some 33-55 yd (30 – 50 m) inland from the lagoon shoreline, landward of the low lagoon-side beach berm, and well above the high tide mark[118]. Communities will face threats to habitability over the next 70 years and beyond. Coastal flooding, exacerbated at higher sea levels, will continue threatening people, buildings, land, and infrastructure in the RMI (Table 7). The combined impacts of continuous sea level rise wave action and extreme sea level events will affect the habitability and livelihoods of atoll-based communities for any sea level rise greater than 20" (0.5m).

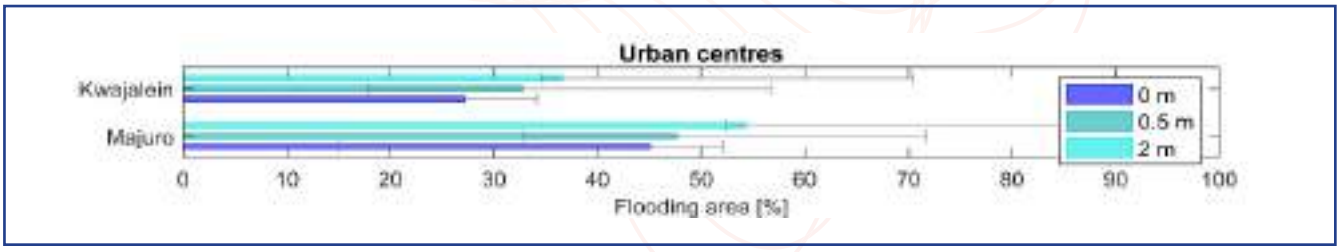
[118] *Spennemann, 2006*

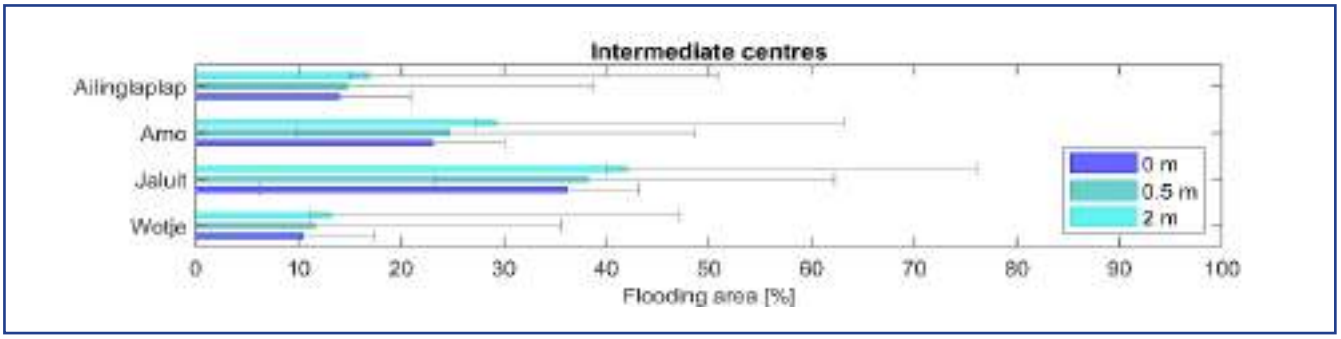
Table 7: Type of atolls, % of the population, and % of land.*

Type of Atoll	Atolls/Centers	# Atoll / Centers	% Population	% Land Area
Urban Center	Majuro, Ebeye	2	70.5	6.5
Intermediate Center	Ailinglaplap, Arno, Jaluit, Wotje,	4	11.6	30.4
Rural Atoll	Ailuk, Aur, Ebon, Enewetak, Jabat, Kili, Kwajalein (withouh Ebeye), Lae, Lib, Likiep, Maloelap, Mejit, Mili, Namdrik, Namu, Ujae, Utrik, Wotho,	18	17.9	63.1

**** The % of the population is calculated based on the 2011 RMI Census and only inhabited atolls in 2021 were included.***

The level of vulnerability varies between the different types of atolls and the different communities in each atoll. Differences in the exposure to the sea level rise are highlighted in Figure 18, but other climate change impacts will affect the general exposure of the atolls/ islands and their communities. In addition, socio-economic drivers, such as poverty, weak economic development, and gender inequality, will strongly influence vulnerability at the local level. The accessibility to services, particularly health, education, and transport in different atolls, has an essential impact on the population distribution, influencing their vulnerability. In addition, the level of investment varies locally to protect against extreme events and provide for economic development opportunities. It is lower in the more rural atolls, leading to internal migration to the urban or intermediate centers.





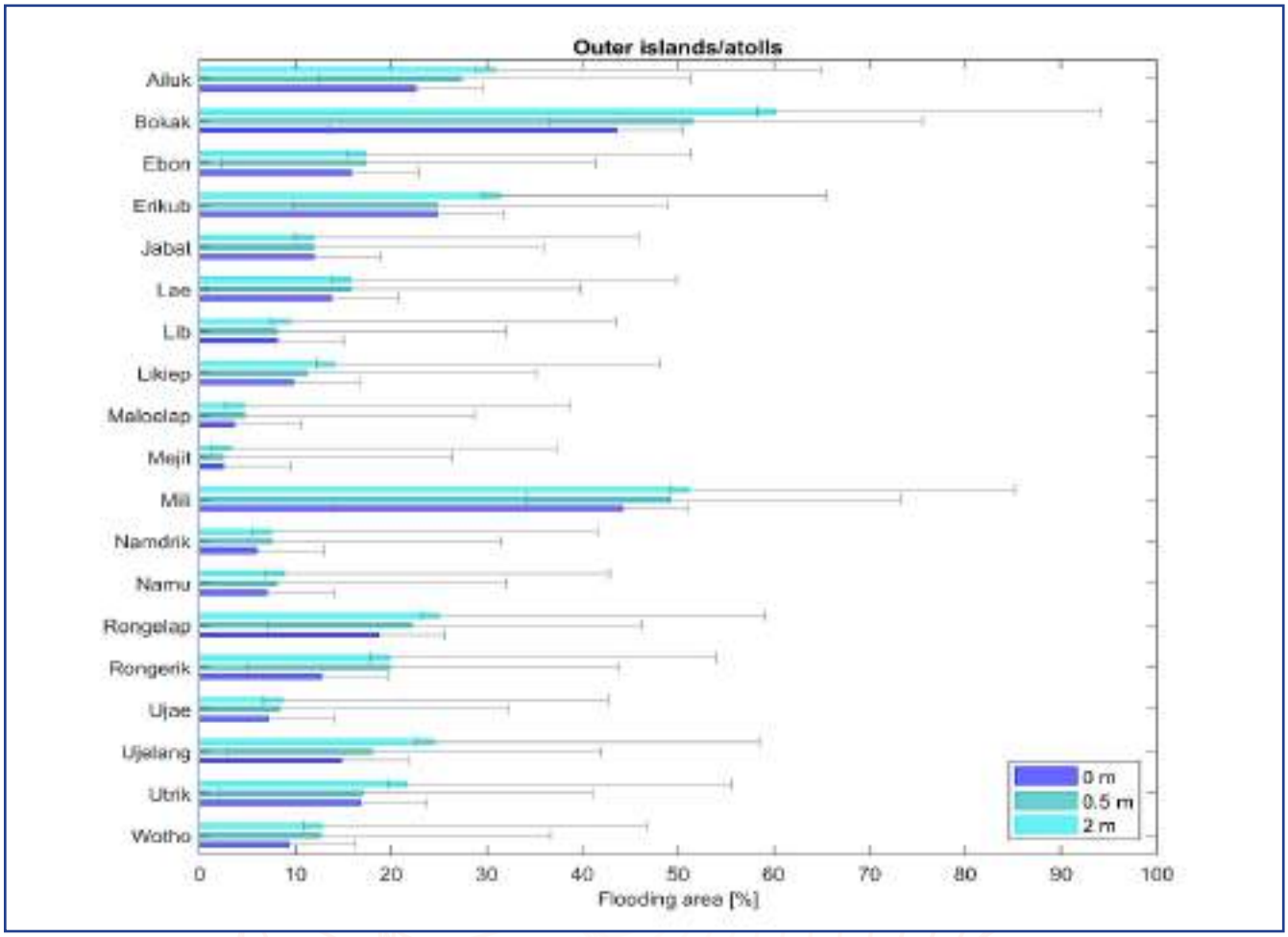


*Figure 18: Percentage of flooded area per atoll by settlement types**

Modeled using global elevation data. Uncertainty bands were estimated based on the comparison to high-resolution model results for Majuro and Ebeye

The current development patterns in the RMI (including demographics and sector demands), excluding the US Military facilities on Kwajalein, are generally separated into three groups: urban centers, intermediate centers, and neighboring rural atolls.

4.2.1 Urban Communities

Majuro and Kwajalein are home to most of the RMI's population and contain the main urban centers. Majuro, the capital, is the country's most populated atoll and it's political, economic, and cultural center. Ebeye is the most densely populated island in the Pacific. These communities typically have better access to healthcare, education, and infrastructure services, but face challenges related to rapid urbanization, such as overcrowding, inadequate housing, and pressure on water and sanitation systems.

The urban communities of Majuro and Ebeye have essential infrastructure for public services and economic development, which are threatened by more frequent and intense coastal flooding due to sea level rise (see below specifically for Majuro and Ebeye). Although

it is more difficult to measure and attribute to climate change, coastal erosion is also a critical issue in these urban communities where housing and infrastructure can be located close to the coastline. Damage to critical infrastructure, such as ports, harbors, and jetties, can (and will) continue to disrupt inter-island connectivity and fundamental lifelines for trade, food, and energy security.

The high density of buildings and population in these urban communities may generate an urban heat island effect where the temperature is higher in dense neighborhoods compared to less urbanized areas. A high-density population may also increase the risk of dissemination of diseases, including those influenced by climate change, such as respiratory illnesses and vector-borne or water-borne diseases.

In **Majuro Atoll**, swell waves are the leading cause of coastal flooding risk. Waves from the northeast mainly cause swell-related flooding. The urban centers of ***Djarrit***, ***Uliga***, and (to a slightly lesser extent) ***Delap (D-U-D)*** are thus exposed to large waves with long periods. Typhoons are infrequent but can cause significant damage[119]. Intense precipitation is a major factor in flooding caused by typhoons, resulting in flooded areas otherwise unaffected by swell-related flooding.

For D-U-D and Rairok, the percentage of the area flooded during high tide (Mean Higher High Water, MHHW) increases rapidly from 20 in (0.5 m) sea level rise onwards (Figure 19, left panel). Beyond this level, large areas will be flooded during each tide (especially in Djarrit and Rairok), while at Laura, tidal flooding is still limited at 3.3 ft (1 m) sea level rise. For the 6.6 ft (2 m) sea level rise scenario, practically all of Majuro Atoll will permanently or regularly be inundated by tides.

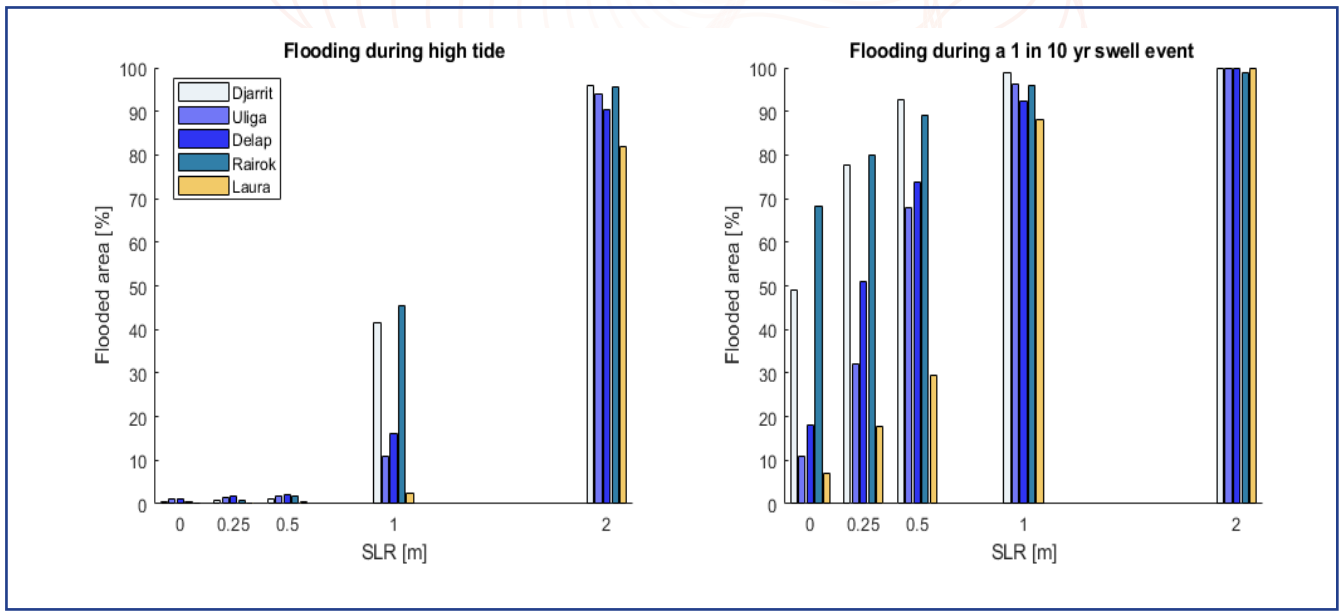


Figure 19: Flooding during high tide (MHHW) (left panel) and during the 1-in-10-yr swell wave event (right panel) for the urban centers Djarrit, Uliga, Delap, and Rairok, and the intermediate center Laura.

[119] *Spenneman 1996*

A considerable portion of the DUD-Rairok area (10-70%) already experienced more than 10 cm of **flooding during a 1-in-10-year swell wave event** (Figure B.7 and Figure B.). This is projected to increase dramatically with SLR. With a 20 in (0.5 m) sea level rise, between 70 and 80% of the DUD-Rairok area will be flooded. With a 3.3 ft (1 m) sea level rise, this will increase to 90 – 95%. Compared to urban centers like *Delap, Uliga, Djarrit*, and *Rairok*, the intermediate center, *Laura*, is relatively well protected from flooding due to its higher elevation and milder wave exposure (Figure 20). The flood extent is 30% for 20 in (0.5 m) sea level rise, compared to 70 – 95% for the DUD-Rairok area (Figure B.7). For 3.3 and 6.6 ft (1 and 2 m) sea level rise, however, the flood extent in Laura rapidly increases to 88 and 99%, respectively.

Flooding from swell, typhoons, and rainfall can translate to expected average annual damages by considering the population and assets in hazard-prone areas. Due to the large number of assets in urban centers, the coastal risk is higher compared to intermediate centers and neighboring islands. For the DUD-Rairok area, the expected losses resulting from flooding are estimated at 4.4 million USD/year on average for the current situation (no sea level rise), which corresponds to approximately 2% of the current annual GDP of the RMI, compared to 0.26 million USD/year for Laura. For the 20 in (0.5 m) sea level rise, the total expected losses are 56 million USD/year on average for DUD-Rairok and 1.4 million USD/year for Laura. For the 3.3 ft (1 m) sea level rise, the expected average losses increase exponentially to 206 million USD/year for DUD-Rairok and 12.1 million USD/year for Laura (Majuro CVA).

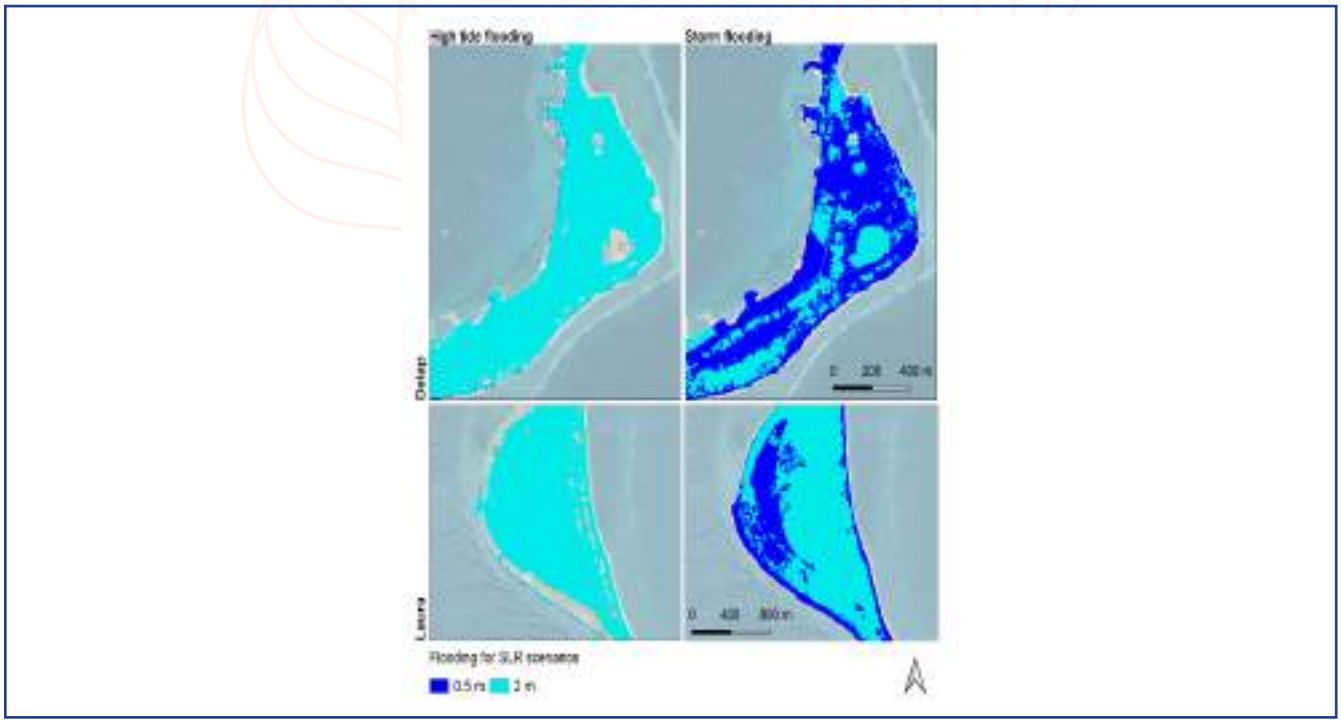


Figure 20: Illustration of flooding scenarios for the Delap, Djarrit, and Laura communities in Majuro, showing regions affected by groundwater flooding, high tide flooding and flooding during a storm event for different sea level rise scenarios.

In **Ebeye**, as in Majuro, coastal flooding is caused by large swell events and infrequent typhoons. During the 1-in-10-year storm, more than two-thirds of the island (69%, Table B2) can be flooded. Flooding frequency and extent will increase with sea level rise. With 20 in (0.5 m) sea level rise, the island will experience frequent flooding during high tide. For a simulated storm event, 89% of the island will be flooded with 21 in (0.53 m) sea level rise, up to 96 and 99% for the 3.3 and 6.6 ft (1 and 2 m) sea level rise scenarios, respectively.

The portion of people affected increases with sea level rise, from 67% for the present situation to 98% for 31 in (0.78 m) sea level rise, reflecting the trend in flooded areas. The main source of direct damage is damage to houses and the Ebeye causeway. Estimated total damages may increase by a factor 3 to 4 due to sea level rise, from 4.5 million USD/yr for the current scenario to 16 million USD/yr for 31 in (0.78 m) sea level rise (Table 8).

Table 8: Overview of the flooded areas, people affected, and EAD for Ebeye, for the 1-in-10-yr swell event.

	SLR=0.5 m (approx. 1.5 ft)	SLR=1.0 m (approx. 3 ft)	SLR=2.0m (approx. 6 ft)
SSP1-2.6: Sustainability	**2090** [2070-2130]	**>2150** [2120->2150]	**>2150**
SSP1-2.6 Low-Confidence: Sustainability including low likeihood, high-impact ice sheet processes	**2090** [2060-2130]	**2100** [2080-2150]	**>2150** [2130->2150]
SSP2-4.5: Middle of the road	**2080** [2070-2100]	**2140** [2110->2150]	**>2150**
SSP5-8.5: Fossil-fuel development	**2070** [2060-2080]	**2110** [2090-2140]	**>2150** [2140->2150]
SSP5-8.5 Low-Confidence: Fossil-fuel development including low likelihood, high-impact ice sheet processes	**2070** [2050-2080]	**2100** [2070-2140]	**2140** [2100->2150]

Results up to 0.78 m sea level rise are based on the Ebeye CVA study, while flooded areas for 3.3 and 6.6 ft (1 and 2 m) are from the Atoll Study. The 10.2, 21, and 31 in (0.26, 0.53, and 0.78 m) sea level rise values were based on Representative Concentration Pathways RCP 4.5 and RCP 8.5 for time horizons of 2050 and 2100 (source: Deltares 2022c).

4.2.2. Semi-Urban Communities

Semi-urban communities in the RMI are usually located on larger atolls or close to the main urban centers, such as Majuro or Ebeye. The lifestyle in semi-urban communities is often a mix of traditional and modern, with residents engaging in subsistence activities like fishing and agriculture and participating in the cash economy through employment or small businesses.

Intermediate centers, such as Ailinglaplap, Arno, Jaluit, and Wotje, have a lower population

density than the urban centers but include important infrastructure such as government buildings, high schools, and jetties. They are expected to continue to develop in the future, accommodating more people from either the urban atolls or the rural atolls. Intermediate centers will increasingly experience sustained groundwater flooding or frequent flooding during high tide, potentially rendering these areas uninhabitable or unsuitable for agriculture. In addition, saltwater intrusion may inhibit agriculture and require more costly measures for drinking water supply, such as import and desalinization, if the demand cannot be covered through rainwater capture.

Infrastructure and population in these semi-urban communities are threatened by climate change impacts (sea level rise related erosion and inundation) like the infrastructure and population in the urban communities. However, due to lower population density, the urban heat island effect and disease spreading is expected to be less significant. We need to ensure the development of these intermediate centers considers climate change and disaster risks to ensure they are sustainable and are planned to limit the generation of new/additional risks.

4.2.3 Rural and Outer Atoll Communities

The outer atolls are more remote and have smaller populations, often in rural or semi-rural settings. These communities rely more on traditional subsistence lifestyles, including fishing and agriculture. They generally have more limited access to services and infrastructure, which can result in lower levels of education, healthcare, and economic opportunities. Due to their isolation and lower population densities, these communities may also be more vulnerable to the impacts of climate change, such as sea-level rise, saltwater intrusion, and extreme weather events, which can threaten their livelihoods and overall resilience.

On most neighboring atolls and islands, the development pattern is still largely influenced by continued low population densities due to the significant out-migration to the main urban centers or overseas. However, where there are higher population pressures or less adherence to traditional approaches to locating residential and other buildings has occurred over the last half-century, development exposure to coastal inundation and shoreline change has increased. The traditional division of land has also had an important role in the development pattern of these rural atolls, with the traditional land unit, called "*weto*" extending in strips running from the ocean to the lagoon side, ensuring that each household has an appropriate location across the island for residential structures and also provide access for each household to the different environmental zones on the island.

The issues facing these rural neighboring atoll communities mostly relate to food and water security. More frequent and intense coastal flooding will lead to salinization of the groundwater reserve and the soil, limiting the yield of crops, an impact already observed in low areas on Likiep. In addition, changes in the rainfall patterns may also affect agriculture yields, particularly in the northern atolls already prone to drought. Changes in the ocean, in particular ocean warming and ocean acidification, are projected to impact fish and other marine organism distribution, affecting coastal fisheries, which is essential for food supply and income generation. Both expected reduction of food supply from agriculture and fisheries in the neighboring atolls are expected to make community members more dependent on imported food, with health and financial consequences for the households

and increased solid waste management issues.

The key issue for the rural neighboring atolls is the likelihood of the atolls becoming uninhabitable due to more frequent and intense flooding, damaging infrastructure and impacting the groundwater aquifer. A vegetated buffer between the lagoon shoreline and residential or other structures may reduce the impacts of coastal flooding on infrastructure and buildings, and this tends to be the most 'optimum' position for development in terms of minimizing exposure to all but the most extreme typhoon wave-related inundation events. However, the efficiency of such measures decreases with sea level rise and is thus temporary. When sea level rises, relocation to other, protected atolls is projected to be one potential adaptation measure available, and the consequences of this measure in terms of loss of land, loss of livelihood, and community will need to be addressed.

Image Supplied by Webmedia South Pacific

The challenge facing planning adaptation measures for neighboring atolls relates to the lack of accurate data on island topography to help predict key flooding areas and develop specific flood maps for individual neighboring atolls. Projections of future coastal flooding vary for the different islands, depending on local factors such as land elevation and wave exposure. For example, there are islands with lower projections of flooding (e.g., Aur, Maloelap, Ujae, Wotje, Figure B.6), but it is noted that this is highly uncertain due to the low resolution and accuracy of the global elevation data.

4.3 Vulnerabilities of Key Economic and Social Sectors

Sector vulnerabilities relate to how well a particular sector can address climate change's impacts in their relevant area. Vulnerabilities may relate to governance, policy direction, data/information, financial or physical.

4.3.1 Vulnerabilities of the Works, Infrastructure, Utilities, Energy, Transportation Services and Communications Sectors

The RMI faces significant challenges in sectors reliant on physical infrastructure: utilities, energy, transportation, and telecommunications (Tables 9-12). The very nature and distribution of these infrastructures amplify their susceptibility. Common vulnerabilities are:

Legislative Concerns of Land Tenure and Ownership: RMI's unique land tenure system often limits infrastructure development. A case in point is the road to Majuro airport, rerouted around private property when the owner didn't grant access. This occasionally forces infrastructure into less optimal locations, like areas closer to coastlines, exposing them to greater climate risks. The predominance of privately owned land housing public infrastructure poses additional challenges. Disagreements over lease terms can jeopardize the continued operation and accessibility of vital infrastructure.

Environmental Factors: The inherent low elevation of the RMI's atolls poses a two-fold threat. Firstly, most infrastructure finds itself in coastal areas, at direct risk from severe weather events and rising sea levels. Secondly, spatial constraints have led to logistical challenges, such as smaller aircraft being the only feasible mode of air transport due to runway lengths. In urban centers limited land availability sometimes pushes vital facilities closer to the coastlines, heightening their vulnerability.

Economic Implications: The onus of infrastructure maintenance for outer atolls typically falls on local governments. Given their limited financial resources, they often grapple with developing and maintaining quality infrastructure. This underfunding results in facilities that are more susceptible to damage and decay. The RMI's dispersed geography complicates the provision of consistent services. Transporting essentials to distant atolls is a logistic and economic challenge, sometimes pricing these services out of reach for remote residents.

Tangible Impacts of Climate Change: Projected increases in sea levels foreshadow more frequent coastal erosion and flooding. Key infrastructure components, including ports, roads, and buildings, are directly in harm's way. Such eventualities risk making roads impassable and can also sever community links to essential services. Furthermore, rising groundwater threatens foundational structures, potentially leading to more rapid deterioration and contaminating water sources.

The RMI is no stranger to the ravages of tropical cyclones. If projections hold true, the archipelago will see a surge in the frequency and intensity of these destructive events. The repercussions span from direct infrastructure damage to prolonged service disruptions, especially in transport, severely affecting island connectivity and access to essential services.

Oceans becoming more acidic can erode coastal structures. From seawalls to ports, increased maintenance and repair are on the horizon. Additionally, the corrosive effects of acidic waters can compromise the longevity and integrity of concrete structures, requiring more frequent replacements.

With global temperatures on an upward trend, the RMI faces multiple challenges. Elevated temperatures can speed up wear and tear on infrastructure, from roads to buildings. Moreover, utility systems, especially electricity and water supplies, might buckle under the strain of extreme heat, rendering them unreliable. Such conditions also raise health and safety concerns for workers, necessitating more frequent breaks and prolonging construction or repair schedules.

Table 9: Specific Transportation Sector Vulnerabilities

Sector / Hazard	Hotter temperatures (hot days, heat waves)	Rising sea levels (high tide'sunny day' flooding, rising groundwater level)	Increased tropical cyclones (increased frequency, intensity, more larger waves, and higher storm surges)	Changing rainfall patterns (drought, extreme rainfall intensity)	Ocean changes (sea surface temperature, dissolved oxygen, acidification)	Other (sector specific)
Air Transport	The existing airport facilities and operations are vulnerable to increasing hot days and heatwaves as they are largely open-air or cooled only by natural ventilation and fans. The increasing number of hot days and heat waves will affect comfort of terminal staff and users, may affect the safety (e.g., dehydration, fatigue) of ground staff personnel, the reliability of ground support equipment, accelerate the deterioration of infrastructure (e.g., asphalt runway), and place additional stress on supporting infrastructure services (e.g., power supply, water, and sanitation).	RMI airports are low lying and vulnerable to rising sea levels with an increasing risk of coastal erosion of airport lands, coastal flooding of airport facilities, and with airport access routes and supporting infrastructure (e.g., roads, energy, water supply) also vulnerable to sea-level rise. The effects of SLR will be felt as both a chronic threat (gradual decline in service) and via acute extreme events such as extreme storms. For Majuro, this has a cross-sector impact with a reduction in the potential freshwater collection from groundwater infiltration, with the runway acting as a significant source of freshwater runoff capture	The increased frequency and intensity of extreme weather events such as tropical storms or cyclones will lead to greater disruption to air travel, damage airport infrastructure, and pose risks to aircraft and passengers. Severe weather conditions can lead to flight cancellations, delays, and potential damage to aircraft. Alterations in wind patterns may require adjustments in flight routes and landing approaches, impacting the efficiency and safety of air transport.	Changes in weather patterns, including shifts in wind patterns and rainfall variability are expected to affect the air transport sector. Such changes can affect flight operations, particularly for small aircraft and inter-island domestic flights. The airstrips in RMI are unsealed, except for Majuro and Kwajalein, and are generally in a poor state. These often consist of only grass, coral, or gravel surfaces, which results in additional maintenance after heavy rain events.		The changing climate change will impact airport facilities, infrastructure and operations across the multiple sectors that rely on air transport. This includes passenger air travel for tourism and social connectivity, the economic sectors which rely on air transport (e.g. tourism, fisheries, importing critical components for infrastructure/ facilities), humanitarian development and aid, health and emergency transport, government, and diplomatic transport.

Sea Transport		The erosion of shorelines and inundation resulting from sea level rise can undermine foundations, cause structural damage, and render infrastructure associated with the Ports unusable. This can hinder transportation, trade, and economic development, making it challenging to provide essential services to the outer atoll communities.	The increased frequency and intensity of extreme weather events such as tropical storms or cyclones will lead to greater disruption to sea transport, as well as damage port infrastructure. These severe weather conditions can lead to sailing cancellations, delays, and potential damage to vessels. Further isolating the outer communities in RMI.		Rainfall variability is expected to affect the sea transport sector, with increased levels of flooding within the port as well as the surrounding transport network (roads) upon which the ports rely on to move their goods in Ebeye and Majuro.	One of the key restrictions highlighted by MTCIT that will impact the RMI response to climate change is that due to the isolation from other countries, the majority of items coming into RMI must go through the Port. However, there is limited space and capacity for unloading, particularly due to the lack of cranes at the Delap international port. There is currently no plans by MTCIT or the RMI Ports Authority to increase the capacity at these chokepoints. This is further exacerbated by impacts from climate change when the roads to and from the port are flooded due to inundation. The port is also vulnerable to power outages, which affects operations.

Land transport	Hotter temperatures can cause roads to soften and expand, which can lead to potholes and other damage. This can make roads more dangerous to drive on and can also increase maintenance costs.	As sea levels rise, coastal areas where roads and transportation infrastructure are often located are at risk of flooding and coastal erosion. This can damage or render roads impassable, hindering transportation, trade, and economic development, making it challenging to respond to emergencies, and isolate communities from essential services like hospitals, schools, and markets. The coastal roads in RMI are particularly vulnerable to these impacts.	Increased frequency and intensity of extreme weather events: These events can cause significant damage to roads, bridges, and other transportation infrastructure, resulting in disruptions to transportation services. Landslides and flash floods can also occur, further hindering road accessibility.	Climate change can alter rainfall patterns, leading to changes in water availability and the potential for increased rainfall intensity. Heavy rainfall events can result in flooding, which can damage road pavements, bridges, and culverts, making them impassable. In contrast, droughts can lead to soil instability and the weakening of road foundations, increasing the risk of road damage		

Table 10: Specific Telecommunications and Energy Sector Vulnerabilities

Sector / Hazard	Hotter temperatures (hot days,heat waves)	Rising sea levels (high tide 'sunny day' flooding, rising groundwater level)	Increased tropical cyclones (increased frequency, intensity, more larger waves, and higher storm surges)	Changing rainfall patterns (drought, extreme rainfall intensity)	Ocean changes (sea surface temperature, dissolved oxygen, acidification)	Other (sector pecific)
Telecommunications	Increased temperatures can require additional maintenance and cooling of the equipment	RMI are low-lying atolls, making them susceptible to sea level rise. As sea levels rise, coastal areas where telecommunications	Increased frequency and intensity of extreme weather events: RMI are exposed to tropical storms, cyclones, and other extreme weather events. These			Telecommunication networks rely on a stable and continuous supply of electricity to operate. Power outages caused by climate-related events can result in

Telecommunications Cont.	that is relied upon in RMI to communicate. Any disruptions can have significant consequences, particularly to critical communication lines, such as those used by emergency services.	infrastructure is often located are at risk of flooding and coastal erosion. This can damage or disrupt the operation of critical infrastructure, including submarine cables, communication towers, and equipment shelters.	events can cause physical damage to telecommunication infrastructure, such as downed power lines, damaged antennas, and structural damage to communication towers. These disruptions can lead to service outages and affect the reliability and availability of communication services.			service interruptions and impact the functionality of telecommunications networks, particularly where this is an important means of communication in the extreme climate or emergency events. Increased maintenance and repair costs: Climate change-related impacts, such as storms, flooding, and high humidity, can accelerate the wear and tear of telecommunication infrastructure. This can lead to increased maintenance and repair costs for the sector.
Energy	As temperatures rise, people will need to use more energy for cooling. This will put a strain on the energy grid, which will increase the number of blackouts already impacting Majuro, as an example.		Increased tropical cyclones can potentially disrupt the supply chain and increase the costs of importing diesel (e.g., through changing weather patterns and conditions that affect maritime transportation).			The switch to a focus on renewable energy may reduce some vulnerabilities to the impacts of climate change, particularly the individually powered homes. However, lower- income houses, particularly those in the outer atolls, are likely to be considered unsuitable for solar installation due to being in poor structural condition. Therefore, the most vulnerable parts of our community may remain vulnerable to power outages as a result of increasing climatic events in the future.

Table 11: Specific Water and Sanitation Sector Vulnerabilities

Sector / Hazard	Hotter temperatures (hot days, heat waves)	Rising sea levels (high tide'sunny day' flooding, rising groundwater level)	Increased tropical cyclones (increased frequency, intensity, more larger waves, and higher storm surges)	Changing rainfall patterns (drought, extreme rainfall intensity)	Ocean changes (sea surface temperature, dissolved oxygen, acidification)
Water resources	Hotter temperatures can lead to increased evaporation rates, which can reduce water availability in aquifers. This can be particularly problematic in areas that are already water- stressed, such as the outer atolls. Warmer temperatures can also lead to decreased water quality due to less dissolved oxygen, which is essential for aquatic life. Warmer water provides a more favorable environment for the growth of algae and other microorganisms, resulting in contamination and increased risks to health from more prevalent water-and vector-borne diseases.	Sea level rise can lead to the infiltration of saltwater into the groundwater freshwater lenses. This intrusion can contaminate the freshwater supplies, making them unsuitable for consumption and irrigation, requiring treatment to remove the salt content.	Extreme storms and heavy rainfall events can cause flooding and may carry pollutants, such as chemicals, sewage, and debris, into the groundwater, rendering it unsafe for use without proper treatment. Heavy rainfall may overwhelm individual rainwater harvesting systems, reducing the percentage of the rainfall that can be effectively collected.	Some areas may experience increased rainfall intensity, leading to challenges in capturing and managing the excess water. Other regions may face reduced rainfall, resulting in water scarcity (droughts) and the continued need for alternative water sources will be required.	With increased acidification comes increased contamination when combined with the other hazards, like sea level rise and tropical cyclones, which will increase the likelihood of inundation.
Wastewater	Higher temperatures can increase the growth of bacteria in wastewater, which can make it more difficult to treat. This can increase the risk in RMI of prevalent water-and vector-borne diseases, particularly where there are discharges of raw sewage into the ocean off the coastline of Majuro due to degraded outfall pipes and infrastructure.	The existing infrastructure in Majuro and Ebeye already has occurrences of saltwater intrusion; this occurrence will increase in frequency, duration, and intensity, because of sea level rise.	The outfalls of the saltwater reticulated systems have been damaged in the past because of extreme storms. This vulnerability will continue as the presence of extreme storms will continue with expected changes to the frequency and intensity. High winds, storm surges, and heavy rainfall associated with these extreme weather	Extreme weather events resulting in heavy rainfall can inundate the wastewater network, including poorly maintained septic tanks or pits where this is poor drainage and damage to the tanks. This poses health and environmental risks	The wastewater systems on Majuro and Ebeye are reticulated saltwater wastewater systems. As ocean acidification increases then there will be accelerated deterioration. This will increase

Wastewater Cont.			events can result in pipe breaks, leaks, or even complete destruction of the infrastructure. This damage can disrupt the saltwater reticulation system, leading to water shortages and difficulties in providing a consistent supply of water to the population.	due to the release of untreated sewage into the surrounding environment. Conversely, droughts will limit the ability of the Ebeye wastewater system to be able to draw water from the wells to pump and flush out the system.	maintenance and running costs.
Solid Waste	Increased temperatures can lead to accelerated waste decomposition, higher emissions of volatile organic compounds and increased odor generation. Higher temperatures could also increase the corrosion rates of machinery by accelerating chemical reactions and increasing the evaporation rate of moisture and therefore the concentration of corrosive substances. Landfill fires are a serious problem, and they can be exacerbated by increased temperatures. Due to the lack of separation of hazardous substances from the landfills in RMI, there are increased	Both of the landfill sites used on Ebeye and Majuro are at risk of inundation from sea level rise and extreme storms. This would result in the potential contamination of the surrounding environment through the release of waste materials and contaminants through leachate.	Due to the low lying nature of the existing landfills in Majuro and Ebeye, there is already a significant risk of waste material being washed into the surrounding coastal waters. This can lead to severe pollution and risks to human health. The increase of tropical cyclones will only exacerbate this issue. The same applies for outer atolls where waste is stored/disposed near the coastline.	More frequent extreme rainfall events increase the amount of leachate that will be discharged from the unlined landfills in RMI. This will further add to the contaminants leaching into the coastal waters around RMI. Further impacting human health and freshwater sources.	

Table 12: Specific Coastal Protection Sector Vulnerabilities

Sector / Hazard	Hotter temperatures (hot days, heat waves)	Rising sea levels (high tide 'sunny day' flooding, rising groundwater level)	Increased tropical cyclones (increased frequency, intensity, more larger waves, and higher storm surges)	Changing rainfall patterns (drought, extreme rainfall intensity)	Ocean changes (sea surface temperature, dissolved oxygen, acidification)	Other (sector specific)
Coastal Protection	Warmer temperatures can lead to increased corrosion of the materials used to construct seawalls, as well as increase expansion and contraction processes. This can weaken seawalls and make them more likely to fail.	Sea level rise exacerbates coastal erosion and increases the risk of inundation. Higher sea levels result in more frequent and severe erosion of beaches, shorelines, and protective dunes. Extreme storms and changing weather patterns can further intensify erosion and lead to the loss of land in places that were not previously exposed, undermining the effectiveness of coastal protection measures. The RMI lacks natural barriers to climate hazards due to the low- lying nature.	Extreme storms, including tropical cyclones, can cause severe damage to coastal infrastructure, such as seawalls, breakwaters, and revetments. When combined with rising sea levels, increased storm surge heights pose greater challenges to the structural integrity of these coastal protection structures.	Flooding from extreme events can create additional ponding where seawalls have been constructed as they are often higher than the adjoining low- lying land (as they act to stop wave run-up and events). This means they can act as a barrier for stormwater runoff, which exacerbates and prolongs the impacts felt on the adjoining properties that the seawalls were established to protect.	Increased levels of acidification can lead to corrosion of the materials used to construct seawalls, such as concrete and steel. This can weaken the seawalls and make them more likely to fail.	Impact on biodiversity and ecosystems: Coastal protection measures can disrupt natural coastal ecosystems and habitats. These structures can impede the movement of sediment, alter wave patterns, and impact marine and terrestrial biodiversity. Changes in water temperature, salinity, and other factors associated with climate change can further affect the health and resilience of coastal ecosystems.

Image Supplied by the Marshall Islands Journal

4.3.2 Vulnerabilities of the Healthcare and Social Services Sectors

The Republic of the Marshall Islands (RMI) faces pronounced vulnerabilities in its healthcare and social services due to the impacts of climate change. These vulnerabilities pose a significant threat, from damaging vital facilities to straining the healthcare system, curtailing access to social services, and introducing new climate-induced health challenges.

Climate Influence on Diseases: Island nations, particularly those in the Pacific, are exceptionally vulnerable to health repercussions resulting from climate change. Droughts in the region, which intensify water shortages, act as breeding grounds for diseases like dengue fever, Zika virus, and cholera.

Storms and flooding have an immediate impact, increasing the risk of food and waterborne illnesses. As flooding becomes frequent, it affects agricultural output, particularly coastal crops. The RMI's dependence on imported foods is heightened, risking the nutritional intake of its residents. Given the high prevalence of diseases, such as diabetes and tuberculosis in Micronesian nations, any additional health challenges could overwhelm the system.

Furthermore, as global temperatures rise, health challenges intensify. Human bodies face extreme stress when exposed to temperatures above 35°C. Continued exposure can lead to severe health complications or even death. With temperatures climbing, there's a growing risk of heat-related ailments[120]. The elderly, children, and those with chronic conditions face heightened risk. Without adequate interventions, the next decades could see an alarming rise in

[120] *Singh, R. B., Hales, S., De Wet, N., Raj, R., Hearnden, M., & Weinstein, P. (2001). The influence of climate variation and change on diarrheal disease in the Pacific islands. Environmental health perspectives, 109(2), 155–159. URL:* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240636/

heat-related deaths in places like the Marshall Islands.

Infectious Diseases and Climate Sensitivity: The correlation between climate change and the spread of infectious diseases is becoming undeniable. Temperature fluctuations, precipitation variations, and humidity changes directly influence disease vectors and their transmission rates.

Although socioeconomic advancements have curtailed several infectious diseases, these gains risk reversal with the changing climate conditions. The 2016 RMI Environment Report underscored this, spotlighting the looming dangers of climate-related health issues. Rising sea temperatures present a new set of challenges, from increased cases of diarrhea[121] and dengue fever to quicker food spoilage rates, escalating the risks of food poisoning.

General Vulnerabilities: Underlying the specific threats from climate change are several general vulnerabilities that compound the healthcare challenges in the RMI:

Urbanization: With a significant portion of the population residing in urban hubs, the risk of rapid disease spread, sanitation issues, and healthcare access disparity grows.

Poverty: Economic constraints hinder individuals from seeking timely medical attention or accessing preventive care.

Geographic Spread: The dispersion of islands adds logistical challenges to healthcare administration and service delivery.

Coastal Living: Most people live near the coast, making them immediate victims of climate adversities.

Island Ecosystems: Overuse and contamination risks threaten the already fragile freshwater resources.

Human Resources: An ongoing concern is the region's lack of adequately trained healthcare professionals.

Health Infrastructure Challenges: Many health facilities, particularly those located near the coasts, risk damage from extreme weather events. This puts a strain on healthcare accessibility[122]. Access challenges are manifold - from high travel costs to infrequent transportation options and the reliability of ports[123]. Climate-induced migration also disrupts established healthcare dynamics[124]. Urban centers become overburdened while remote clinics grapple with relevancy and staffing issues. Existing health issues like cancer, diabetes[125], and tuberculosis will likely worsen with the climate shift. This will require curative and preventive measures to ensure a healthy populace in the future.

[121] *Bentham, G., & Langford, I. H. (2001). Environmental temperatures and the incidence of food poisoning in England and Wales. International journal of biometeorology, 45(1), 22–26. URL:* https://pubmed.ncbi.nlm.nih.gov/11411411/

[122] *Taylor, 2021*

[123] *McCue, 2021*

[124] *Van Der Geest, Burkett, Fitzpatrick, Stege and Wheeler, 2019*

[125] *Dain, K., & Hadley, L. (2012). Diabetes and climate change—Two interconnected global challenges. Diabetes research and clinical practice, 97(2), 337–339. URL:* https://pubmed.ncbi.nlm.nih.gov/22890699/

Image Supplied by Webmedia South Pacific

4.3.3 Vulnerabilities of the Education, Skills, and Training Sectors

The PSS struggles to provide consistent education and instructional support across the RMI. Heavy reliance on skilled teachers to service less populated atolls is a high vulnerability, as migration statistics indicate decreasing populations in the outer atolls. Available figures show that RMI has not achieved universal enrollment in primary education (UNICEF, 2017). The PSS aims to reduce the number of school dropouts by 25%, partly by ensuring there is reliable sea and air transportation to get students to atolls with high schools and the provision of dormitories for outer island students. Such initiatives will need to account for the impacts of climate change. This will be particularly important given the PSS goal to transfer all Grade 7-8 students in primary schools with fewer than 50 students to the nearest larger school, reducing the number of small public primary schools. Such a move may contribute to further out migration from small atolls and islands. Despite goals to maintain enrollment numbers, enrollments continue to decline at all levels, attributed to migration to the US. Such outmigration will likely continue to affect education services on the outer islands and in key population centers as students and their families migrate. The continued migration of people from the outer islands to the core areas will also cause population pressures on school rolls in these centers and student accommodation. It puts financial pressures on households (and extended social support networks) forced to migrate. Where children and teenagers have to move for education on their own, there is potential for increased vulnerability when separated from family support, particularly for young women.

Education policies may also impact negatively on younger children in the family. Marshallese men and women often migrate for education and training, and this diaspora means that a significant proportion of children and young people do not live with their biological parents,

causing stress for the younger children and their families. Some 11% aged 0-4 years have one or both parents living overseas. For 7% of these children, their father is overseas, leaving their mothers to meet the daily demands of parenting with support from the extended family.

Unfortunately, up-to-date data on the impact of natural disasters on school infrastructure and children attending schools during natural disasters is unavailable (UNICEF, 2017). Climate change is likely to impact many school facilities significantly and will need to be addressed to increase the resilience of school facilities to climate and disaster risks. This includes physical infrastructure resilience, and the students and teachers within these facilities. Key climate change impacts include: Droughts and poor access to drinking water could affect students' health and may influence attendance and school closures. Additional concerns include flooding and inundation of school facilities;coastal erosion and loss of land impact on physical infrastructure more generally (jetties and wharves); spreading of communicable diseases, including vector-borne diseases; extreme high temperatures could affect the health of students and their ability to learn, and hence, may influence attendance, especially as the ability to regulate temperatures in schools is limited; extreme weather events affect transportation, making children unable to access schools;

Policies: No specific climate change policies are currently established within the education sector. Within the TTEC Working Group, PSS represents education and is a cross-cutting issue across sectors. Future policies would need to address the construction of new or replacement school infrastructure facilities. When school facilities are being developed, they need to account for climate change,e.g. through elevated structures, cooling systems, and adequate water supply to withstand droughts. PSS will need to working with communities, local government, and central government to protect key schools from erosion, flood and inundation and to ensure schools have adequate water supply for drinking and proper sanitation, accompanied by health education and hygiene training in the curriculum. A strategy is needed to address population change and provision of education in remote islands where populations may dwindle due to climate change.

Image Supplied by the Marshall Islands Journal

4.3.4 Vulnerabilities of the Fisheries Sector

Due to the importance of the fisheries sector in the RMI, the impacts of a changing climate could be significant to the livelihoods and subsistence of the Marshallese.

Commercial Oceanic Fisheries: Generally, changes in rainfall patterns associated with ENSO and the ITCZ can affect coastal water salinity and nutrient levels, influencing the productivity and distribution of fish and other marine species by disrupting spawning seasons and migration patterns, affecting fishing activities and the long-term sustainability of fish stocks. In addition, extreme storm events that bring heavy rainfall and subsequent runoff from the surrounding land can also lead to water pollution and habitat degradation, further impacting fisheries. In contrast, changes in sea and land temperatures can lead to shifts in the distribution and abundance of fish species. Some fish species may migrate to cooler waters, affecting traditional fishing practices and local fishing economies. Warmer water temperatures can also increase the risk of coral bleaching events, damaging coral reefs and associated fish habitats.

These impacts are likely to result in tuna species caught by purse-seine fishing (skipjack, yellowfin, and bigeye tuna), which RMI is so dependent on, migrating in an easterly direction into the high seas out of the existing EEZs. Simulations to consider the potential future distribution of tuna as a result of changing environmental variables have identified that by 2050, under a high greenhouse gas emissions scenario (RCP 8.5), the total biomass of the three tuna species in the combined jurisdictions of the 10 PNA EEZs would decrease by a total of approximately 12%, with an average of 13%. Specifically, for the RMI, under this scenario, the average expected change to the biomass in yellowfin tuna is a reduction of 10%, a reduction in bigeye tuna of 2%, and a slight 1% increase in skipjack tuna of 1%[126].

[126] *Bell et al. 2021*

Overall, the average total change in biomass is projected to decrease by 19,261 tons, from 437,919 tons in 2020 to 418,658 tons by 2050. However, under the same scenario, the maximum change predicted could be as high as a reduction of 10% in total, reducing the total biomass by 43,738 tons. The estimated changes in purse-seine catch under RCP 8.5 could reduce total annual fishing access fees for the RMI, projected to be approximately $200,000 but as high as $2.7 million. It is noted that under a lower-emissions scenario (RCP 4.5), the projected impacts are expected to be less severe, with some SIDS benefiting from an increase in tuna species caught. This is the case for the RMI, where the distribution of tuna species in an easterly direction will initially help the RMI, as they are located further east than some of the other Pacific SIDS. But as the climate changes, the tuna species will continue to move further east out of the RMI EEZ, too, so the potential benefits will be temporary. Critically, the sustainability of tuna catches could be at greater risk because the monitoring, control, and surveillance required to combat illegal, unreported, and unregulated fishing and impose penalties for non-compliance are more complex in high-seas areas where tuna are expected to migrate. This is because responsibility for compliance with fishing regulations on the high seas rests with the states that 'flag' fishing vessels (often resulting in self-regulation), whereas compliance within EEZs is under the control of coastal states. With changes to the distribution of tuna into the high seas, the onus will be on the Western & Central Pacific Fisheries Commission (WCPFC) to implement tighter controls on fishing for tropical tuna species by all vessels operating in high-seas areas of the Western and Central Pacific Ocean (WCPO).

In addition to the direct climate change impacts on the distribution of fish species, the fisheries sector faces vulnerabilities such as the potential loss of Majuro as a key transshipment port due to sea level rise and increased likelihood of road inundation. Several factors will influence Majuro's continued role as a vital port in the Pacific, with decision-making being a fluid process. Key drivers include the eastward movement of fish stocks under climate change, which may reduce visits to Majuro; the need to maintain safe and protected anchorage areas, something Majuro currently provides; the accessibility to essential amenities and facilities near the wharf; the necessity to maintain and possibly increase wharf-side access and capacity in the face of climate change; and cost considerations, which could be affected by increased climate-related maintenance costs[127]. These aspects collectively determine Majuro's attractiveness as a transshipment location and are subject to change due to climate change and other variables.

Coastal Fisheries: Models for the tropical Western Pacific indicate that sea surface temperature will rise by ≥ 3 °C, surface dissolved oxygen will decline by ≥ 0.01 ml L-1, pH will drop by ≥ 0.3, and net primary productivity will decrease by 0.5 g m-2 d-1 across much of the region by 2100 under the business-as-usual scenario. These changes were associated with rates of local species extinction of > 50% in many regions as fishes and invertebrates decreased in abundance or migrated to regions with conditions more suitable to their bio-climate envelope. Maximum potential catch is projected to decrease by > 50% across many areas, with the largest impacts in the western Pacific warm pool. Climate change scenarios that included strong mitigation resulted in substantial

[127] *Blaha, 2019*

reductions of Maximum potential catch losses, with the area where Maximum potential catch losses exceeded 50% reduced from 74.4% of the region under business-as-usual to 36.0% of the region under the strong mitigation scenario[128].

Based on the current (baseline) catch levels, the projected impact on the volume of coastal fisheries caught could fall for 13 of the 14 PIC under almost all climate change scenarios. Declines greater than 18% by 2050 are expected under a high emissions scenario, with most being over 50% under this climate scenario. Even for a low emissions scenario, the average decline in PICs will be 28.5%. For the RMI, the best-case scenario predicted is a decline of 40% of the coastal catch and 75% in the worst-case scenario, as shown in Table 13 below.

Table 13: Estimated change in the Maximum Catch Potential (MCP) for RMI under a high emissions scenario (SSP5-8.5) for 2030 and a low (SSP2-4.6) and high emissions scenario (SSP5-8.5) for 2050.

CHANGE IN MCP (%)									
Pacific Island Country	Species category	Catch comp.	SSP5-8.5 2023		SSP2-4.6 2050		SSP5-8.5 2050		
			MCP change	Range	Median	MCP change	Range	Median	MCP change
RMI	Demersal	0.712		-60 to -20	-40.0	-28.5	-90 to-60	-75.0	-53.4
	Nearshore pelagic	0.288		-60 to - 10	-35.0	-10.1	-90 to-50	-70.0	-20.2
	Overall		**-44.9**			**-38.6**			**-73.6**

In addition to direct impacts on fish abundance, coastal habitats around atolls, including coral reefs and seagrass habitat, are likely to be impacted by climate change. This will increase the vulnerability of the coastal fisheries relied upon by those communities. Ocean acidification from a changing climate can hinder the growth and development of shell-forming organisms, such as oysters, clams, and coral reefs[129]. Impacts on these important coastal habitats around the atolls in the RMI will further change the species type and abundance, which increases the vulnerability of the coastal fisheries sector. This will likely reduce the number of fish caught and sold at local markets or consumed for subsistence by the Marshallese living on the outer atolls.

4.3.5 Vulnerabilities of the Culture and Internal Affairs Sector

Gender: Marshallese climate change policies acknowledge that climate change affects men and women differently, making efforts to integrate gender and human rights considerations into adaptation and mitigation plans. Women in the RMI suffer disproportionately from climate change owing to existing societal roles, responsibilities, and inequalities.

[128] *Ash et al., 2018*
[129] *Ash et al., 2018*

This disadvantage is exacerbated by their responsibilities in families, such as domestic food and water provision and childcare, combined with limited access to resources like health, education, and public office.

The impact on women is especially pronounced in the outer atolls, where women's roles in making handicrafts and maintaining domestic duties are vital for family income and well-being. Climate change risks and disasters expose them to economic hardship, unemployment, health issues, gender-based violence, limited access to justice, and increased poverty and marginalization.

Gender, though not a 'sector' traditionally, is addressed through institutions and mechanisms like the TTEC and CCD. These entities ensure all sectors are gender responsive and inclusive, promoting gender equality by confronting norms, roles, and inequalities in various areas. The intersectional approach recognizes overlapping forms of discrimination based on factors like class, sex, age, or disability. Women Uniting Together Marshal Islands (WUTMI) is a leading non-governmental organization promoting women's rights. Comprised of 22 chapters from outer islands and beginning to form chapters outside the RMI, WUTMI implements programs strengthening parenting skills, addressing substance misuse, establishing support services for gender violence survivors, and increasing awareness of gender in climate and disaster risk management.

Gender and human rights in relation to climate change activity is a complex and singular issue – given the fundamental desirability to bring women's voice, alongside that of men, to the critical climate change decision-making over the next few years and into the future. Major cultural and existential decisions will be required in the short term to identify a practicable adaptation pathway, and in the intermediate and longer term to prepare for and implement it. Considerations need to be mindful of original traditions and customs.

From a once cooperative and complementary role in decision-making, women's voice and influence has diminished dramatically from pre-colonial times. Their historical influence as peacemaker, consensus builder and finisher was never more needed than now to be part of addressing the decisions required of climate change.

Image Supplied by Webmedia South Pacific

Indeed, prior to the colonial period, women had significant power in decision-making, and played roles in fishing, canoe building and navigation. With Christian influence at the turn of the 19th century this culture changed, and the power of women was diminished. Today, women face multiple barriers that prevent them from living lives free of violence and coercion, and decision making power is largely in the hands of men.

The complexity and dilemma of acknowledging the issue and changing current norms is demonstrated by quotes from recent studies:

1. The NAP GN report[130] commissioned by the NDC – Partnership Working Group notes: **"While both gender and human rights are espoused by Marshallese Institutions, their incorporation into the nation's efforts to adapt to climate change is a complex task often requiring new ways of thinking, collaborating and governing".**

Understanding why gender equality and human rights considerations should be central to adaptation efforts, and how to accomplish these important objectives, is essential for an effective response of the Marshallese people and its government to the climate crisis.

2. The Ministry of Culture and Internal Affairs Gender Equality report[131] states:

"In Marshallese culture, women are traditionally respected as key decision-makers and landowners and recognised for their contribution to our economy, society and families. We culturally value women and girls, but we realise that the lived experiences of our Marshallese women are far from perfect. Women continue to face multiple barriers that prevent them from enjoying a life free from violence and coercion where they can access equal opportunities and equal rights."

The report goes on to note:

"The fundamental values of Marshallese culture include caring for each other, respect, reciprocity and partnership. However, these traditional beliefs and women's customary rights co-exist with dissonant gender stereotypes, gender roles and inequality. In modern society, most decision-making has shifted to the men of the family. Stereotypes include the belief that women's place is in the home, while men should occupy the public space…"

3. The Beca Output 2 report[132], commissioned by the PREP II Project, noted a report by WUTMI[133] which:

"… found patriarchal ideology reflected in community values and beliefs regarding gender, gender roles and women's rights, and men's use of violence against women."

It went on to note: "Despite having a history of matrilineal land rights and women having chiefly titles and clan affiliation, (recent) cultural and religious values shape constructions of masculinity and femininity, placing women in a subordinate role to men. These gender unequal values, attitudes and practices are repeatedly conflated with tradition or 'custom'. As a result, women are accorded fewer rights and less

[130] *NAP Global Network, "Gender and Human Rights Analysis: Ensuring a Gender-Responsive NAP in the Republic of the Marshall Islands, 2021*

[131] *Ministry of Culture and Internal Affairs, "Gender Equality – where do we stand?", May 2018*

[132] *Beca Consultants, "Output 2 – Sector Vulnerability and Adaptation Planning Report" August 2023*

[133] *WUTMI, "Someone to Save Me From Him: Findings from the Community Engagement Study on the Design of the Violence Against Women and Girls Support Service in RMI, 2016*

social freedoms than men, and men's use of violence against women is justified and largely used with impunity. Over half of all women (56%) and men (58%) surveyed agreed that violence against women was justified under specific circumstances."[4]

4. But this was not always the case and the conflict between traditional and modern values might be explained by Tonie de Brum[134] who references Carol Curtis[135]:

"...during the pre-colonial period women were always held in great respect. Because they were the creators of new clans and lineages they had significant power in their community and decision-making. However ...after Christianity had swept through the RMI at the turn of the 19th century, the power vested in women through their matrilineal lineage began to dissipate.

She recalls a time in history, before Christian influences, when women were fishers, canoe builders and navigators themselves. The traditional roles of Marshallese women as nurturers, providers and overall leaders of their clans were undermined and the power which belonged to them was passed on and continues to be vested in their brothers as a result of foreign contact."

De Brum also references Arthur Spoehr[136]:

"The extant scholarship offers evidence of Marshallese women's standing being diminished by the missionary values of Christianity and western society's notion of traditional gender roles – all of which were accepted by the Marshallese. Nowadays, customary norms, stereotypes of women's roles and a lack of public awareness have left Marshallese women excluded from decision-making positions."

This has been addressed to some extent by recent equality policy and law and within the RMI Public Service women occupy senior positions – however, as noted by WUTMI, progress is slow and the norms and blockages still exist. Representation in the Nitijela and in local government remains sparse.

Image Supplied by Webmedia South Pacific

[134] *Kattil-De Brum Tonie K, "Women of the Marshall Islands and Environmental Change: Agency and Power in Resource Management" Thesis for MES – University of Waikato, NZ, 2018*

[135] *Curtis Carol, "Women and Culture", (n.d), 1992*

[136] *Spoehr, A, "Majuro: A village in the Marshall Islands", Chicago Natural History Museum, 1949*

At a political level, action has been taken with the "National Gender Mainstreaming Policy" (2015), the report from the Ministry of Culture and Internal Affairs on "Gender Equality – where do we stand?" (2018) and the more recent "Gender Equality Act" (2019).

At a social and community level, the slow implementation of these measures is showing a need to go far beyond the current dialogue and provide for programs, commitment and champions across society. There are concerns in the NAP GN report[1] that efforts to address these issues have a feel of 'tick box' measures and it is felt a focused and better resourced response is required. This view is reinforced in discussions with the WUTMI Board, who note their successes while lamenting the lack of resources and noting ruefully their difficulty in having an overall impact because of entrenched attitudes.

The NAP should become a platform for gender action. This can be achieved through development of a Gender Action Plan and by inclusion of gender elements in all sector action plans.

Two things are clear. First, the fundamental importance of women's voice in climate change decision-making. Cabinet has acknowledged this in adopting the SLR Adaptation Policy[137] in June, in which addressing women's voice is one of the priority underlying issues. Second, the need to elevate the work of WUTMI to a higher level of focus and resourcing and the work of MCIA to promote gender equality and responsiveness in all sectors. Both are required to overcome the substantial barrier represented by the current social norms and stereotypes around gender.

One example of the complexities of the challenge, from the community consultations, is from Wotje, where women explained that due to the increase in air temperature they find they are staying home more and not interacting with and supporting each other. This coupled with the reduction of livelihood options for men puts more stress on women in the household and can lead to violence without a positive coping mechanism. Therefore, the community requested for traditional huts to be built around the island to promote social cohesion and strengthen positive social networks.

Youth, Elderly, and the Infirm/ Disabled: Approximately 34% of the RMI population are under age 15, and 54% are under 24. With high rates of teenage pregnancy and only 5% possessing tertiary qualifications, youth face unique challenges. Many must leave rural homes for education, limiting visits due to transportation issues. Climate change impacts are forcing more young people to leave their home islands to support families, thus affecting both the working-age population on outer islands and the youth's connection to traditional skills and healthy diets. Furthermore, the visible impacts of climate change are causing despair and anxiety among youth about their future on traditional lands. The Youth Services Bureau emphasizes education and discussion with young people to help them understand climate adaptation, mitigation, and preservation of Marshallese cultural traditions.

On average, life expectancy is around 65 years[138].Ischemic heart disease is the leading cause of death in the RMI[139]. Poor diet, water scarcity, and higher temperatures exacerbate the existing vulnerabilities of this population.

[137] *Government of RMI, "SLR Adaptation Policy", June 2023*
[138] *World Bank, 2021*
[139] *IHME, 2021*

Access to health care is limited to primary care in the outer islands and secondary care in the mainland. Vulnerable older adults and those with underlying health conditions may be required to travel overseas for health care away from their main support networks. Health is one of the primary reasons for internal and external migration, particularly for senior citizens and those with underlying health conditions[140]. The limited diet available, temperatures, and risk of extreme weather events may be things that this population cannot withstand and result in higher rates of morbidity amongst this population, increased health effects, or forced migration.

Image Supplied by Webmedia South Pacific

Persons with disabilities in the Pacific Islands, notably the 6,210 in the Republic of the Marshall Islands (RMI), face significant marginalization. The 2021 RMI Census revealed disabilities such as difficulties in seeing (8%), hearing (4%), walking or climbing (5%), concentrating (6%), self-care (3%), and communicating (3%). Their lower adaptive capacity makes them particularly vulnerable to climate change and disasters. Challenges include not accessing warnings due to hearing or reading impairments, mobility issues, and living in poorly constructed homes. Recovery post-disasters is often slower, with some facing displacement or inadequate housing. Though RMI ratified the Convention of the Rights of Persons with Disabilities in 2015, services are sparse, particularly on outer islands, due to funding constraints. These challenges often result in social and financial isolation for disabled individuals. The government did establish a disability pension in 1990 through the Marshall Islands Social Security Administration (MISSA),

[140] *Van Der Geest et al, 2019*

but the scheme's effectiveness is uncertain due to data gaps. There's a pressing need to bolster support for this vulnerable group.

Culture: The MoCIA is responsible for protecting historic and cultural heritage. Currently, this is focused on identifying sites of cultural heritage and the demarcation on maps. The HPO within MoCIA also has the function of reviewing earthwork applications and commenting on any cultural heritage sites of significance that may be impacted. However, there is currently limited information on the impacts of climate change on cultural sites of significance in the RMI. Anecdotal reports are that many cemeteries are at risk from coastal erosion and SLR, and such sites being damaged can have very high associated impacts on the community.

There are also vulnerabilities associated with maintaining cultural practices in the RMI with a changing climate. For example, water shortages and rising sea levels on the outer atolls affect the traditional plants that comprise the predominant diet in outer atolls. Embedded cultural practices tied to traditional food sources are at risk, particularly in outer atoll communities. There are also implications for traditional practices, such as the production of handicrafts, with physical resources, such as freshwater for growing crops used in the production of the handicrafts, coming under strain. Given the reliance of many outer atoll communities on handicrafts for income, this is a higher vulnerability for outer atolls than main urban centers.

The CDD Situational Statement points to other less visible effects of climate change on vulnerable people: There is growing despair or identity crisis affecting the populations of low-lying atolls, where people have close ties to their land but have little idea how to accept or deal with the knowledge that climate change will take their lands and threaten their rights and livelihoods, possibly within generations.

Land tenure: The land tenure arrangements in the RMI mean that all land is private. A current vulnerability associated with land tenure is that many arrangements, particularly in outer atolls, are 'handshake' agreements between landowner and leaseholder, which means they rely on the ongoing goodwill of the parties involved. This may create future vulnerabilities as land comes under more pressure due to rising sea levels. There is also a process of voluntary registration of land ownership. This creates vulnerabilities as unclear land ownership and lease arrangements may be the subject of increasing disputes in the future, particularly as people become displaced from their lands and seek to migrate to other land areas they consider they have a 'claim' over. The lack of planning controls over what can and cannot be done on land means that land particularly vulnerable to the impacts of a changing climate may continue to be developed, increasing climate risks over time.

Institutional vulnerability: The key impacts on the Divisions/ Offices operating under the MoCIA are summarized in Table 14 below:

Table 14: MoCIA Roles In Addressing Climate Vulnerabilities

Division/Office	Responsibilities	Climate Vulnerabilities
Administration Division	Emergency response and disaster management, budget development	Increased frequency and intensity of climate-related disasters, need for additional resources, integration of climate considerations
Electoral Division	Conducting elections, voter registration, casting of ballots	Extreme weather events disrupting electoral processes, infrastructure damage, population displacement
Local Government Division	NI communities' development, infrastructure, disaster preparedness	Rising sea levels, coastal erosion, lack of 'whole island' picture leading to service duplication or gaps
Historic Preservation Office	Protecting cultural heritage and historic resources	Sea-level rise and coastal erosion threatening cultural sites, need to develop strategies to mitigate risks
Registrar Division	Protecting vital documents (birth, death, marriage)	Climate-induced disasters damaging physical records, need to ensure safety and preservation of vital documents
Central Adoption Authority	Adoption and counseling services	Increased climate-related disasters causing higher stress levels and psychological challenges
V7AB (National Government Radio Broadcast)	Content and priorities related to public information	Need to allocate airtime and resources for information on climate change adaptation and disaster preparedness
Ebeye Office	Elections, disability, gender development, registrar services in Ebeye	Climate change affecting accessibility and provision of services, need for contingency plans
Community Development Division (CDD)	Human rights, child rights, disability coordination, etc.	Indirect impacts on rights, increased vulnerability of specific groups, need for accurate data collection and community focus

Policies/strategies: The RMI government recognizes gender and human rights as essential in national strategies, laws, and institutions. The CDD in MoCIA oversees implementing, monitoring, and reporting on policies for vulnerable groups and international treaties (CRC, CEDAW, and CRPD) serving marginalized individuals. It promotes gender in development initiatives, institutional arrangements, and financing, focusing on diverse needs and voices. CDD emphasizes women's leadership and capacity building for better problem solutions.

CDD leads the Gender and Protection Cluster under the National Disaster Management Office, acts as the secretariat for the National Human Rights Committee, and chairs the WUTMI Executive Committee, among other roles. The Training Centre, partnered with WUTMI, prepares Marshallese for employment, including a two-month handicraft course.

RMI's international voice includes a seat on the UN Human Rights Council, and women leaders are engaged in global women's rights discussions. The National Gender Mainstreaming Policy (2015) and other key documents guide gender integration in government services, economic empowerment, and inequality reduction. Official priorities include addressing teenage pregnancy, violence against women, and limited access to justice.

Main national policies aimed at improving gender equality within climate change strategies include: National Gender Mainstreaming Policy (RMI, 2015) - Focuses on delivering gender-responsive programs and reducing GBV; Tile Til Eo 2050 Climate Strategy (RMI, 2018) - Incorporates gender and human rights into adaptation and mitigation strategies, promoting women's role in decision-making; Gender Equality Act (RMI, 2019) - Legally frames gender equality, promoting gender integration across climate-related policies; Updated Nationally Determined Contribution (RMI, 2018) - Commits to gender-responsive approaches and aims for carbon neutrality by 2050. The 2019-2021 NDC Partnership Plan focuses on incorporating gender and human rights in the NAP and climate action, including gender-sensitive budgeting.

4.4 Vulnerabilities of the Natural Resources and Commerce Sectors

Climate change poses severe risks to the RMI's natural resources and commerce sectors, which depend on environmental conditions for sustenance and trade. The existing nutrient-poor soil, lacking essential elements like nitrogen and phosphorus, will be further strained by escalating temperatures, droughts, and sea level rise.

Intensifying droughts have led some outer atoll communities to forgo farming, conserving scarce water strictly for household use. Such drastic adaptations have negative repercussions on community health and nutrition. The ACWA project addresses part of this challenge by upgrading 3,000 homes for enhanced rainwater harvesting. Yet, despite these efforts, the issue of freshwater availability remains acute, especially in the northern atolls.

The RMI has uniquely fragile water resources due to their small size, lack of storage, and limited freshwater.[141] The main sources of fresh water are rainfall harvesting and groundwater – urban centers utilize rainwater, groundwater, desalination, and imports, while the outer islands use mainly rainwater and groundwater. Wet season rainfall generally supplies the majority of freshwater to the RMI, and the main source

[141] *Subbarao, S. & Mucadam, R. (2015). Second National Communication of the Republic of the Marshall Islands. United Nations Development Program/Global Environment Facility. Suva, Fiji. URL:* https://unfccc.int/sites/default/files/resource/mhlnc2.pdf

of drinking water is rainwater catchments and tanks which are used by almost four-fifths of households.[142] About 88% of the population has access to improved drinking water sources. Despite relatively high rainfall, the limited storage capacity and aging reticulated water system mean the public water supply is rationed – under non-drought, normal operating conditions, the public water operates three days a week for four hours a day.[143]

There is a pressing need to upgrade the city's water infrastructure due to historic underinvestment in water management and rehabilitating water and wastewater systems. This urgency is heightened as more people relocate to the two urban islands, adding strain on already stretched water supplies. The impacts of climate change, specifically salt-water intrusion, on these resources haven't been thoroughly addressed[1]. On the Majuro atoll, the primary water sources are the Laura freshwater lens and an airport runway catchment system. These feed the city's main reservoir. As global temperatures climb, this reservoir risks increased evaporation rates, further limiting an already scarce freshwater supply.

Additionally, the looming threat of sea level rise can compromise this freshwater lens. This leads to risks like saline contamination, affecting agriculture, and general depletion of freshwater reserves. If sea levels continue to rise and are combined with increased storm surges, it could temporarily make groundwater saline, a situation only remedied when sea levels stabilize[1].

Lower rainfall with higher temperatures associated with global warming would decrease the groundwater resources of these atolls, with less rain-fed recharge, increased evaporation, and increased water demand.[1]

Northern atolls in RMI predominantly rely on rainwater, making them vulnerable during low rainfall periods. The 1998/1999 El Nino, one of the most severe, brought only 8% of the usual rainfall over four months, severely impacting areas like Laura's freshwater lens on Majuro. This shortage forced the government to declare a disaster and use Reverse Osmosis (RO) Units, which are expensive, environmentally unsustainable, and emit CO2. The implications for RMI's disaster management and response are significant, with potential increases in the frequency and intensity of El Nino events.

MNRC has seen an increase in breadfruit trees being "burnt," meaning that a section or the entire canopy of the breadfruit tree has lost its leaves and is not producing any breadfruit. This is due to an increase in temperature and exposure to salt spray. Plans to increase the planting of these traditional species by MNRC must include measures to ensure the plants remain viable with climate change impacts.

Rising temperatures and increased hot days also pose risks to communities, with heat stress and discomfort affecting outdoor agricultural and forestry activities and constraining the number of hours that can be spent on them.

Crops will become increasingly susceptible to pests and diseases. Pests such as the breadfruit mealybug, coconut scale, and spiraling whitefly, which can seriously affect crop productivity and overall food security, may increase. The isolation of the RMI means that these same crops have a narrow genetic base, particularly

[142] *RMI (2016). Republic of Marshall Islands State of the Environment Report 2016. Apia, Samoa: SPREP. URL:* https://www.sprep.org/attachments/VirLib/Marshall_Islands/state-of-environment-report-2016.pdf

[143] *ADB (2020b). Key Indicators for Asia and the Pacific 2020, 51st Edition. Asian Development Bank. Manila. URL:* https://www.adb.org/sites/default/files/publication/632971/ki2020.pdf

some of the varieties of species of pandanus, taro, breadfruit, coconuts, dwarf banana, and sources of traditional medicines, which are now endangered. This increases their vulnerability to the impacts of climate change. Protecting the genetic diversity of these crops from introduced pests and diseases and the effects of extreme weather events like droughts and severe cyclones, is difficult (and sensitivity high). The limited resources currently in the RMI for quarantine and biosecurity increase the vulnerability to pest and disease outbreaks with warming temperatures.

With increased migration to urban centers and beyond, here is an increasing risk of losing traditional knowledge of agricultural practices. This includes the knowledge of how to farm and care for domestic and traditional plants and animals across the outer atolls. This has accompanied Marshallese households' overall decline in agriculture engagement. This also impacts the handicraft industry, which often relies on natural resources like freshwater to grow the plants used in the outer atolls.

Historically, coastal forests on the beach crest above the high tide mark have been thinned and removed in many urban and rural areas to provide land for development, particularly in Majuro and Ebeye. These root systems were used to reinforce the beach "berm" or crest and, to an extent, could resist coastal erosion, maintain berm height, and therefore minimize the occurrence of overtopping. Their removal has resulted in more frequent overtopping events and erosion along the foreshore, increasing vulnerability over time. Tables 15 and 16 show sectoral vulnerabilities in the RMI.

4.5 Summary of RMI Community and Sector-Level Vulnerabilities

Table 15: Summary of Community-Level Perceptions of their Vulnerability across the RMI

		Sea Level Rise							Rising temperature of ocean		Typhoon		Rising Air Temperature				Drought	
Atoll	Type	King Tides	Water Contamination	Flooding	Coastal Erosion	Food Contamination	Radioactive Contamination	Vector Borne/ Water Borne Disease	Depletion of Fishing Stocks	Coral Bleaching	Infrastructural Damages	Dock Damages	Gender based Vioence	Isolation and Heat Stress	Livelihood	Erratic Rainfall		Food Insecurity	Handicraft industry impacted
Amo	Urban																		
Majuro	Urban																		
Ebeye	Urban																		
Ailinglaplap	Intermediate																		
Wotje	Intermediate																		
Jaluit	Intermediate																		
Ailuk	Rural																		
Enewatak	Rural																		
Kwajalein	Rural																		
Wotho	Rural																		
Ebon	Rural																		
Kili	Rural																		
Likiep	Rural																		
Mejatto	Rural																		
Ujae	Rural																		
Utrik	Rural																		

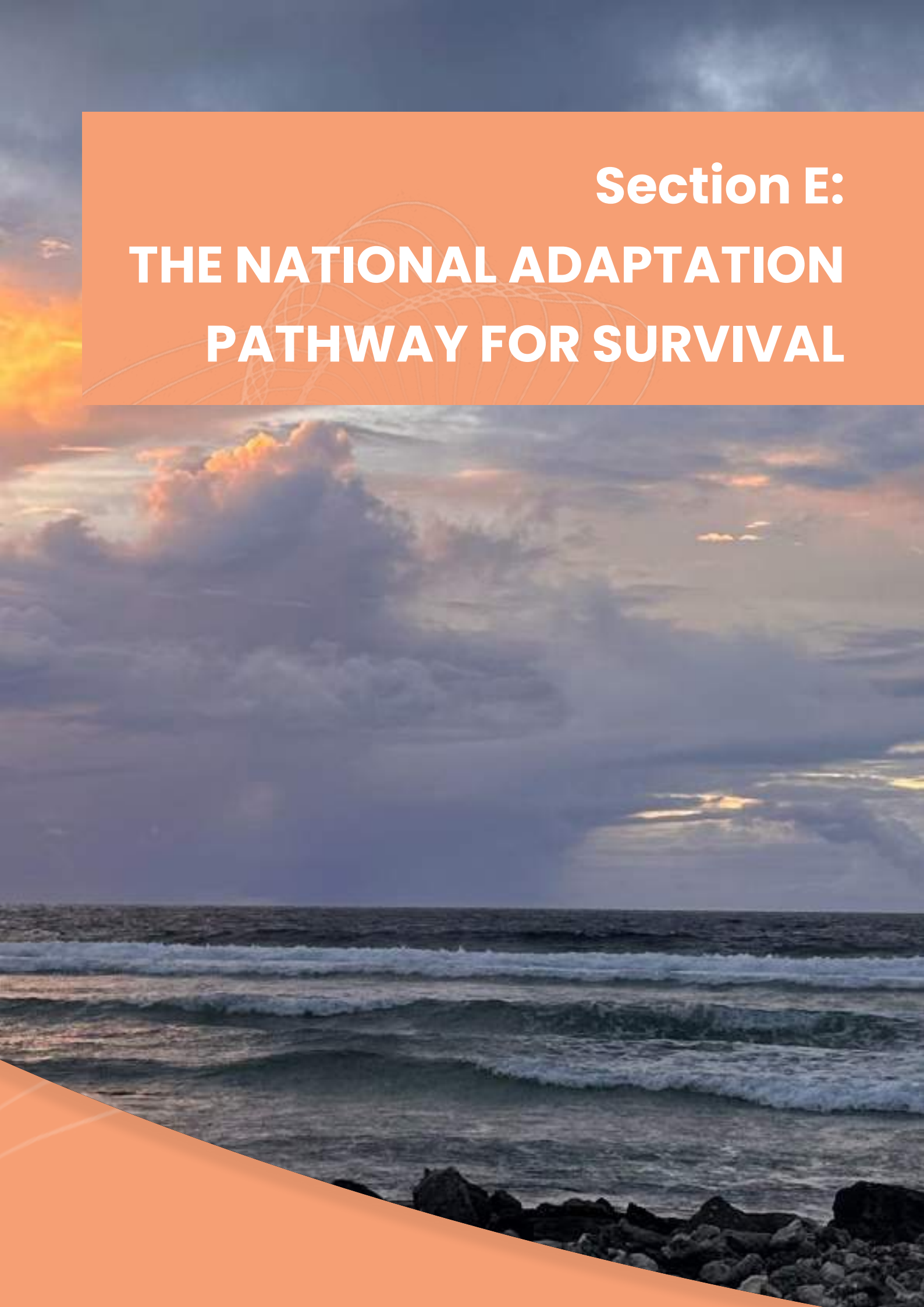
Red= Hi; Blue= Mid; Green=Lo; White=No response

Table 16: Summary of Sector Vulnerabilities across the RMI

Vulnerability summary						
		Climate Hazard				
Sector	Elements at risk	Increased temperature	Flooding/heavy rainfall	Increase in drought	Sea-level rise	Increase in ocean temperature/acidification
Works and Transport	Water supply					
	Telecommunications					
	Coastal protection					
	Wastewater					
	Stormwater					
	Ports					
	Roads					
	Airports					
	Electricity infastructure					
Natural Resources	Coral ecosystems					
	Agriculture/aquaculture					
	Horticulture/crops					
	Tourism					
	Terrestrial ecosystems					
Fisheries	Commercial					
	Coastal					
Internal Affairs	Vulnerable people (gender, disabled persons, youth, elderly)					
	Cultural heritage sites					
Health	Facilities					
	Human Health					
	Health services					
Education	School facilities					
	Services					

Red= Hi; Orange= Mid; Grey= Lo or No; Green=Hazard may reduce Vulnerability

Image Supplied by Webmedia South Pacific



Section E:
THE NATIONAL ADAPTATION PATHWAY FOR SURVIVAL

Section E: THE NATIONAL ADAPTATION PATHWAY FOR SURVIVAL

5.0 Purpose of the Adaptation Pathway

As described in the previous section, the projected effects of climate change for RMI are uncertain and will unfold over many decades and well into the next century. Therefore, adaptation is best approached as a *process* of adjustment over time[144]. RMI's NAP identifies an Adaptation Pathway grounded in the best available science and seeks to set out a process for preparing for the impacts of climate change, and implementing adaptation activity to secure the well being of MRI citizens. The Adaptation Pathway also aims to limit loss and damage.

The Adaptation Pathway is characterized by a sequence of actions in the long-term, each triggered by a change in environmental conditions (for example, sea-level rise), social conditions (for example, out migration), or a combination of these. Trigger points indicate when there is a need for a step change in adaptation action[145]. In this way, the Adaptation Pathway guides how adaptation activities should happen, what adaptation should involve, and, importantly, when adaptation should happen – which is not a set date, but is based on when conditions make changes necessary[146]. The Adaptation Pathway enables adaptation to begin now with dynamic decision-making in response to changing conditions and new information[147].

Practical development options in the Adaptation Pathway are limited by the low lying and often narrow land forms (there is limited width and height to retreat to) and by the attendant high cost of long term land protection measures (involving hard edged engineered walls or revetments and, ultimately, lifting of land). They are also limited by the enabling environment, both from a cultural perspective (noting the difficulties for development arising from the traditional land tenure and individual rights mechanisms) and from the need to develop adaptation capacity and adjust the institutional governance frameworks to enable the dynamic and the critical decision-making required.

The intermediate and long-term habitation limits from sea level rise (SLR) are contained in the SLR Policy[148], however it is becoming clear[149] that 'the complex intersections of climate related impacts means that it is likely habitation limits will be reached long before sea level rise makes islands uninhabitable'.

This underscores the need for urgent action and decision making in the early phases of the Pathway. Particularly, there is need to establish SLR and climate impacts monitoring to inform decision-making and to undertake deep discussion on the underlying issues of the SLR Policy.

144 *Hasnoot et al., 2013*
145 *Werners et al., 2015*
146 *Werners et al. 2021*
147 *Barnett et al., 2014*
148 *RMI Government, RMI SLR Adaptation Policy, Cabinet Minute 098 (2023), June 2023*
149 *Beca Output 3 Report – Community Vulnerability and Adaptation Planning Report, September 2023*

The proposed Pathway is set out in Figure 21. It includes four phases – all adjusted for actual observations of climate impacts at the time:

Phase D1 (2023 – 2040) In this phase, the necessary implementation frameworks would be prepared, the technical studies on the protection measures and the underlying issues of the SLR Policy would be undertaken, and local planning and measures for community led low technology and nature-based-adaptation would be initiated.

Phase D2 (2040 – 2050) In this phase, key decisions on protection measures for the 20" (0.5m) SLR decision point would be made. There would be consideration of the consolidation of services and planned relocations from unprotected atolls as necessary and consideration of the practicability of measures to achieve protection to 6.5ft (0.5m) SLR for 2150 and beyond.

Phase D3 (2050 – 2070) This phase includes the implementation of identified measures for protection and planned relocation and review of the Pathway beyond D3.

Phase D4 (2070/2090 – 2150) This phase provides for validation and implementation of 6.5ft (2m) SLR protection measures or alternative pathways of migration or identification of alternative land[SS1] .

Pathway Principles: Over the long-term timeline, five indelible principles will guide this process:

i. An *effective* pathway that is driven by the demand of the Marshallese people to respond to national and local needs and values[150].

ii. An *efficient* pathway that is well planned, coordinated, mainstreamed across all sectors and scales, and commenced as soon as possible[151].

iii. An *equitable* pathway that considers the most and least vulnerable people, their livelihoods, quality of life, and prospects for a better future for the next generations of Marshallese.

iv. An *enabled* pathway that is data and evidence-based, led by national leaders, implemented through responsible and empowered national institutions, and sufficiently resourced[152].

v. A *sustainable* pathway that is designed to improve the lives of as many Marshallese for as long as possible without risking worse conditions for them because of actions taken in the short to medium term.

5.1 Considerations for Decision-making for the Pathway

i. ***Managing Uncertainty***: Our Pathway acknowledges that uncertainties over time could impact the mid- and long-term decisions. The flexibility to manage such uncertainties is built into the Pathway.

Uncertainty 1: Projections about how much the climate will change arise because there is uncertainty about how much emissions of greenhouse gasses there will be. The trend of more warming, rising seas, and changes in climate and oceanic processes is clear: some

[150] *Eriksen, et al., 2011*
[151] *Schipper et al., 2022*
[152] *Barnett, 2022*

change is now occurring, and more change is inevitable – with all indications pointing to increasing changes, but the actual amount and timing of changes are still unclear[153].

Uncertainty 2: The specific responses of environmental systems to changes in climate and oceans is uncertain. For example, there is uncertainty about the future shape and size of islands[154].

Uncertainty 3: There is uncertainty about the effectiveness of specific adaptation interventions. As noted by the IPCC, "there is limited information on the effectiveness of the adaptation practices and the scale of action needed"[155]. Not much is known about adaptation on atolls[156] because there has been little investment in research and tangible initiatives[157]. Pilot studies are needed, for example, to identify whether nature-based measures will be able to keep pace with an accelerating rate of sea level rise.

ii. ***The timeline for action is based on present scientific models and data:*** This NAP is predicated on data and information which informs that sea levels are projected to rise around the RMI to: 20" (0.5m) between 2070 and 2090; 3.3ft (1m) around 2130, and; 6.5ft (2m) beyond 2150. At around 20 in (0.5m) of Sea Level Rise (SLR), habitability of unprotected atolls will become problematic due to extreme tides and frequent wave over-wash.

iii. ***The raised and protected land for the 2150 timeframe should provide space to safely accommodate people*** for a sea level rise scenario of 2 meters. The amount of land required to host 10,000 Marshallese would range from 0.25 km², for a population density comparable to Ebeye today, to 1.5 km², for a population density comparable to Delap today. A new airport would require an additional ~0.5 km². The land would need to be raised to a minimum target elevation between 11.0 and 12.5ft (3.3 and 3.8m) to prevent groundwater-driven intrusion for up to 2 meters of sea level rise.

iv. ***Preliminary analyses on identifying land for protection is based on environmental and physical parameters that may be moderated by social and cultural priorities:*** While physical and environmental criteria are used for identifying land to protect and elevate, they are only part of a much broader decision-making process that will need to take place, in which many other important factors will contribute to and influence the decision (see Table 17 below). Extensive stakeholder engagement will be required for some factors to be adequately considered in order to fully incorporate them in the decision-making process, while others may require more detailed data collection and analyses over the timeline.

[153] *As per the RMI Sea-Level Rise Policy 2023, SLR and its effects shall be actively monitored for the purposes of adaptation planning and decision-making, hence recognizing this uncertainty. For this purpose, the IPCC 2021 SLR Scenario projections SSP1- 2.6, SSP2- 4.5 and SSP5-8.5 should be used as the basis for updating future SLR planning projections.*

[154] *Kench et al., 2018*

[155] *Mycoo et al. 2022*

[156] *In theory adaptation can significantly reduce climate impacts on atolls. For example, there are already highly engineered islands (such as Hulhumale in the Maldives) that are likely to be sustainable through a changing climate (Brown et al., 2020).*

[157] *UNEP, 2022*

Table 17: Additional Criteria for Pathway Decision-making (Deltares, 2023)

Theme	Factors
Socio-cultural	Heritage, potential for traditional livelihoods, diversity, cultural protection status
Socio-economic	Presence of vulnerable populations, blue economy, distribution of costs and benefits of the project
Socio-political	Land ownership and rights, political will, governance, decision-making, legal conditions, geopolitical factors, financing availability
Ongoing transitions	Population loss and growth on different atolls, emigration, climate change rate, green energy transition, collaboration between SIDS
Ecological	Ecological impacts, environmental protection status (e.g. Marine Protected Areas)

5. ***Consideration of the Practicable Limits of Technical Feasibility:*** These include exposure to hazards, construction feasibility, and functional feasibility. Exposure to hazards: RMI is exposed to several natural hazards, including waves, typhoons, extreme precipitation, flooding, and drought. Several atolls have the additional hazard of having a history of nuclear testing. Construction feasibility: Raising or creating new land in RMI that is large enough to house 10,000 people and an airport would be challenging, given RMI's remoteness and atoll geomorphology. Thus, the emphasis is currently on the physical size and shape of an atoll, its accessibility, and its proximity to services during the construction phase. Functional feasibility during the transition period: Any planned movement of people, infrastructure, government services, and commerce will take long transition periods. Therefore, an option is for new settlements to be developed near settlements that have existing service infrastructure and commerce that can be extended; or in areas where there is feasibility to situate such services (utilities, commerce etc). It is more functionally feasible if new settlements can accommodate existing infrastructure, government services, and commerce and less feasible if these are lacking in a transition phase.

6. ***All the adaptation pathway options are costly.*** Investments available for flood protection measures will likely be insufficient. Most neighboring islands and intermediate centers will only be protected by low-cost, local adaptation solutions, and planned relocation from these islands to new centers is very likely. The cost of protecting all atolls against this is costly (order of $35 billion for 6.5ft (2m) SLR and $5 billion for 20" (0.5m) SLR) – it will be necessary to consider which parts of atolls, and how many atolls, can be protected. The cost of protection is a well-known limitation and this likely means that protection of the urban centres of Ebeye and Majuro D-U-D beyond 20" (0.5m) SLR is not practical.

7. ***Recognize that a conducive enabling environment must be put in place for effective implementation of physical actions:*** The physical implementation of the Pathway actions requires grounding, empowerment, and national authorization

via respective legislative, policy[158], planning, and institutional governance frameworks. The current institutional and implementation landscape have to be assessed and improved as necessary, particularly in the short term, to facilitate the later phases of the Pathway.

8. ***Consider nature-based solutions in place of hard-engineered solutions where available and appropriate:*** Identify low-cost and nature-based adaptation measures and activate them locally in the short to intermediate term. This is to improve habitability and potentially extend the 20 inches (0.5m) SLR tipping point projection. These measures should include upscaling local initiatives from Reimaanlok and traditional activity. For long term protection piecemeal hard-edge adaptation measures will not be sufficient or effective for RMI, and incremental measures building towards an identified planning point over time will be necessary.

5.2 Pathway Steps 2023 to 2150

The Pathway (Figure 21) includes the key activities, targets, and critical decision points and options and identifies timely windows of opportunity for the execution of a national strategy to combat climate change. In its first NAP, RMI seeks to focus on the next ten years of implementation. The NAP will be revised, updated, renewed, and reapproved in 10-year cycles over the Pathway timeline. As we focus on the next decade of action in our Pathway, we do so while collectively steering toward the 2070 and 2150 thresholds. The Pathway takes us from the present 2023 to a long-range planning point of 2150.

There are two **Threshold Points** identified along the Pathway. Threshold Point 1, around 2070, is the estimated 'marker' year by which sea-level rise is expected to an estimated 20" (0.5m) mark around the RMI. Threshold Point 2 has been pinned at around 2150 when the sea-level is estimated to reach a 6.5ft (2m) mark. Each threshold corresponds to certain adaptive actions, or suite of actions, that must be taken.

Four main Decision Points (D, D2, D3, D4) are identified along the Pathway. Each of these decision points represents the relative point in time by which critical national decisions must be made. At these points, the decisions will affect subsequent decisions along the pathway; they are path-dependent decision points. The first two decision points prioritize national decisions about Protection as a main adaptation strategy, while the next two decision points further along the timeline focus on national decisions about Planned Relocation and Migration as adaptation strategies.

158 *An example of this is the SLR Policy 2023 that calls for a rolling 50-year planning horizon for SLR be applied to definitive adaptation planning; and that a National Planning Statement for Climate Change be prepared to guide and monitor adaptation development.*

Figure 21: The Long-Term National Adaptation Pathway of the Republic of the Marshall Islands

From 2023 to around 2040

In this phase, the RMI intends to resolve many of the underlying issues to enable the pathway for decisive and effective implementation of adaptation actions. These issues are further discussed in the Enabling Conditions section of the NAP, but six broadly described issues are the most relevant to adaptation.

1. ***Public policy transformation*** through reforming existing policies to align with climate change needs, technological advancements, and global trends. Transformation also includes streamlining processes, reducing red tape, enhancing government responsiveness, and replacing outdated policies that may hinder climate adaptation objectives.

2. Develop ***institutional and administrative arrangements*** and capacity to implement national adaptation activities. This includes structuring the government mechanisms, ministries, agencies, and committees to undertake climate actions effectively and efficiently in coordinated ways. It also includes arrangements for oversight, governance, accountability, and transparency.

3. Align ***land tenure and land rights*** with climate adaptation needs as necessary and appropriate.. This includes reconciling Marshallese traditional land ownership and transfer approaches with modern best practices. This applies to communities, businesses, investors, and donors.

4. Develop ***climate finance pipelines***, i.e., the processes of securing and channeling financial resources towards climate-related projects and initiatives. This includes the planning, development, approval, execution, and monitoring of investments aimed at mitigating the impacts of climate change or adapting to its effects; and identifying and accessing various sources of finance, such as public and private funds, grants, loans, or investments.

5. Reviewing and updating ***environmental and construction regulations*** to align withclimate adaptation protection and relocation priorities, considering geophysical and infrastructure works across parts of the RMI.

During this period, the RMI government and stakeholders must develop and implement atoll specific adaptation and resilience measures through atoll adaptation and disaster planning which includes resilience provisions from the new DRM Act 2023. The focus of the next decade is the design and planning stage, with implementation/ construction later on.

In the ***Urban atolls*** of Majuro and Ebeye, the design plans will include how to relocate communities and government services and therefore identify agreed new sites on the atolls that meet the criteria of being able to be protected to the 0.5m sea level rise threshold by 2070 and have the potential to be protected to the 2m threshold by 2150, if it is found to be practicable. Coastal protection measures for urban centers must be upgraded to prevent frequent flooding and buy time for long-term transformative measures. Urban centers, such as the Djarrit-Uliga-Delap (DUD) area in Majuro and Ebeye, house most of the population and key critical infrastructure such as hospitals and airports. Without adaptation, these densely populated urban centers will experience

frequent flooding even with small amounts of sea level rise. With SLR in excess of 20" (0.5m) ground water intrusion from rising sea will lead to the need to lift land as well as protect it. This is impractical in the highly developed existing urban centers and consideration will need to be given to re-locating the center of government to a safer site.

In ***Semi-Urban atoll***s, the objective will be to invest in protection to be resilient to the 0.5m sea-level rise (Threshold 1). This could mean protecting entire atolls or at least their highest elevations. Where that atoll cannot be protected to this Threshold and adaptive mechanisms shift from protection to planned relocation of communities.

Image Supplied by Webmedia South Pacific

Two options exist for intermediate centers: either the 'low-cost, short-term' option, ultimately leading to the island's abandonment in decades to come, or the 'high-cost, long-term' option, leading to a consolidated urban center later in the Pathway. The first option is the implementation of **Nature-based Solutions (NbS)** to increase protection levels and decrease the vulnerability of these islands to flooding. Possible measures include reef restoration, artificial reef structures, and coastal berm enhancement (vegetation planting, vertical increase of the berm level). An important aspect of these measures allows for periodic flooding and storm deposition on the island, thus allowing for some natural dynamics and potential vertical growth of the coastal berm in response to sea level rise. However, they provide less protection against flooding than engineered coastal protection structures, and island assets will be periodically flooded.

Additional measures for this low-cost scenario include planned relocation from hazardous regions (near the ocean coast and areas below mean sea level) to safer locations on the

intermediate centers. Between 2070 and 2090[159], the intermediate centers relying on NbS are expected to become uninhabitable, primarily due to frequent flooding, but also on some islands due to salinization of drinking water and/or insufficient agricultural production. Monitoring flooding and island change will help inform both residents and the government in the decision for planned relocation.

The second option for intermediate centers is raising land and protecting it. Studies for addressing these issues are contained in the SLR Policy.

In ***Outer or Rural atolls***, RMI will promote climate resilience through appropriate NbS solutions and cost-effective, hard-engineered protection for identified infrastructure and works. The adaptation pathway for sparsely populated neighboring atolls and other islands comes down to buying time until sea level rise and other climate change impacts render the islands uninhabitable (for example, moving away from flood-prone areas within the same atoll). NbS measures allow for local, inclusive adaptation with strong involvement of local inhabitants. The need for these studies are also anticipated in the SLR Policy.

The results of a preliminary multicriteria assessment study[160], are shown in Table 18 below. Since many criteria in the construction and functional feasibility themes are based on proximity (to transport and critical infrastructure, basic amenities), Majuro, Kwajalein, and several nearby atolls appear at the top of the list. Since more criteria (social, cultural, and economic) should be included, this list is illustrative but provides an example of the future analysis that the RMI government will undertake for decision-making along the Pathway.

*Table 18. Illustrative Ranking of 10 atolls on Raising Land or Creating new land areas**

Rank	Atoll	Overall	Exposure to Hazards	Construction Feasibility	Functional Feasibility
1	Majuro	4.6	1.5	1.4	1.7
2	Arno	4.4	1.6	1.3	1.5
3	Mili	4.1	1.6	1.3	1.2
4	Kwajalein	3.7	1.2	1.4	1.2
5	Ailinglaplap	3.5	1.3	1.2	1.0
6	Jaluit	3.5	1.3	1.2	1.0
7	Ebon	3.1	1.3	1.0	0.8
8	Likiep	3.1	1.1	1.1	0.8
9	Lae	3.0	1.2	0.7	1.2
10	Maloelap	3.0	1.3	1.1	0.7

* Based on the outcome of an initial MOCIA for physical and environmental criteria when all criteria are weighted equally (Deltares, 2023).

[159] *In 2070 SLR is expected to be 0.36 m to 0.47 for SSP1-2.6 and SSP5-8.5, respectively. In 2090, SLR is expected to reach 0.49 m to 0.74 m for SSP1-2.6 and SSP5-8.5, respectively (Garner et al., 2021).*

[160] *Deltares, 2023. Methodology to identify land to protect and elevate. Assessment of environmental and technical criteria.*

Between 2040 and 2050

In this phase, the critical Decision Point 2 is included. Here, the RMI government and stakeholders will consider the actual sea-level rise and other up-to-date data and models to select and decide which atolls shall continue along a protection pathway as their adaptation strategies, be it nature-based, hard-edged, or a combination of both. If needed, decisions will also be made regarding which atolls can no longer be protected based on priorities for protection, size of communities and acquired funds.

New, raised centers need to be created to provide space for habitation, government buildings, and infrastructure in the RMI in the long term. As the sea level rises, parts of the urban centers will be lower than the surrounding sea. This will lead to groundwater salinization and problems for agriculture and drinking water supply. At the same time, water may seep under coastal defense structures and inundate low-lying areas without continuous and costly drainage and dewatering. This will likely lead to parts of the urban centers becoming uninhabitable sometime between 20 and 40 in (0.5 and 1 m) sea level rise[161]. Raising land in densely populated urban centers is probably not economically and practically feasible. Therefore, new space will need to be created in anticipation of increased flooding beyond 20 in (0.5 m) of sea level rise. The area to reclaim or raise depends strongly on the availability of funds for adaptation.

Between 2050 to 2070

The major construction of protective infrastructure at new community sites must be completed. Importantly, these new sites will consist of lands or atolls (or some combination thereof) that can accommodate the projected RMI population. This largely pertains to building the 'new' Majuro and Ebeye at their designated new locations. It also focuses on the major development of raised and protected locations within the RMI where the communities from areas they deem uninhabitable may move to and be accommodated and where their livelihoods can be sustained or improved. This is the 'transition' period during which new communities, housing, government services, and requirements for living are built and developed. This period also represents when the RMI's forward-looking strategy focuses more on relocation.

2070 to around 2090

No communities are living on atolls or islands where their safety and livelihoods are threatened and the population is now consolidated in the elevated and protected land areas. This represents the important strategic completion of adaptive action on the Pathway to avert the worst-case scenarios of the 20 in (0.5m) sea-level rise (Threshold 1). In this period, the RMI government and stakeholders must start looking at the most recent data and models to determine if a further shift in adaptation strategy is needed to counter the 6.5ft (2m) sea-level rise (Threshold 2) by 2150. The decision here is to invest in further protection infrastructure of the already protected atolls/ areas or a combination thereof to confront the projected 2m sea level rise or shift the adaptation strategy to a priority of preparedness for migration of the population out of the RMI. A phased approach could include raising islands for 3.3 ft (1 m) sea level rise with adaptive/floodproof infrastructure and housing (e.g., high doorsteps, proper drainage systems, compartmentalization of areas to reduce flooding extents) that allows

[161] *Monitoring of ocean and in particular groundwater levels on the atolls will help better identify what amount of sea level rise between 20 and 40 in (0.5–1.0 m) will lead to groundwater flooding around critical infrastructure, such as hospitals and main access roads, and under what conditions this flooding is likely to occur.*

for future protection / raising works. This will also be based on factors including the will of the people, updated models of sea-level rise, other geophysical and meteorological challenges (for example, frequency of extreme weather events).

2100 to around 2150

If the D4 decision was to shift focus to population migration or finding alternative land, this is the period over which this will need to be implemented and achieved. The Pathway reiterated that this is the third adaptive priority after the priority of atoll protection and atoll planned relocation have been exhausted between 2023 and 2090.

5.3 Estimating the Costs of Adaption Options

Protecting all **urban centers** up to 20 in (0.5m) sea-level rise was estimated in 2021 at over USD 1000 million. Therefore, prioritization of investments will be required[162]. For example, protecting the DUD area from flooding on the open ocean coast or the ocean coast of Ebeye and the lagoon coast of DUD could require up to USD 250 million (Table 19), while investments of up to USD 500 million could provide ample options for prioritizing urban centers. The DUD's ocean and lagoon coast can be protected, but it is also an option to protect the ocean and lagoon coast of Rairok. Another option is to focus investments on Ebeye and the causeway that links Ebeye to Guggegue.

Meanwhile, up to USD 1000 million could be required to protect the entire DUD-Rairok and Ebeye region. However, this does not include the Ebeye causeway. Hence, a second option exists where Ebeye and the entire causeway could be protected from flooding.

Table 19: Overview of adaptation options for protecting urban centers up to 0.5 m SLR for investment scenarios of approximately USD 250, 500, and 1000 million[163].

Investment (million USD)	Option	Region	Construction costs (million USD): Best estimate [lower upper]
250	Option 1	DUD lagoon + Ebeye ocean	$ **230** [165 - 470]
	Option 2	DUD ocean	$ **300** [200 - 410]
500	Option 1	DUD ocean & lagoon + Ebeye ocean	$ **530** [365 - 880]
	Option 2	Rairok ocean & lagoon	$ **500** [350 - 865]
	Option 3	Ebeye ocean & lagoon + Ebeye causeway ocean & lagoon	$ **475** [330 – 835]
1000	Option 1	DUD ocean & lagoon + Ebeye ocean & lagoon + Rairok ocean & lagoon	$ **1085** [755 - 1875]
	Option 2	DUD ocean & lagoon + Ebeye ocean & lagoon + Ebeye causeway ocean & lagoon	$ **920** [640 – 1700]

the construction cost at a future time of execution.

[163] *Construction costs are based on estimates from the Majuro CVA. The range in costs includes both the choice for different types of protection, as well as the uncertainty in costs for each protection type. These costs do not include potential relocation / rehabilitation costs. Besides financial considerations and space requirements, other technical, institutional, and economic considerations exist on what parts of the urban centers to protect and how to protect these.*

Raising an area of land sufficient for the entire current population of the RMI with an average population density of 230 m² per person (current population density of DUD-Rairok area; Atoll Study) is likely to exceed USD 5000 million. Increasing population density in the elevated area to that of Djarrit (approximately 55 m² per person) or Ebeye (approximately 25 m² per person) will allow for greater populations to be located on the raised areas and reduce total costs.

Raising land to (2 m) sea level rise allows for the long-term habitability of islands but is also expensive and requires significant investments in a short timeframe. The decision of Threshold 2 will be made by around 2070 as this sea level rise is estimated to occur by 2150. Table 20 gives estimates for potential areas that can be raised or reclaimed, along with the associated potential population in these raised areas, for investment scenarios of USD 500, 1000, 2500, and 5000 million.

Table 20: Overview of adaptation options for raising or reclaiming land for new urban centers for investment scenarios of $ 500, 1000, 2500, and 5000 million.

Investment (million USD)	Adaptation option	Unit cost (m²)	Total m²	Population for densities of 230m²/pers.	55m²/p.	25m²/p.
$ 500	1: Raise land & rebuild (up to 1 m SLR)	$ 800	630,000	2,700	11,500	25,200
	2: Raise land + revetment (up to 2 m SLR)	$ 1,500	330,000	1,400	6,000	13,200
	3: Land reclamation (up to 2 m SLR)	$ 2,000	250,000	1,100	4,500	10,000
$ 1.000	1: Raise land & rebuild	$ 800	1,250,000	5,400	22,700	50,000
	2: Raise land + revetment	$ 1,500	670,000	2,900	12,200	26,800
	3: Land reclamation	$ 2,000	500,000	2,200	9,100	20,000
$ 2.500	1: Raise land & rebuild	$ 800	3,130,000	13,600	56,900	125,200
	2: Raise land + revetment	$ 1,500	1,670,000	7,200	30,400	66,800
	3: Land reclamation	$ 2,000	1,250,000	5,400	22,700	50,000
$ 5.000	1: Raise land & rebuild	$ 800	6,250,000	27,200	113,600	250,000
	2: Raise land + revetment	$ 1,500	3,330,000	14,500	60,500	133,200
	3: Land reclamation	$ 2,000	2,500,000	10,900	45,500	100,000

** Unit costs are based on the Atoll Study, Table 6-1. Three population densities are listed to estimate the total number of people to populate the new centers. Population estimates are rounded to the nearest hundred. Raising land to withstand sea level rise beyond 6.6 ft (2 m) is possible but more costly and has not been costed.*

The abandoned land could be raised following planned relocation from the urban centers. This would be cost-effective as the urban centers would be equipped with relatively advanced coastal protection structures. This option is heavily dependent on demographic trends (international migration, population density in remaining urban centers), condition of the coastal protection structures, availability of construction material, and sea level rise projections.

For Semi-Urban centers, as shown in the total area that can be raised for four investment scenarios ranges from 0.12 sq. miles (0.31 km²) (USD 500 million) and 0.97 sq. miles (2.5 km²) (USD 2000 million) for Raise and Rebuild, to 0.07 square miles (0.17 km²) (USD 500 million) and 0.54 sq. miles (1.33 km²) (USD 2000 million) for Raise and Revetment (Table 21-22). Only a few smaller regions at Wotje (Wodmej), Jaluit (Jabor), and Majuro (Arrak) can be protected by up to 3.3 ft (1 m) sea level rise under the investment scenarios of USD 250 and USD 500 million (Table 21). For the investment scenarios of $1000 and $2000, these centers, as well as Ine (Arno) and Ebadon (Kwajalein), can be protected up to 6.6 ft (2 m) sea level rise. Other intermediate centers such as Jaluit, Roi-Namur on Kwajalein, and Jih and Woja on Ailinglaplap can be protected by up to 3.3 ft (1 m) sea level rise for these investment scenarios (Table 22). These issues would be reviewed under the SLR Policy.

Table 21: Overview of adaptation options for raising land to consolidate intermediate centers, for investment scenarios of $ 250, 500, 1000, and 2000 million.

Investment (million USD)	Adaptation option	Unit cost (2021 USD / m²)	Total km²	Population for densities of		
				230m²/pers.	55m²/p.	25m²/p.
$ 250	1: Raise land & rebuild (up to 1 m SLR)	$ 800	0.31	1,300	5,600	12,400
	2: Raise land + revetment (up to 2 m SLR)	$ 1,500	0.17	700	3,100	6,800
$ 500	1: Raise land & rebuild (up to 1 m SLR)	$ 800	0.63	2,700	11,500	25,200
	2: Raise land + revetment (up to 2 m SLR)	$ 1,500	0.33	1,400	6,000	13,200
$ 1.000	1: Raise land & rebuild	$ 800	1.25	5,400	22,700	50,000
	2: Raise land + revetment	$ 1,500	0.67	2,900	12,200	26,800
$ 2.000	1: Raise land & rebuild	$ 800	2.50	10,900	45,500	100,000
	2: Raise land + revetment	$ 1,500	1.33	5,800	24,200	53,200

** Unit costs are based on the Atoll Study, Table 6-1. Three population densities are listed to estimate the total number of people to populate the new centers. Population estimates are rounded to the nearest hundred. Raising land to withstand SLR beyond 6.6 ft (2 m) is possible but more costly and has not been costed.*

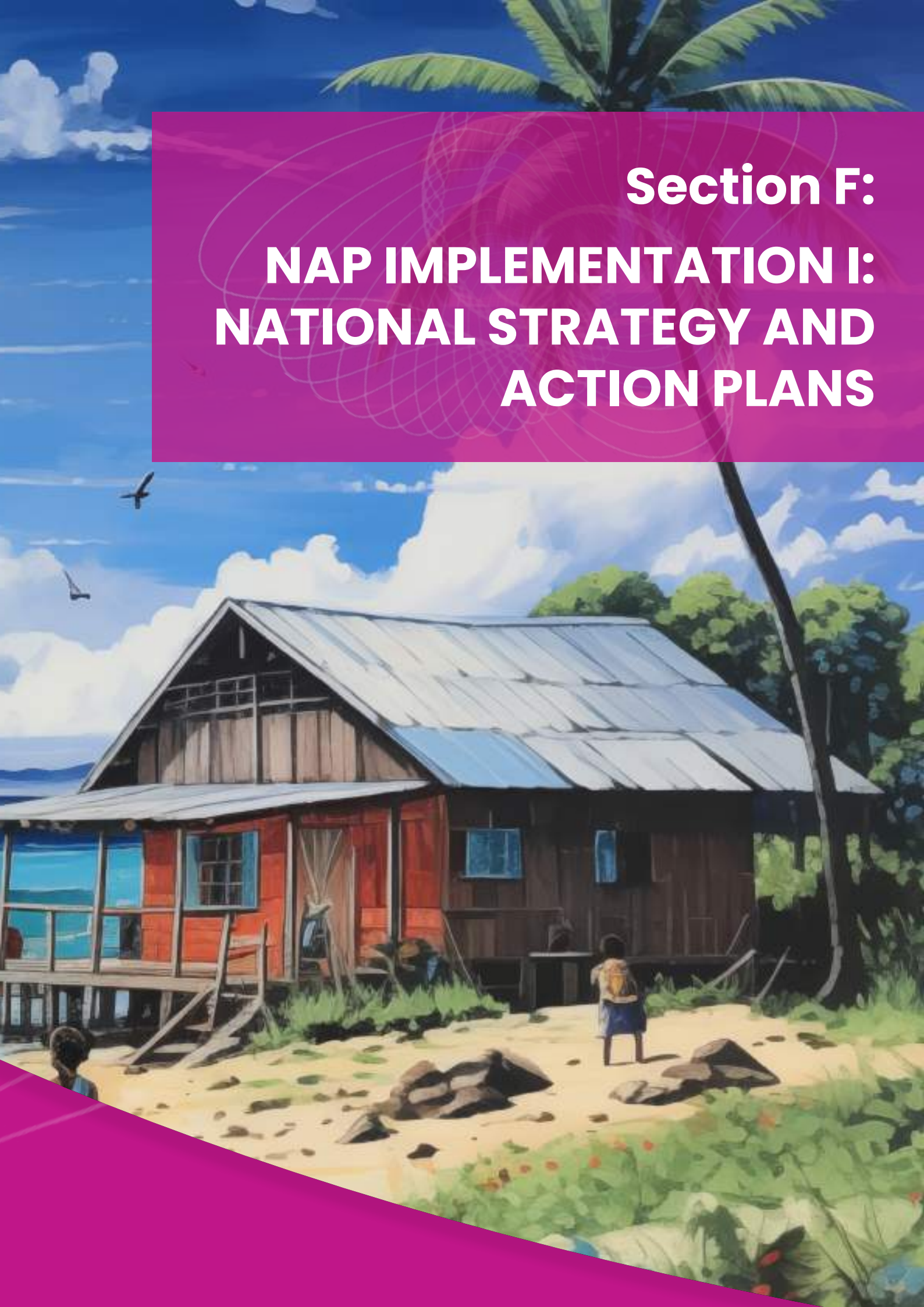
Table 22: Total costs (2021 $) for raising different islets of intermediate centers, for both the Raising & Rebuilding and Raising and Revetment options.*

Atoll	Island	Area [km²]	Total costs (million USD) for Raising & Rebuilding up to 1 m SLR (Unit cost of $ 800 USD/m2)	Total costs (million USD) for Raising & Revetment up to 2 m SLR (Unit cost of $ 1500 USD/m2)
Wotje	Wotje	2.56	$ 2000	$ 3800
Wotje	Wodmej	0.87	$ 700	$ 1300
Arno	Arno	1.96	$ 1600	$ 2900
Arno	Ine	1.13	$ 900	$ 1700
Jaluit	Jabor	0.37	$ 300	$ 600
Jaluit	Jaluit	1.72	$ 1400	$ 2600
Kwajalein	Roi Namur	1.68	$ 1300	$ 2500
Kwajalein	Ebadon	1.16	$ 900	$ 1700
Ailinglaplap	Woja	2.53	$ 2000	$ 3800
Ailinglaplap	Jih	2.50	$ 2000	$ 3800
Ailinglaplap	Bigatyelang	2.92	$ 2300	$ 4400
Majuro	Laura	2.43	$ 1900	$ 3600
Majuro	Arrak	0.52	$ 400	$ 800

* Costs rounded to nearest $100 million.

Section F:

NAP IMPLEMENTATION I: NATIONAL STRATEGY AND ACTION PLANS



Section F: NAP IMPLEMENTATION I: NATIONAL STRATEGY AND ACTION PLANS

6.0 The National Strategic Plan And Climate Adaptation

The National Strategic Plan[164] (NSP) is RMI's apex planning document, which provides a roadmap for progress on national priorities in strategic areas of social services and cultural identity, economic development, infrastructure, environmental awareness, climate change, and governance. Furthermore, the NSP aligns with the priorities and frameworks outlined in national policies, sectoral plans, and international agreements.

In relation to the NSP, the National Adaptation Plan (NAP) becomes the apex national planning and implementation document on Climate Change Adaptation and Resilience[165]. It aligns with the NSP's Environment, Climate Change and Resiliency pillar. When actions are undertaken to fulfill the NAP, the NSP's Climate Change ambitions are directly fulfilled. Additionally, because of the cross-cutting nature of climate adaptation actions, the implementation of NAP objectives also plays a substantial role in achieving progress on other NSP Pillars (for example, Economic Development and Infrastructure), as well as meeting other targets at the community and sectoral levels.

The NAP (Figure 22) is designed to be the apex coordinating document for planning and implementation across several allied policy spheres (for example, the National Sea-Level Rise Policy), existing and envisioned sectoral programs and strategies (for example the Ministry of Health Climate Change and Health Strategy) as well as government and donor funded projects and initiatives on climate change adaptation and resilience building (for example, UNDP, GEF funded, and IOM).

NAP action plans to provide broad national-level guidance on what types and character of policies, sectoral programs, and donor-funded projects are the most salient to overall NAP progress and, by extension, that of the NSP. Those initiatives that will be prioritized for investment and implementation. Figure 22 below illustrates the implementation relationships between the NSP, NAP, and other national processes.

In the NSP, Pillar 2, "Environment, Climate Change and Resiliency," identifies Climate Change as a strategic priority along with Atoll Environment, Disaster Risk Management and Radiation.

[164] *The NSP 2020-2030 spans a 10-year timeframe (to be updated in 10-year cycles); sets the national vision and long-term development goals; identifies Sector Over-Arching Goals; specifies the Sectors, Strategic Areas and related Policy Objectives; provides a guide for the allocation of budget resources through the MTBIF and annual budget appropriations. Further, that 'resilience', in all its dimensions including, environmental, social, economic resilience, would be the foundation of the NSP and a development necessity. There is a recognition that challenges faced by RMI are not just from climate change and natural disaster hazards but also from socio-economic factors.*

[165] *The new National Disaster Risk Management Plan in development will also play a role here.*

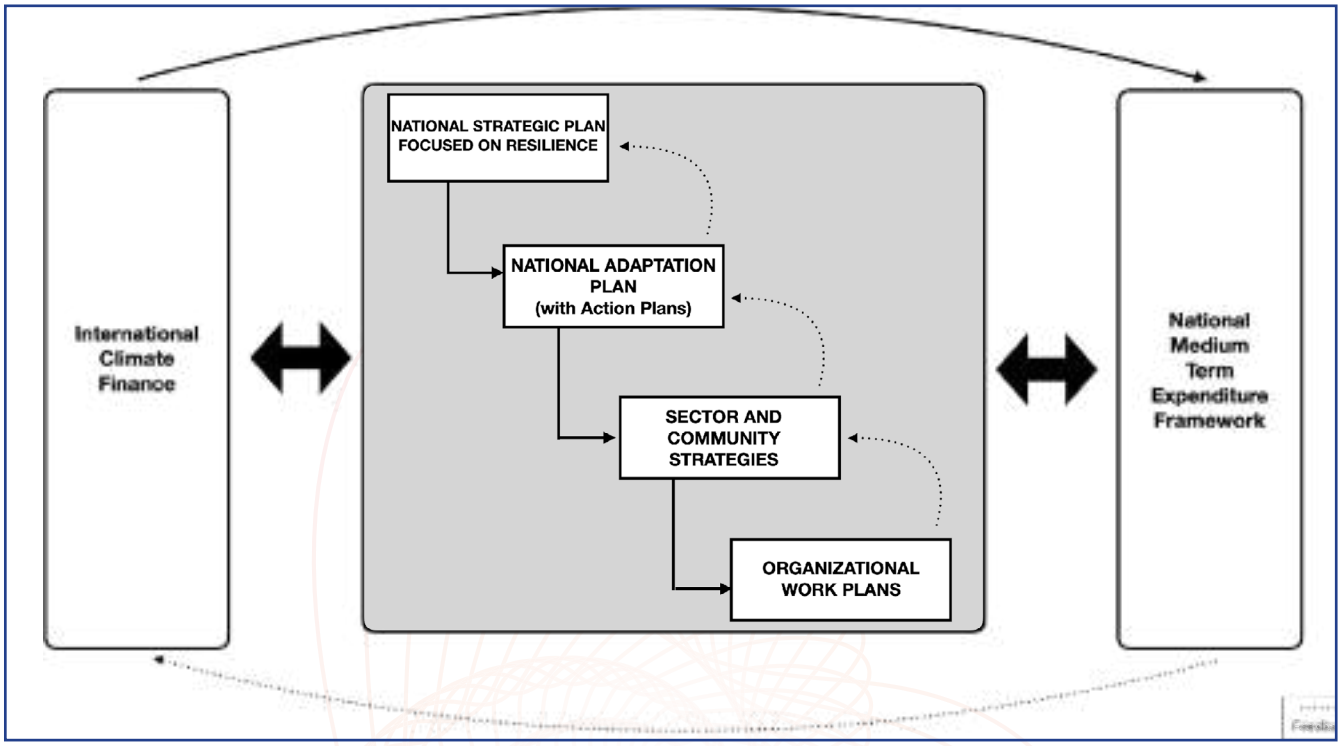


Figure 22: Strategic relationships between NSP, NAP, and other national processes

The NAP Implementation and Action Plans provided here will advance commitment set out in the NSP to a holistic response, and guide mainstreaming climate-related risks into planning and budgeting.

6.1 The NAP Implementation Strategy

The Overarching Goals of the RMI NAP 2023 are threefold (Figure 23).

Goal 1 is to build and sustain adaptive resilience across all human and ecological facets of the RMI. At least two high-level outcomes are required to achieve this Goal.

Outcome 1 is sectoral resilience across key economic and social sectors of the RMI, and

Outcome 2 is community-level resilience across all 24 inhabited atolls/islands, including urban, semi-urban, and rural/outer atolls.

Goal 2 is to strengthen the enabling environment to support short-, medium-, and long-term adaptation activities. There are two high-level outcomes to achieve the Goal:

Outcome 3 is to build and sustain an 'All-Of-Government' commitment to national adaptation and resilience in the short, medium, and long terms.

Outcome 4 is to build and sustain 'All-Of-Society' involvement in national adaptation and resilience in the short, medium, and long terms.

Goal 3 is cross-cutting across Goals 1 and 2. It is to adapt through a self-determined approach to RMI's heritage and its current and future generations. To achieve it RMI will pursue:

Outcome 5 inclusivity and fairness in all national decision-making around climate adaptation. Diagram 23 below illustrates the RMI's NAP Implementation Strategy.

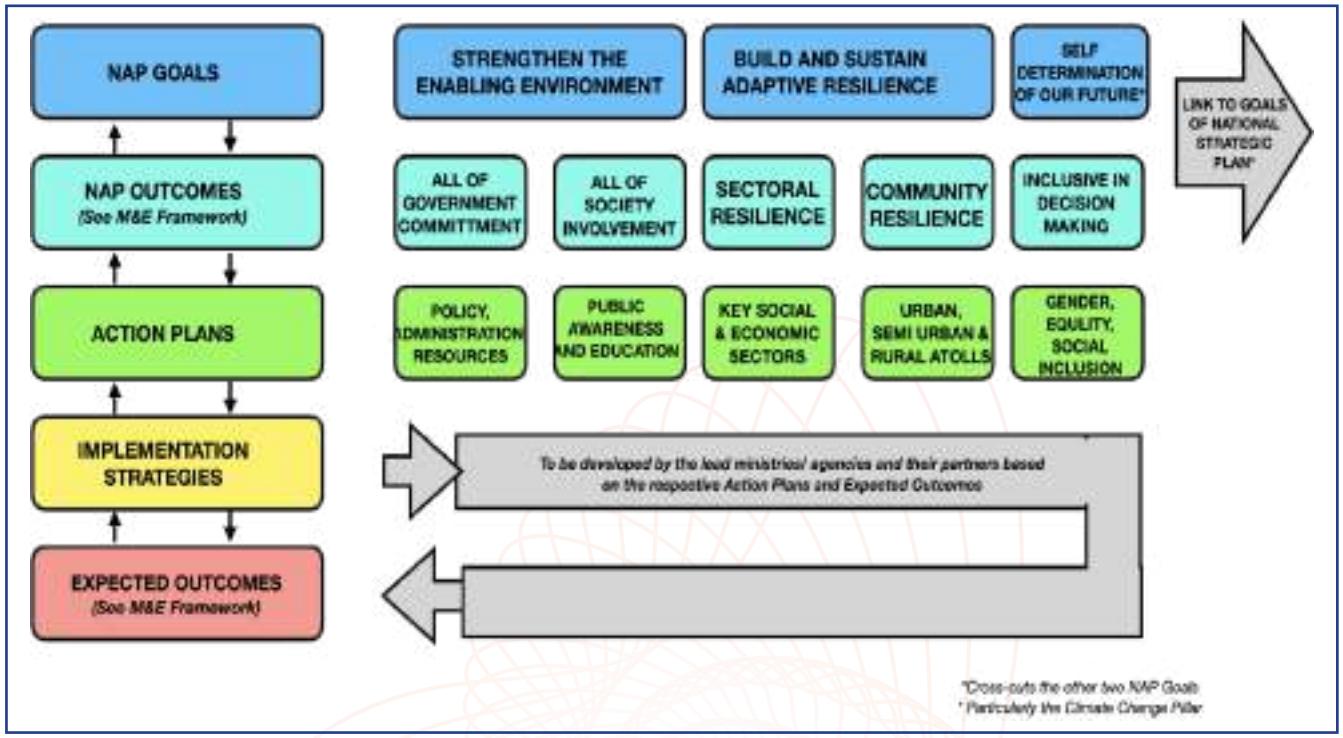


Figure 23: Hierarchy of Objectives of the NAP Implementation Strategy

Action Plans have been developed to realize each of the NAP Outcomes. For Outcome 1 on Sectoral Resilience, Action Plans for six key sectors have been developed – Education, Health, Infrastructure, Fisheries, Natural Resources and Commerce, Internal Sector. For Outcome 2 on Community Resilience, the Action Plan includes activities to build resilience across urban, semi-urban, and rural atolls. For Outcome 3, an 'All-of-Government' Action Plan comprises several policy-strengthening, governance, and administrative and resource mobilization activities. For Outcome 4, an 'All-of-Society' Action Plan includes activities to promote public awareness and education, social acceptability, and political will to build climate resilience. For Outcome 5 on Inclusivity in Decision-Making, the Action Plan on gender, equality, and social inclusion cuts across all the aforementioned Action Plans. For these NAP Action Plans to achieve the expected outcomes, they must be converted into specific Implementation Plans by their respective lead ministries and agencies.

6.2 Action Plans for Key Economic and Social Sectors

Climate Adaptation Action Plans are combinations of recommended options to pursue from now to 2050. However, the most attention is paid to implementation over the next ten years. Generally, the tables indicate implementation timeframes from 2024 – 2030 (these are the more urgent actions that need to happen first); 2030 – 2045 (some of these may be dependent on short-term actions); and 2045 and beyond (these require greater lead in time or are not required in the interim).

Tables 23-34 highlight action plans for various vital sectors, actors, and key players, and possible Adaptive Capacity and Adaptive Barriers to their implementation. Barriers to adaptation have been identified that are general (table 23 below) as well as sector-specific (detailed in relevant sections)

Table 23: Cross-Sector Adaptation Barriers

Potential Barriers to Adaptation
1. Agencies and organizations face funding, communication challenges, and confusing roles in climate adaptation.
2. Shortage of skilled professionals in areas related to climate change adaptation hinders development, exacerbated by the migration of qualified experts.
3. Geographical isolation of neighboring islands in the RMI makes transport of personnel and shipment of material and equipment difficult, affecting the implementation and the monitoring of adaptation activities. Limited transportation to the atolls reinforces this barrier.
4. Limited understanding of various detailed climate change impacts in the different sectors
5. Donor-funded infrastructure focuses on 'direct' climate change adaptation but less on activities indirectly reducing local vulnerability to climate change. Effective coordination of effort priorities with international entities is needed.
6. Limited climate change information sharing hinders long-term adaptation, with challenges like the disrupted communication across atolls. Improved record-keeping and risk data are needed for effective resilience planning.
7. Gaps in data collection – inefficient data recording and monitoring system
8. Socio-economic challenges and ad hoc community demand for immediate fixes can divert resources and hamper holistic, long-term planning climate change adaptation and resilience.

6.2.1 Action Plan for the Works, Infrastructure, Utilities, Energy, Transportation Services and Communications Sectors

Table 24: Action Plan for Works, Infrastructure, Utilities, Energy, Transportation, and Communications Sectors.

No.	Action	Timeframe	Responsibility	Interlinkages/ Dependencies/ Stakeholders
W1	Revise of the NNIP to focus on climate change as a cross-cutting lens incorporated in infrastructure projects.	2024-2025	MWIU MTCIT RMI Ports Authority	This action links to the cross-sector action of setting long-term levels of service for infrastructure, facilities, and services.
W2	Operationalize legislative and policy frameworks to incorporate a long-term consideration of climate change in line with the strategic direction provided in the NAP and agreed levels of service.	2024-2030	MWIU MTCIT RMI Ports Authority	

W3	Implement the NIIP, ensuring the prioritization of infrastructure work and maintenance that align with climate adaptation policies.	2026-2030	MWIU MTCIT RMI Ports Authority	This action links to the cross-sector action of setting long-term levels of service for infrastructure, facilities, and services.
W4	Conduct an infrastructure sector-specific vulnerability assessment to prioritize protection areas, infrastructures and services, identify and plan for future service levels.	2024-2026	CCD MWIU MoCIA	
W5	Establish a governance arrangement for the infrastructure and services sector to enable multi-agency partnerships and improve efficiencies across donor-funded infrastructure projects.	2024-2026	CCD MWIU Other relevant agencies MEC MoCIA Donor agencies MOFBPS	RMI Ports Authority MTCIT MISC Air Marshall Islands Inc
W6	Operationalize the assessment of the vulnerability of the potential new infrastructure for key sectors	2026-2030	CCD MWIU Other relevant agencies	
W7	Establish a Build Back Better Best Practice Guideline for rebuilding infrastructure to be more resilient if damaged during disasters.	2024-2026	CCD NDMO MWIU	Links to cross-sectoral action
W8	Identify, develop, and implement training and education programs for local people to improve their skills and capabilities to develop and maintain infrastructure and services across the RMI.	2026-2040	CCD MWIU MoEST	
W9	Launch a program to improve the communication and transport within and between the outer atolls to reduce disruptions, provide for resilience and backup systems.	2026-2040	MWIU MTCIT	MoCIA NDMO CCD
W10	Provide input to planning for, and implement maintenance and investment per the long-term levels of infrastructure agreed as part of, the long-term adaptation pathways.	2045-2070	All infrastructure and services agencies	Links to cross-sectoral levels of service action

Table 25: Summary of Potential Adaptive Barriers to Implementing the Action Plan for Works, Infrastructure, Utilities, Energy, Transportation, and Communications Sectors

Specific Barriers to Adaptation in the Infrastructure sector
1. Economic challenges in the RMI stem from limited inter-atoll connectivity, resulting in restricted access to services. Reduced voyages by MISC and high transportation costs impede market access and essential services, impacting community well-being.
2. Infrastructure is vulnerable due to environmental and resource challenges.
3. No current planning framework guides appropriate development, and the existing Planning and Zoning Act 1987 faces implementation challenges. Marshallese landowner rights may impact the adoption of certain adaptation measures on their property.

6.2.2 Action Plan for the Healthcare and Social Services Sectors

Table 26: Action Plan for Healthcare and Social Services Sectors

No.	Action	Timeframe	Responsibility	Interlinkages/ Dependencies/ Stakeholders
H1	Continue implementing the approved sector climate and health strategy, aligning the strategy with the NAP sectoral action plan.	2024-2030	Ministry of Health	CCD, NDMO
H2	Implement a post-disaster recovery policy, including financing for quick re-establishment of priority health services (including "build back better").	2024-2026	CCD and NDMO Ministry of Finance	Will require coordination between MoCIA, Ministry of Health and Public Services, and be an endorsed prioritization plan.
H3	Audit climate resilience of existing health infrastructure and program of upgrading.	2024-2026	Ministry of Health CCD	Ministry of Works, Infrastructure and Utilities
H4	Launch programs to improve accessibility to healthcare in the neighboring atolls, including upgrading outer island health facilities so all have internet/satellite capabilities and include video conferencing and the wharfs to allow the MOHHS boat to dock.	2027-2045	MTCIT MWIU	MWIU MoCIA Ministry of Finance Ports Authority

H5	Develop and implement education programs on health and climate change – both awareness and resilience building including all aspects of climate change and health.	2024-2045	Ministry of Health WUTMI CCD	Requires a collective approach between these government Sections, MoCIA Ministry of Education- PSS
H6	Healthy homes program: Targeted at sanitation, waste disposal, water collection and storage, and resilience to extreme temperature	2024-2045	CCD MoCIA	MWIU Ministry of Finance
H7	Collect annual data of climate change impacts on health and the impact of adaptation measures.	2024-2070	MOHHS EPPSO CCD	Health clinics MoCIA
H8	Build capability of health staff in all climate and health priority areas	2024-2070	MOHHS MOEST CCD MOFBPS.	In addition, see NCCHP and RAP v2 documents. Involve MTCIT for radio/ TV to promote health messages and recruitment drives.
H9	Implement building specifications for repairs (post weather events), upgrades, and new buildings to respond to climate change.	2030-2045	MWIU MOHHS CCD	Could be applied across all ministries with public infrastructure.
H10	Provide input to planning for, and implement maintenance and investment per the long-term levels of health services agreed as part of, the long-term adaptation pathways.	2045-2070	All infrastructure and services agencies	Links to cross-sectoral levels of service action

Table 26: Summary of Adaptive Capacity and Adaptive Barriers to Implementing the Health Sector Action Plan

Adaptive Capacity
1. Local social networks that can be utilized for support and education.
2. Local knowledge of climate patterns and strategies to secure food and water sources.
3. Local natural health practices that improve resilience.
4. Local food growing and healthy living habits that can be enhanced.
5. Utilization of existing women's networks and programs.
6. A climate change Division is embedded in MoHHS and budgeted for.
7. The endorsement of the national climate change and health policy and its strong alignment with the RMI NSP and the NAP.
9. Strong, practicable, and effective health disaster response systems performing well during the COVID-19 pandemic are a sound foundation for deploying adaptation actions.

Specific Barriers to adaptation in the Health Sector
1. The NCCHPv2, 2022 identifies: insufficient expertise and resources, including lack of dedicated staff, equipment, training, and information. Others are complicated transportation logistics for reaching outer islands and unreliable internet and electronic communications; perceived lack of political will and competing priorities; limited engagement of traditional leaders and landowners; and cultural taboos, apathy, and stigma in some cases (e.g., mental health).
2. Changed dietary practices and loss of traditional knowledge about food.
3. Poor household conditions – inadequate water sources, poor sanitation, lack of waste disposal systems, unhealthy food preparation areas, overcrowding, and inability to withstand extreme weather.
4. Limited staffing capacity and capability. This is particularly an issue given that mental health is expected to worsen with climate anxiety.
5. Gaps in data collection – migration tracking and annual population reporting, including age, gender, and health status.
6. Absence of building codes relating to new buildings and repairs of buildings with climate resilience.
7. Plans post-disaster in terms of policies and prioritization for rebuild/response – including health provisions and infrastructure.
8. Limited/no coordination of aid-funded projects to avoid duplication and maximize benefits for the Health Sector.
9. Migration and the challenges of declining populations in the outer islands, growing populations in urban centers, and loss of trained health professionals overseas.
10. Increasing migration and an urbanizing population will have less access to natural resources, traditional practices, and cultural networks that were used to adapt to weather events in the past.

6.2.3 Action Plan for the Education, Skills, and Training Sectors

Table 27: Action Plan for Education, Skills, and Training Sectors

No.	Action	Timeframe	Responsibility	Interlinkages/ Dependencies/ Stakeholders
E1	Development of a Climate Change Adaptation Plan for the Education Sector.	2024-2026	MOEST CCD	MOHHS MOFBPS MoCIA
E2	Audit of climate resilience of existing education infrastructure and recommendations for program upgrades.	2026-2028	MWIU MOEST CCD	Ministry of Health Ministry of Finance MoCIA
E3	Building specifications for post-disaster repairs, upgrades, and new buildings to respond to climate change.	2025-2028	MOEST NDMO CCD MWIU	Could be applied across all ministries with public infrastructure.

E4	Implementation of the Adaptation Climate Change Adaptation Plan for the Education Sector , with a focus on the upgrade of education facilities. Special efforts should focus on the education facilities used as shelter.	2026-2045	MWIU MTCIT	Could be applied across all ministries with public infrastructure.
E5	Revision school curriculum at all levels to better include climate change, its causes, impacts in the RMI and locally relevant adaptation options	2024-2026	MOEST CCD	The curriculum will need to be regularly updated with new information
E6	Training of teachers to successfully deliver the revised curriculum.	2026-2045	MOEST	Refresher training to be regularly offered
E7	Provide input to planning for, and implement maintenance and investment per the long-term levels of education services agreed as part of, the long-term adaptation pathways.	2045-2070	All infrastructure and services agencies	Links to cross-sectoral levels of service action

Table 28: Summary of Potential Adaptive Barriers to Implementing the Action Plan

Specific Barriers to Adaptation in the Education Sector
1. Limited or unavailable sanitation facilities at some schools.
2. Insufficient water supply during longer periods of disaster will also be affected by drought conditions exacerbated by climate change.
3. The lack of resilience of transportation systems at any time, especially during a disaster or severe weather event.
4. The limited capacity of medical personnel to aid in immediate emergencies is especially problematic if students are concentrated on certain islands during a disaster.
5. Lack of air conditioning or adaptive capacities of classrooms, especially new classrooms, with classrooms becoming too hot for classes to continue during certain times of the day or year.
6. Reliance on teachers in outer atoll islands and risk of them migrating due to climate change.
7. Teachers with limited knowledge of climate change impacts may not appropriately incorporate climate change education into school curricula and teachings.

6.2.4 Action Plan for the Fisheries Sector

Table 29: Action Plan for the Fisheries Sector

No.	Action	Timeframe	Responsibility	Interlinkages/ Dependencies/ Stakeholders
F1	Development of a Climate Change Adaptation Plan for the Fisheries Sector, based on the MIMRA Strategic Plan	2024-2026	MIMRA CCD	
F2	Assessment and monitoring of the fisheries sector in the RMI economy and the economic and social consequences of climate change on the sector .	2024-2045	MIMRA EPPSO	

F3	Monitoring, mapping and modeling of the changes in the tuna stock to inform the PNA countries and enable them to plan for changes in government revenues and related economic benefits from tuna fishing and negotiate within their respective partnerships at a regional and international level to maintain the present-day benefits	2024-2045	MIMRA PNA	Subregional fisheries organizations including FFA. Regional fisheries Management organizations, including WCPFC. IATTC.
F4	Monitoring, mapping and modelling of the changes in the coastal fish and invertebrates' stock to inform the coastal fisheries management	2024-2045	MIMRA	
F5	Expand on MIMRA's Fish Aggregating Device (FAD) program to improve fishing for local communities.	2024-2030	MIMRA	
F6	Protect and manage the customary way of handing down traditional knowledge by working with the Historic Preservation Office to collect, collate, and appropriately share this knowledge.	2024-2030	MIMRA HPO	
F7	Facilitate training to build capacity on the outer islands and atolls to monitor and evaluate impacts on the coastal fisheries.	2024-2030	MIMRA	Potentially link to local climate change representatives on the outer atolls.
F8	Expansion of the existing Reimaanlok community-based management program and of the trials to expand existing mariculture.	2024-2045	MIMRA	Funding agencies Ministry of Finance
F9	Retain a portion of the fisheries license revenue to establish sustainable sector management plans for RMI and reduce the risk of external aid funding support reducing or disappearing entirely.	2024-2045	MIMRA	Ministry of Finance
F10	Provide input to planning for, and implement maintenance and investment per the long-term levels of fisheries services agreed as part of, the long-term adaptation pathways.	2045-2070	All infrastructure and services agencies	Links to cross-sectoral levels of service action

Table 30: Summary of Adaptive Capacity and Adaptive Barriers to Implementing the Action Plan

Specific Barriers to Adaptation in the Fisheries Sector
1. MIMRA depends on other Ministries for critical infrastructure, including transportation to outer islands and communication with them. While the RMI Ports Authority manages ports in major areas, local governments handle outer island facilities, facing severe resource constraints.
2. Effective management requires robust international cooperation, but as climate change alters tuna habitats, existing agreements and relationships may be challenged, especially with some nations resisting zone-based management in favor of historical flag-based approaches.

3. Challenges in managing global demand, prices, and market access due to its small size and geographical remoteness.
4. Limited data on the fisheries sector's contribution to the onshore economy, including employment in related industries and revenue from visiting vessels.
5. Decentralized organization of coastal fisheries and land tenure complexity that poses challenges for MIMRA in management, collaboration, data collection, and fisheries monitoring.
6. Population decline and internal migration to Ebeye and Majuro intensify pressures on their coastal fisheries, leading to overfishing and environmental degradation.
7. Transportation challenges to outer atolls hinder the sale of fish and potential mariculture exports, which require intact deliveries to international markets.

6.2.5 Action Plan for the Internal Affairs Sector

Table 31: Action Plan for Internal Affairs Sectors

No.	Action	Timeframe	Responsibility	Interlinkages/ Dependencies/ Stakeholders
IN1	Development of a climate change adaptation plan for the internal affairs sector	2024-2026	MOCIA CCD	MIMA
IN2	Collection, update and use of sex-disaggregated data and gender analysis to inform the implementation of programs and projects and to ensure that resources allocated for adaptation actions benefit the most vulnerable groups.	2024-2030	EPPSO MOCIA CDD MOEST	Link to collection of demographic/ migration data cross sectoral action
IN3	Undertake capacity development on gender and climate change, bringing together different sectors through joint training workshops and regional visits. Support women leaders and conduct training for prospective female councilors and mayors.	2026-2045	MOCIA CCD WUTMI	Training center
IN4	Support to the development and implementation of local adaptation plan for the atolls of the RMI, including capacity building, improved connectivity and support to the sustainability of all aspects of local governance and record keeping to increase resilience.	2024-2030	CDD CCD Registrar Division	MTCIT MoHHS MoEST MIMA
IN5	Integrate climate change considerations into budget development and resource allocation processes, prioritizing funding for climate adaptation initiatives. Introduce gender budgeting processes to track the proportion of budgets spent on women's issues.	2024-2030	Administration division	Ministry of Finance

IN6	Promote public awareness campaigns on climate change, and the importance of participation in decision-making processes. Develop specific programs to promote women's participation.	2024-2045	MOCIA Electoral Office MTCIT National Radio	Dedicate airtime and programming to disseminate information on climate change impacts, adaptation strategies, and community resilience.
IN7	Support capacity building for local communities in climate adaptation and disaster risk reduction and sustainable practices. Identify and coordinate local island representatives.	2026-2045	CCD NDMO CDD	Link to collaboration with NDMO, ACWA project and CCD to identify local climate champions on each atoll.
IN8	Identify and prioritize vulnerable cultural heritage sites to protect and preserve climate change impacts and artifacts. Develop climate change adaptation plans for historic sites, including measures to mitigate sea-level rise and increased coastal erosion.	2024-2026	HPO CCD	Engage with communities, government agencies, and international partners to raise awareness and secure funding for cultural heritage conservation in the face of climate change.
IN9	Develop and implement programs to provide services to support community members, in particular to improve health, mental health, education and other services	2026-2030	MOCIA All relevant agencies	Links to cross-sectoral levels of service action
IN10	Provide input to planning for, and implement maintenance and investment per the long-term levels of services agreed as part of, the long-term adaptation pathways.	2045-2070	All infrastructure and services agencies	Links to cross-sectoral levels of service action

Table 32: Summary of Potential Adaptive Barriers to Implementing the Action Plan for the Internal Affairs Sector

Specific Barriers to Adaptation in the Internal Affairs Sector
1. The view of women only as vulnerable can hinder their potential as proactive agents of change in climate adaptation actions.
2. Cultural norms around gender-based violence hinder women's engagement in various community activities, including climate adaptation. The normalization of such violence highlight the significant challenge in shifting attitudes towards gender equality.
3. Sociocultural norms dictate traditional gender roles, often side-lining women from decision-making despite the matriarchal land system. While women possess voting rights equal to men, cultural practices deter them from leadership roles, potentially hindering climate adaptation efforts given women's closer understanding of climate change impacts on aspects like food security and health.
5. Reasonable climate and gender policies exist but lack thorough governance mechanisms that ensure equal participation. Men dominate political spheres, with few women in top roles, indicating potential tokenism in gender-inclusive initiatives rather than genuine commitment to change.

6. Climate change exacerbates food insecurity and health issues, with limited financial resources hindering adaptation to these challenges. The 2016 drought led to higher morbidity rates and decreased nutrition, particularly impacting women responsible for family nourishment, and the resulting malnutrition has generational consequences, but addressing these issues requires a multi-faceted approach beyond just the health sector, considering poverty, education, and urbanization.

7. Governance and policy challenges in climate change adaptation include fragmented government structures and a lack of interagency coordination. Additionally, the insufficient integration of climate considerations into mainstream policies and plans can hinder effective adaptation across various sectors.

8. The RMI grapples with socioeconomic challenges, such as high poverty and dependency on climate-vulnerable sectors, which intersect with climate adaptation efforts. These challenges can constrain resource allocation and the execution of adaptation measures for the most vulnerable populations.

9. Public awareness and engagement in climate adaptation is hindered by consultation fatigue, diverse project messages, and historical trauma from nuclear testing. Marshallese fear losing control over their futures. Addressing this requires multi-faceted efforts, including capacity building, improved coordination, and sustainable funding sources.

6.2.6 Action Plan for the Natural Resources and Commerce Sectors

Table 33: Action Plan for Natural Resources and Commerce sectors

No.	Action	Timeframe	Responsibility	Interlinkages/ Dependencies/ Stakeholders
N1	Review the Republic of the Marshall Islands Agriculture Sector Plan 2021 – 2031 to strengthen the climate change focus.	2024-2026	MONRC	
N2	Launch technical support programs for drought and temperature/sea spray resilient crops and a direct planting program for these species.	2026-2030	MONRC	OCIT (economic return on crops)
N3	Expand the "climate-smart agriculture" raising campaign to include education on future impacts to crops and climate-resilient crop practices.	2026-2030	MONRC	Coordinate awareness raising with MoCIA
N4	Undertake a survey of coastal forests across RMI, their condition, and the level of existing protection.	2024-2026	MNRC MICS	
N5	Investigate specific locations where nature-based solutions, such as coastal forests, can enhance resilience to rising sea levels/salt spray and commence.	2024-2030	MNRC	CCD MoE
N6	Complete a tourism competitiveness study to understand activities under this sector, its importance in the socio-economic situation of the RMI and how it may be impacted by climate change.	2024-2026	OCIT	EPPSO (Immigration data)

N7	Support the Historic Preservation Office (HPO) in collecting and retaining historical, cultural, and traditional knowledge on agriculture and ways of life.	2024-2030	HPO	MNRC OCIT
N8	Modernize the Copra subsidizing scheme and determine plans around the length of time subsidies apply while economic practices can be established in outer islands (for example, export of coconut oil).	2024-2045	MNRC	OCIT, CCD
N9	Develop and implement plans for additional seawalls and other protection measures, such as nature-based solutions, to protect key tourism infrastructure, such as hotels, where it aligns with service levels and long-term adaptation plans.	2024-2045	MNRC OCIT CCD	MWIU Ministry of Finance
N10	Provide input to planning for, and implement maintenance and investment per the long-term levels of agriculture services and tourism opportunities agreed as part of, the long-term adaptation pathways.	2045-2070	All infrastructure and services agencies	Links to cross-sectoral levels of service action

Table 34: Summary of Adaptive Capacity and Adaptive Barriers to Implementing the Action Plan for Natural Resources and Commerce Sectors

Potential Adaptive Barriers
Planting on outer islands is difficult because agriculture is labor intensive, and prolonged outdoors is less desirable with increasing temperatures.
Transportation to the remote neighboring islands is difficult (slow and lack of shipping / too infrequent), meaning people have limited opportunities to sell their goods / grown vegetables.
Aircraft only visit outer atolls generally once per week or sometimes twice for larger atolls. These services can be disrupted for various reasons, including adverse weather or maintenance. These planes also have very limited freight capacity.
More agricultural production could lead to deforestation, soil erosion, and land degradation.
Governance in the RMI emphasizes enhancing economic activities, especially in agriculture, to increase resilience against climate change effects. The MoNRC collaborates with other sectors, like the MoWIU and the PSS, for education on traditional practices. Yet, communication with communities about the timeframes and alignment with national adaptation pathways, especially in depopulating areas, is essential for proposed economic growth.
Traditional practices may become less suitable to the changing climate and lead to lower social outcomes. Alternatives may need to be considered by communities e.g. agricultural practices; and will need to be accompanied by education and training. Similarly, climate changes may alter the survivability of important flora and fauna species, requiring consideration of introducing non-indigenous resilient species for communities to use.
Internal migration to Majuro, Ebeye, and external out of RMI is risking the loss of traditional agricultural knowledge, impacting the care for domestic and traditional plants and animals across outer atolls. The decline in agricultural engagement has similarly affected the handicraft industry, which depends on natural resources from these neighboring islands.

The NSP 2020 highlights the economic inefficiencies stemming from government subsidies for copra, negatively impacting the copra processing industry. Addressing Tobolar's economic viability is crucial, and while growth opportunities exist in the sector, they should be explored for food security, commercial production, and resilience-building.

The NSP 2020 identifies that while there is some underutilized land in RMI, which offers potential for increased output of agricultural food crops, this is limited, and soil conditions are generally poor.

Natural tropical forest ecosystems, utilized for various purposes, including wood production and agroforestry, suffer from data and information deficiencies related to biodiversity, ecological importance, and traditional management, among other aspects. It is essential to address these data gaps to consider nature-based solutions in adaptation plans.

6.3 Action Plan for Spatially Distributed Communities

Table 35 lists adaptation actions that can begin immediately and the atolls and islands where these are most applicable[166]. Other atolls and islands would likely also benefit from these adaptation activities. While the actions are not ranked by priority, the implementation time frame reflects the urgency with which the respective action needs to be addressed. The table below shows goal 1, outcome 2 of the NAP implementation strategy.

In conjunction with the NDMO, the CCD will coordinate and administer the Community Action Plan with reporting to the Ministry of Internal Affairs – Local Government Division. This approach maximizes the resources of all three organizations, relies on a combined mandate that covers much of the NAP objectives, and reduces overlaps in each organization's investments and activities. Different committees have been established and different action plans are being developed at atoll levels, for example the Reimaanlok supports the establishment of a specific committee and the development of natural resource management plan and the NDMO supports the establishment of a disaster committee and the development of disaster plans. However, some atolls will have limited resources to implement and monitor different plans at the same time. A discussion between the local government and multiple government agencies is necessary to determine the most relevant approach for the different types of atolls, be it a series of very focused plans or an integrated development plan for the atoll, or any option in between.

[166] *These actions were developed through extensive consultations with atoll communities by the IOM and Melbourne University. International Organization for Migration, Jo- Jikum, Marshall Islands Conservation Society, The University of Melbourne and Women United Together Marshall Islands. 2023. "My heritage is here" : Report on Consultations with Communities in the Marshall Islands in Support of the Development of the National Adaptation Plan. International Organization for Migration: Majuro.*

Table 35: Community Action Plan for Atolls and Islands

No.	Action	Timeframe	Sector & Lead Responsibility	Atolls & Communities
A1	Building on the establishment of Disaster Committees by NDMO, establishment or extension of Atoll level committees to support the development and implementation of Community Action Plans	2024-2025	CCD, NDMO and MOCIA (Local Government Division)	All atolls
A2	Identification on the format and scope of the local adaptation plans (isolated or integrated with other issues), acknowledging different ones may be needed for different atoll types	2024-2025	CCD, NDMO and MOCIA and other relevant agencies	All atolls
A3	Development of Community Action Plans including sections on specific vulnerability and exposure and tailored adaptation pathways aligned with the national adaptation pathways	2026-2028	CCD, NDMO and MOCIA (Local Government Division)	All atolls
A4	Implementation and monitoring of the progress of the Community Action Plans and adaptation pathways, including monitoring the outcomes and the resulting change in vulnerability	2028-2045	CCD, NDMO and MOCIA (Local Government Division)	All atolls
A5	Development and implementation of awareness campaigns and capacity building for community members and local governments on climate change, its impacts and adaptation options.	2028-2045	CCD, NDMO MOCIA	Other relevant partners for specific topics (e.g., gender, fisheries, etc.)
A6	Development and implementation of program to support sustainable and diversified livelihoods in the communities (e.g., tree planting, community gardens, marine protected areas, aquaculture, handicraft, etc.)			

A7	Development of and support to programs to deliver sustainable, climate change proofed services to community members, including health, education, energy, housing, water supply, communication, transport, etc.	2028-2045	CCD, MOCIA Other relevant government agencies	Other relevant partners for specific topics (e.g., gender, fisheries, etc.)
A8	Development of and support to programs to improve coastal protection and risk resilience. This includes assessment of areas at risk, piloting nature-based solutions, coral regeneration, strengthened DRM	2028-2045	CCD, MOCIA NDMO Other relevant government agencies	MICS
A9	Program to support representativity and inclusivity in decision making	2028-2045	CCD, MOCIA Other relevant government agencies	Other relevant partners for specific topics (e.g., gender, people with disabilities, etc.)
A10	Provide input to planning for, and implement maintenance and investment per the long-term levels of services agreed by the community as part of, the long-term adaptation pathways.	2045-2070	Communities, local government, all infrastructure and services agencies	Links to cross-sectoral levels of service action

6.4 A Cross-Cutting Gender Equity-Focused Action Plan

Table 36: The table below corresponds to goal 3, outcome 5 of the NAP implementation strategy. This Action Plan is set according to the four components of the National Climate Change and Health Policy and Revised Action Plan for RMI: Empowerment, Evidence, Resources, and Implementation.

Table 36: Interlinkages and Dependencies among Stakeholders.

No.	Action	Timeframe	Responsibility	Interlinkages/ Dependencies/ Stakeholders
G1	Empowerment: Actively use the NAP implementation as a springboard for gender equality actions – noting the strength of the existing legal and policy framework and the weakness of its implementation	2024-2030	OCS MCIA CCD	Links to NDC-P Working Group oversight Links to sector action plans, which should include gender elements

G2	Empowerment: Develop and promulgate a gender equality awareness program to change the current cultural norms and strengthen the traditional cooperative roles in decision-making. Include: • Establish champions to promote and enable equality • A publicity program to promote women standing for office – and a parallel program promoting women in politics voter awareness. • A campaign to counter the notion that women are vulnerable	Now-2030	MCIA WUTMI	Links to NDC-P Working Group oversight. Needs to start before the election
G3	Empowerment: Develop and deliver a family development program addressing a range of family issues including: • Cooperative traditions • Elimination of family and gender violence • Shared decision-making • Roles in children's upbringing	2024-2030	MOCIA WUTMI	Links to NDC-P Working Group oversight
G4	Empowerment: Develop and deliver capacity development programs on gender and climate change	2024-2030	MCIA NDC-P	Links to NDC-P Working Group oversight
G5	Empowerment: Promote and fund programs through WUTMI for women's empowerment socially and economically – including women's leadership	2024-2030	MCIA WUTMI	Links to NDC-P Working Group oversight
G6	Evidence: Develop a situational baseline of gender markers and monitor progress against it	2024-2030	MCIA EPPSO	
G7	Evidence: Collect and use sex-disaggregated data and gender analysis to inform development programs and projects. Ensure resources allocated for adaptation actions benefit the most vulnerable groups	2024-2030	MCIA EPPSO	
G8	Evidence: Establish data storage and analysis capacity through government systems to provide an understanding of the RMI situation	2024-2030	OCS EPPSO	Links to Governance Action Plan and Census data
G9	Evidence: Establish strong monitoring, evaluation, and learning protocols to understand progress and adjust programs	2024-2030	OCS CCD	Links to TTEC oversight

G10	Resources: Establish programs for training teachers across all levels in gender-responsive programs, promoting gender equality and modeling these best practices	2024-2030	OCS PSS	Links to TTEC oversight
G11	Resources: Review the school curriculum to promote gender equality practices throughout all age groups actively	2024-2030	OCS PSS	Links to TTEC oversight
G12	Resources: Establish programs to strengthen gender-responsive capacities within the public sector – both in numbers and skills	2024-2030	PSC OCS	Links to TTEC oversight
G13	Resources: Expand existing programs for capacity building in women's leadership	2024-2030	OCS	Links to TTEC oversight
G14	Implementation: Ensure that the implementation of the NAP renforces the need for gender inclusive action plans	2024-2030	OCS CCD	Links to TTEC oversight
G15	Implementation: Develop other positive programs to actively give effect to the National Gender Mainstreaming Policy and the Gender Equality Act – moving assertively to explicit action	2024-2030	MCIA	Links to TTEC oversight
G16	Implementation: Give effect to the NSP Gender Goals in all sector planning	2024-2030	EPPSO HOD's	Link to TTEC Oversight
G17	Implementation: Consider affirmative action in government and local government elections	2024-2030	OCS MCIA	Link to TTEC Oversight

6.5 From Action Plans To Implementation

The objectives of the Community Action Plans and the Sector Action Plans go beyond mere commitment to the NAP. For lead implementation partners, this commitment demands a conversion of their Action Plan into tangible on-the-ground actions and results through respective implementation planning processes. These processes include, for each sector, setting a schedule, determining and accessing resources, and engaging key stakeholders. Each sector-driven implementation process will be a guiding feature for each sector's forward strategies, activities, programs, budget and resourcing.

Similarly, for Community Action Plans presented here, the immediate next steps for lead implementation partners will be bridging that implementation gap. Here, the next step is developing atoll-based Local Area Plans for Adaptation[167] (LAPAs). These LAPAs generate the site, community locale-specific, tailored implementation strategies for each unique

[167] https://www.ids.ac.uk/download.php?file=files/dmfile/LHcasestudy03-NepalLAPA.pdf

atoll in the RMI[168]. They contain implementation schedules of works, targets, and resource plans to generate outcomes that tie directly back to NAP national-level objectives over time.

Image Supplied by Webmedia South Pacific

[168] *The LAPA Framework focuses on incorporating the adaptation needs of local communities into their planning systems to combat climate change impacts. This framework prioritizes a bottom-up, inclusive, and adaptable approach. It employs climate vulnerability assessments to pinpoint the most at-risk municipalities and livelihoods. Centered on the needs of the people, LAPA ensures active participation and direct benefits to those most vulnerable to climate change. The creation of LAPAs is driven by a thorough process, championed by local communities and stakeholders.*

Section G:
NAP IMPLEMENTATION II:
THE ENABLING ENVIRONMENT

Section G: NAP IMPLEMENTATION II: THE ENABLING ENVIRONMENT

7.0 Introduction

This Section addresses what is needed of the enabling environment to support a self-determined, equitable response to the impacts of climate change that serves the needs of all segments of society.

The RMI government, with the support of partners, is committed to establishing a robust enabling environment to facilitate comprehensive implementation of the NAP. This requires an "All-Of-Government" approach embedded within an "All-Of-Society" commitment. It has three core requirements – conducive policy and legal foundations, effective governance and administrative structures, and the ability to mobilize the right resources for sustainable development.

Figure 24: Elements of the 'enabling environment" to strengthen the National Adaptation Plan

7.1 All-Of-Government Approach to Implementing Climate Adaptation Actions

The all-of-government approach requires multiple government departments or agencies to coordinate their actions, resources, and strategies to address complex challenges or to achieve common goals. Instead of operating in silos with each department or agency working independently on issues that may have interconnected components, an all-of-government approach promotes holistic and integrated planning and action.

Departments work together to design and implement policies, ensuring that efforts are complementary and not duplicative. They have shared goals around relevant parts of the government to rally around common objectives, ensuring that everyone is moving in the same direction; and maintain a unified message from the government, ensuring that stakeholders and the public receive consistent information.

Such an approach will be necessary for the focus and application required to address the complexities of issues, decision-making and implementation of the NAP. Table 37 at the end of this section shows an action plan for implementing the all-of-government approach.

Image Supplied by Webmedia South Pacific

7.1.1 Enhancing the Legal and Policy Foundations

The RMI has a strong traditional Constitution-based legislative foundation that anchors national governance. It is based on a cooperative hierarchy of land ownership with traditional linkages supporting livelihood through the lower levels of the hierarchy. While the land ownership hierarchy has been maintained, modern economic activity presents a challenge to maintaining the supporting traditional linkages through the social community structures.

Enhancing the legal and policy environment to implement the National Adaptation Plan hinges on three modes of action. First, is determining if sufficient policies currently exist to support NAP implementation. Policy gaps may need to be filled and efforts are already underway to do so, including for example, new national disaster risk and resilience policies that acknowledge climate adaptation objectives within their proposed mandates. Second, is determining if existing

policies need to be updated to accommodate the NAP objectives. Periodic updates of national policies are always good practice and may also occur in previously set cycles. When such periodic updates are scheduled, they must now take the NAP implementation into consideration. This will also include economic development related policies. Third, where national policies are active and will sufficiently provide the support the NAP requires for implementation, it must be determined if the relevant authorities are empowered enough through proper resourcing and authority to carry out their mandates. Critical areas are noted as follows:

7.1.1.1 Land Tenure and Land Rights

The RMI faces unique challenges tied to its land tenure and property rights systems, challenges which significantly impede climate change adaptation actions. A robust understanding of the intertwined nature of land tenure, land rights, and climate adaptation is crucial for policymakers to effectively address the impending concerns (this has been pointed out more specifically in Action Plans).

Land tenure in the RMI presents a complex web, with private ownership dominating the landscape. Given the absence of public land and the voluntary nature of land registration, there exists a pervasive ambiguity surrounding land ownership. This uncertainty casts a shadow on long-term economic and adaptation planning efforts.

Addressing this issue will require a consideration of the traditions that underpin the system, the economics and the legal framework. This consideration is provided for in the SLR Adaptation Policy as an underlying issue and is part of the associated Action Plan.

7.1.1.2 Sea-Level Rise Policy

In June 2023, the Cabinet adopted the Sea Level Rise (SLR) Adaptation Policy (CM 098 - 2023) to address the complex set of issues arising from the projected rising sea levels. With the current SLR of 4 inches from the baseline around 2000 and projected to reach 20 inches between 2070 and 2100, and a staggering 6.5 feet by 2150, proactive planning and decision-making is necessary if the impacts are to be managed. The Policy[169] addresses three areas:

Firstly, the technical issues of monitoring SLR and its impacts, setting planning parameters and guides and undertaking studies on atoll protection and potential re-location of the center of government. These hinge on the observations that 20" of SLR represents a nominal tipping point for habitation of unprotected atolls and that protecting the urban atolls of Majuro D-U-D and Ebeye is not practicable beyond the 20" threshold. Also, based on the assessment that the cost of this protection is expected to be very expensive. At 20" of SLR it is assessed that the cost of protecting an island within an atoll would be around $300 - $500 million each. For up to $2 billion up to four atoll islands could be protected to provide for population migration from the remaining 20 unprotected atolls. At 6.5ft of SLR beyond 2150, one of these pieces of land could be further protected, lifted 2m and occupied to provide 1 – 1.5 square km of land at an additional cost of $1.5 - $3 billion.

Secondly, a number of underlying issues are identified, which if not addressed will become barriers to adaptation action. These include land tenure, women's voice in adaptation decision-making, re-allocation of rights for people displaced from their land and reforms

[169] *RMI Sea Level Rise (SLR) Adaptation Policy, TTEC Committee, RMI Government CM 098 (2023), June 2023*

of the public sector and the economy. They are fundamental cultural and institutional issues that will require long and complex conversations, touching in some instances on constitutional and Compact-related concerns.

Third, the Policy addresses the need for an institutional framework to provide for the oversight and implementation of the NAP which is a plan of substantial complexity in terms of decisions to be made, money to be spent and underlying barriers to be overcome. There will be a need for an adaptation implementing office and the location and context of its arrangements will be addressed under the Policy and its Action Plan being prepared for Cabinet.

Image Supplied by Webmedia South Pacific

7.1.1.3 Disaster Risk and Resilience Policy

The new DRM Act 2023 provides for disaster and climate resilience planning and a policy will be prepared under the Act to give effect to this. This will be through the new National Disaster Risk Management Plan which will provide for national, agency and atoll level planning. This policy will sit alongside the SLR Policy and other expected social and community policies as a coherent suite to guide resilient development under the umbrella of the National Strategic Plan.

7.1.1.4 Provision of Government Services

Section 15 of the Constitution of the RMI recognizes the right of the people to health care, education, and legal services and the obligation of the RMI Government to take every step reasonable and necessary to provide these services.

The 2021 census notes a population decline for RMI of 22% from 55,000 in 2012 to approximately 43,000 in 2021. In the neighboring atolls the decline is more marked between 33% and up to 50%. There has been migration from the neighboring atolls to the urban atolls of Majuro and Ebeye and a net migration off-shore – notably to the US under the Compact of Free Association.

With levels of service for education, health, infrastructure and community services already marginal for the neighboring atolls it is unsustainable to maintain effective levels of service to these communities and consideration of a level of service policy including consolidation of services is becoming urgent. To continue with a policy of continuing services with decreasing populations simply means the level of service provision for all Marshallese will continue to decline – this at a time when the NAP itself is seeking an increased level of service to prepare for climate change.

7.1.1.5 Physical Planning and Coastal Conservation

The Planning and Zoning Act 1987 provides for the: planning of land and water use; promotion of the health, safety, and general welfare of the people; creation of zones in municipal areas; regulation and control of building construction; prevention of overcrowding of land; and matters connected thereto. This Act is incompatible with the traditional land tenure practice and has not been implemented to any effective extent. Other legislation now sits in parallel and in particular the Protected Areas Network Act 2015. The PAN Act is, however, focused on planning for use of local natural resources and their conservation.

The Urban Resilience Project currently being implemented includes a provision for re-casting the Planning and Zoning Act and the SLR Adaptation Policy calls for the development of a Planning Statement for SLR. Both documents will need to consider the land tenure issue and find some resolution if they are to be effective.

7.1.1.6 Environmental Protection and Climate Adaptation

The National Environmental Protection Act 1984 establishes a National Environmental Protection Authority (NEPA) to protect and manage the environment. The Act is subject to Title I, Article VI of the Compact of Free Association by and between the US and RMI governments. The NEPA is granted powers necessary for its functions, including making regulations for earth moving, environmental impact assessment, marine water quality, pesticides and pollutants, water supply, solid waste, toilet facilities and sewage disposal, and sustainable development. NEPA is also responsible for formulating a Land Use Scheme that provides a rational, orderly, and efficient system of acquiring, utilizing, and disposing of land and its resources to derive maximum benefits.

NEPA may delegate any of its powers and functions – it is not clear the extent to which it has done so to local government authorities or any other party. NEPA has wide-ranging responsibilities: Article 127 appears to give national-level land use planning to the NEPA, although its functionality is currently undeveloped. The Land Use Scheme produced by NEPA may include a land inventory and classification system and designate a range of potential land utilization measures.

NEPA's mandate extends to a system for exploitation of "aquatic resources" within the territorial waters of the RMI, including its Exclusive Economic Zone, but these do not

include aggregates or seabed materials. The environmental impact assessment will be required to create new elevated atoll settlements and is probably necessary for land abandonment that could arise from population consolidation. NEPA's earthmoving regulations apply to creating new elevated island settlements - all earthmoving requires an Erosion and Sedimentation Control Plan.

Table 37: An Action Plan for Strengthening the All-Of-Government Approach

No.	Action	Timeframe	Responsibility	Interlinkages/ Dependencies/ Stakeholders
AG1	Chief Secretary's Office makes a National Declaration on All-Of-Government and All-Of-Society Commitment to NAP implementation.	2024	OCS	CCD, TTEC, Cabinet
AG2	Hold a national discourse on land tenure and land rights law to accommodate NAP actions.	2024-2030	OCS	CCD, TTEC Cabinet
AG3	Re-establish and implement the Planning Act for zoning designations.	2024-2030	MoWIU, Ministry of Environment	MoNRC, Landowners
AG4	Develop and approve the SLR Policy implementation plan.	2024-2030	OCS	CCD, TTEC, Cabinet
AG5	Disaster Risk and Resilience Policy	2024-2030	NDMO	Local Government Division
AG6	Develop a government policy on delivering critical public services with attention to outer atolls based on CBA criteria.	2030-2045	MoCIA	Local Government Division
AG7	Review and update the Planning and Zone Act and attendant regulations to facilitate NAP activities.	2024-2030	MoWIU	Transport, Telecomm, Natural Resources, Environment
AG8	Review and provide resources and support to implement the Coast Conservation Act to facilitate NAP activities.	2024-2045	Ministry of Environment; NEPA	
AG9	Review, update, and resource NEPA strategy to mainstream climate change impacts into EIA and other regulatory processes.	2024-2030	Ministry of Environment; NEPA	CCD
AG10	Establish and empower a high-level NAP Oversight Board with Civic and Expert Working Groups.	2024-2030	OCS	CCD, Cabinet

AG11	Modernize, expand, and resource a National Climate Change Office from CCD as Secretariat for NAP implementation.	2024-2030	OCS, Ministry of Environment	CCD
AG12	Review and rationalize the number and mandates of disparate climate-related committees and taskforces across Ministries for more efficient coordination of efforts and limited human resources.	2024-2030	CCD, NDMO, NDC, TTEC	
AG13	Continue building NDA competencies in proposal administration and pipeline development, including increasing quality and quantity of proposals.	2024-2030	, CCD, NDMO	
AG14	Streamline and implement systems and tools to allocate public financing of NAP activities through national budget processes.	2024-2030	MoFBPS	CCD, Local Government Division MoFBPS
AG15	Lobby international partners to contribute to the new MIRA Trust Fund.	2024-2070	Climate Envoys	MoFBPS, CCD
AG16	Access Compact funding to implement NAP activities, including US technical assistance.	2024-2045	MoFBPS, CCD	MoFAT, NDMO
AG17	Implement public financial management systems and systems to coordinate donor funding records for alignment with NAP budgeting and allocations.	2024-2030	MoFBPS	CCD, EPPSO
AG18	Develop and implement a CBA-based NAP project identification and selection protocol for Ministries.	2024-2030	EPPSO, MoFBPS	CCD, NDMO
AG19	Strengthen and resource the data management capacity, capabilities, and functionality of EPPSO to support NAP processes (data collection, analysis, M&E).	2024-2030	EPPSO, MoFBPS	CCD, NDMO
AG20	Finalize the RMI position paper on Innovative Climate Finance and implement it.	2024-2030	MoFBPS	CCD
AG21	Organize and facilitate a discussion between NDMO, CCD, other agencies, local government and other partners to identify which committees should be established in the neighboring atolls, their composition and the atoll level plans to be developed and overseen by these committees	2024-2026	MOCIA CCD NDMO Other relevant agencies	Non-government partners: IOM, Red Cross, MICS

7.2 Fit-For-Purpose Climate Governance and Administration

The Government of the RMI is committed to reviewing existing governance and administrative structures to align and coordinate how to effectively deal with the multifaceted challenges of climate adaptation. Challenges[170] to be addressed include:

- difficulties with coordination of short and medium term planning and the need for focus in this area
- limited public sector funding leading to competing programs across ministries and fragmented rather than coordinated activities
- the evolving understanding of the role of the OCS as the head of the public service and reinforcing ministry accountabilities within this – also as principal adviser to Cabinet
- the need to ensure appropriate implementing mechanisms and monitoring arrangements are in place to give effect to adopted policies, strategies and plans

Reviewing the institutional arrangements for the implementation of the NAP will be undertaken under the SLR Policy. Arrangements are subject to discussion but are expected to include:

- Maintain the TTEC as the Adaptation Oversight body with a new committee structure to represent the needs of implementation
- Reform the Ministry of Environment Act to provide an appropriate set of mechanisms to promote and coordinate the activities of its constituent offices
- Retain the current policy and advocacy functions (local and global) of the Climate Change Division (CCD) under an appropriate Ministry structure
- Reform and reinforce the planning functions of the Economic Policy Planning and Statistics Office under an appropriate structure accountable to OCS
- Establish an Adaptation Implementing Agency under an appropriate institutional structure accountable ultimately to OCS and Cabinet
- Give consideration to the formation of an expert body to guide advice within the institutional arrangements.

7.3 Mobilizing the Right Resources

Mobilizing the right resources is a linchpin for successful climate adaptation. Allocating a dedicated portion of the national budget for adaptation measures can provide consistent funding for essential initiatives, but, given the scale of the challenge in the RMI., this will not come close to meeting the demands. It will be necessary to leverage international climate finance from entities such as the Green Climate Fund, the World Bank, and bilateral donors to provide the RMI with both funds and technical assistance. Additionally, offering incentives and tax breaks, may also help spur private investments in climate adaptation. Collaborating with neighboring countries, academic institutions, and global organizations can provide insights, technical expertise, and best practices that would be invaluable for the RMI. Avenues for each of these are noted below.

[170] *Much of these points are further reinforced in the recently approved Sea Level Rise Policy 2023*

7.3.1 Climate Finance

The RMI will need to simultaneously seek the most promising financing sources in the short term while also exploring access to additional resources and channels in the medium- and long term.

The NAP financing and resource mobilization will be formed through three key source areas: (1) Assistance, provided bilaterally or through (2) regional entities, from climate finance facilities, or multilateral development banks are channeled through either the government budget (as grants and loans), through the MIRA, or directly to projects, to fund activities that can address climate change adaptation. (3) Domestic public finance is channeled through the government's national recurrent and development and subnational budgets to fund sectoral activities and projects that can address climate change adaptation. This will include resources received through US Compact negotiations, a portion of which may be distributed towards adaptation needs.

(1) International climate finance sources: This is carded to be the RMI's main source of financing the NAP. Sources include bilateral providers, multilateral climate funds, multilateral development banks, and other international and regional organizations.

RMI will seek support from:

i. The Green Climate Fund (GCF), through accredited entities (which in RMI include the Ministry of Finance) or by the CCD, which is the Nationally Designated Authority (NDA).

ii. Adaptation Fund: RMI will access funds through direct access proposals put through its National Implementing Entity.

iii. Global Environment Facility (GEF): The RMI will work with GEF's implementing agencies and National Focal Point to develop project proposals based on the NAP Action Plans.

iv. Climate Investment Funds (CIF): the RMI government will work through the multilateral development banks (MDBs), including the World Bank and Asian Development Bank (ADB), that partner with CIF.

Given the extremely complex application and management processes for grants, RMI may face challenges to apply for multiple major finance at once. It will therefore prioritize those which provide the greatest flexibility and the highest chance of success.

In addition, RMI will continue to advocate in international forums, including the UNFCCC and international finance discussions, to push for flexible, programmatic funding mechanisms and streamlined application procedures in order to increase the accessibility of climate finance. While initiatives such as GCF readiness funds to enhance institutional capacity on the ground and support access are welcome, the experience of the RMI in applying for and implementing GCF projects underscores the need for a paradigm shift in the delivery of climate finance to support adaptation at the scale that will be required.

Moreover, RMI will continue to advocate for a greenhouse gas levy in maritime shipping, proposed by RMI and the Solomon Islands. This could generate significant revenue for vulnerable developing countries, including RMI.

The RMI is also currently undertaking negotiations with the US on the Compact of Free Association. The RMI government will have discretion to spend resources from the Compact on climate adaptation. The amounts that can be dedicated

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to climate adaptation will be reviewed once the Compact negotiations are complete. It is also possible that in the next decade, the US may invest in climate adaptation of its military bases abroad. The Kwajalein Base may benefit from such investment in the atoll and its communities. The RMI government must be ready to involve itself in such discussions.

(2) Regional Cooperation on Climate Finance: Following a decision to draft a Regional Climate Finance Strategy, collaborations between regional entities and global organizations like the UNFCCC Secretariat and GCF have intensified. Initiatives such as the North Pacific office for SPREP, championed by the RMI, facilitated direct communication for environmental policymaking, project development, and access to climate finance. The RMI also supports the Pacific Resilience Facility (PRF), a finance model that advocates for innovative finance measures such as debt swaps and facilitating loss and damage payments, which is particularly crucial for nations like RMI.

(3) General domestic public finance channeled through the national budget: General domestic revenues are not explicitly earmarked for climate change action. General domestic revenues resources are supplemented by domestic borrowing (external grants and loans) and fund the government's national recurrent and development budgets. Together, they constitute a substantial financing potential for capital investments in adaptation (e.g., to climate-proof infrastructure) and recurrent activities (e.g., to develop and implement sectoral resilience policies). These resources are allocated through established budget processes passed annually by the Cabinet in recurrent and development budgets[171].

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[171] *The recurrent budget funds staff, operational expenses, and minor capital outlays for activities of national departments and agencies and provides support to local government administration and capital projects in priority sectors of each atoll. The development budget comprises one-year or multi-year public investment projects and programs, primarily in physical capital (e.g., roads) and human capital. The development budget can also provide co-financing/counterpart funding for development partner projects.*

The new Marshall Islands Resilience and Adaptation Trust Fund Act, 2022 (MIRA), objectives are: (1). Supporting the country's long-term strategies to handle climate change. (2). Gathering, stimulating, and increasing financial resources exclusively for tackling these challenges. (3). Offering a consistent flow of financial aid for initiatives that build climate resilience. (4). Boosting both government and public spending, along with contributions from international partners. (5). Strengthening the government's ability to effectively plan and oversee its national strategies against climate change impacts. It is designed to be a single port-of-call for donors seeking to support RMI's climate adaptation efforts, providing a streamlined, single source of resources that the government can determine how to spend. The goal is to accumulate at least $20 million in the fund by the end of 2026 by combining national sources and support from international partners. The government will contribute USD 3 million for the fund's initial capital. Beyond this initial phase, the government will continue to inject funds from various sources such as: excess savings and resources; revenues from international registries; income from any other significant government service; and any unexpected additional revenues. Besides its contributions, the government will also seek grants from international diplomatic and development allies.

Each year, the overseeing Board will finalize an amount that will be given to the government. This will finance crucial projects that bolster climate resilience, aligning with national plans. To assist with budget preparations, the Board will inform the government each year about the amount available for the upcoming year. Consideration will be given to using some of this funding as prerequisite co-financing required by international finance agencies and donors to tap into larger amounts.

7.3.2 Climate Finance Administration and Capacity Building:

Overall, mobilizing climate finance is complex because of the technical requirements and capacities needed to design and implement climate change adaptation projects, the diversity of funding sources (national, subnational, international, private), and the requirements to apply for, access, and report on the use of those funds. Financing sources and channels will be pursued in a phased manner that fits with the phasing of the NAP into immediate, mid-term, long-term, and ongoing phases of implementation to efficiently utilize the capacity for accessing finance. Funds supporting capacity building will be prioritized in order that greater and more efficient use of available finance can be made over time.

Government Coordination: The Ministry of Finance, CCD, and EPPSO (a central service whose mission is to support the RMI government in defining, implementing, and monitoring the National Strategic Plan will have responsibility for coordinating the international climate financing and the financial planning and implementation of the NAP.

Project Identification and Selection: Based on the NAP Sectoral and Community Action Plans, responsible lead Ministries and Agencies will develop their own Implementation Plans that align with the NAP (and, by extension, the National Strategic Plan), laying out specific ministry-led programs, and projects to be proposed for climate financing for approval MoFBPS by a NAP Oversight Board Board whose members will include CCD as the secretariat, the Ministry of Finance and EPPSO.

MoFBPSA cost-benefit analysis framework (CBA) will be applied to all proposed climate adaptation projects for which Ministries and Agencies request climate financing. The level of analysis will be determined based on several factors, including size, scope, and urgency.

Managing Climate Finance: "Strengthening of RMI's capacity to undertake due diligence, manage climate finance flows, ensure rigorous fiscal responsibility, and provide adequate reporting from the proposal phase through to access and disbursement will be required.

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7.4 Human Capacity Building and Outsourcing

Every RMI sector suffers from skills shortages and a lack of human resources to perform key roles within ministries. This is because the skilled workforce is migrating from the RMI to pursue higher-income earning positions. This skills shortage is expected to continue and be exacerbated by climate change, which may force more people to leave their homes. This is a key vulnerability and will hinder the implementation of the NAP and the actions needed to provide long-term adaptation planning within the RMI. In addition, it is noted that various programs require local on-island skilled resources to perform local roles. For example, the NDMO has a focal point on each island atoll who reports hazards and disasters such as extreme water shortages. The ACWA project also has a local representative tasked with monitoring newly established rain storage on each atoll. Implementing the NAP will also heavily rely on local representatives to undertake ongoing monitoring of climate change indicators, assist with awareness raising in local communities, and potentially implement on-island adaptation measures. There would be considerable benefit in pooling resources and

establishing a paid position on each island that could support these various activities, given the overlapping nature of the requirements.

7.5 All-Of-Society Approach to Implementing Climate Adaptation Actions

The Government of the RMI seeks to provide for an 'all-of-society' approach to implementing climate adaptation actions by ensuring a 'connected' arrangement by which implementation of the NAP is driven and coordinated by the Adaptation Implementing Office effecting delivery through the sector ministries of the government and through the local governments.

The following adaptation capacity development would need to be provided to support this arrangement:

- Capacity development of the MoCIA who would be expected to take a major role in supporting local government and gender and human rights issues and advocacy and in community engagement
- Capacity development of Climate Change Division in policy development, awareness programs and advocacy and monitoring
- Capacity development in the OCS for policy oversight and development and in national planning
- Capacity development within OCS to drive the underlying issues resolution
- Capacity development within the MoFBPS for addressing financing measures and for financial management processes for the NAP implementation
- Capacity development within MoNRC for addressing food security and nature-based-adaptation in the neighboring atolls
- Capacity development for OCIT for economic and livelihood initiatives to run in parallel with the atoll adaptation programs
- Capacity development within MoWIU for land management, coastal development and project management
- Capacity development in the PSS for curriculum development focussed on preparing the next generations for what climate change will bring and encourage commitment to developing skills needed

The NAP will support the deep-seated expertise and insights that reside within local communities and varied societal groups. By shifting towards a more connected and inclusive NAP strategy, we ensure that grassroots insights and local knowledge play a pivotal role in crafting adaptive strategies. Moreover, the onus of addressing climate change transcends governmental duties; it is a collective endeavor that the entirety of society must shoulder. Involving every stakeholder does not only distribute responsibility but also infuses a deeper sense of commitment, which, in turn, leads to sustained action and results. Collaborative learning, pooling resources, and fostering mutual support systems further bolster climate resilience.

Encouraging participatory decision-making, which involves convening community meetings and forums, ensures that residents have a direct hand in the decision-making process. This approach, enriched by consistent feedback, facilitates the evolution and refinement of strategies. Concurrently, schools, community centers, and media outlets can become

instrumental in disseminating knowledge and cultivating awareness about the impending climate risks and necessary counteractive measures.

The synergy of public-private partnerships (PPPs) offers another avenue. By fostering collaborations between the government and the private sector, we can usher in a wave of innovation, secure essential funding, and build a resilient infrastructure against the climate onslaught.

Traditional practices of the RMI people are reservoirs of wisdom. Weaving these into our NAP approaches can enhance effectiveness. Furthermore, it's paramount to elevate marginalized voices, ensuring that groups such as women, youth, and other marginalized communities are seen and heard, playing a pivotal role in decision-making and implementation.

7.5.1 Public Awareness, Education, and Behavioral Change

The NAP envisions an informed, empowered, and proactive Marshallese society. Achieving this requires a multi-faceted approach. We will educate every individual in the RMI about the severe impacts of climate change, especially concerning our natural and cultural heritage. While nurturing conversations on climate change is essential, the goal is personal and societal behavioral change to build resilience. We want to instill changes in everyday behaviors that harmoniously align with the overarching objectives of the NAP.

In parallel, we will intensify its efforts in public education. This will see the integration of specialized climate change modules into school curriculums. Training sessions tailored for teachers, community torchbearers, and other pivotal stakeholders will be regularly conducted to supplement this. These efforts will be bolstered by disseminating informational materials crafted in local dialects, ensuring accessibility and understanding (much of this is already in the Education Sector Action Plan).

We will also emphasize behavioral change by relating success stories to the public. These will chronicle those RMI 'champions' who have taken successful climate adaptation actions in their homes, communities, companies, and livelihoods. Incentive-driven programs will be rolled out, offering tangible rewards for communities and enterprises that exhibit innovative adaptive measures. Additionally, platforms will be available for open dialogues, letting individuals share their unique adaptation stories and challenges.

The RMI government emphasizes public-private partnerships, so collaborative endeavors will be sought with local and global organizations to pool technical expertise and funding. Engagements with educational bodies will be initiated for collaborative research and expansive outreach. The business community will not be engaged as proactive change instigators.

Table 38: An Action Plan for Empowering the All-Of-Society Approach

No.	Action	Timeframe	Responsibility	Interlinkages/ Dependencies/ Stakeholders
AS1	Do a stocktake of multistakeholder participatory processes to update as we move from NAP development under TTEC/AWG to NAP implementation in a new governance framework.	2024-2030	CCD	TTEC, OCS
AS2	Organize and implement a strategic approach to increased involvement of the private sector, faith-based organisations and academia in the NAP implementation process.	2024-2030	CCD	Chamber of Commerce, churches, academic institutions
AS3	Resource and fast-track implementation of the national gender policy.	2024-2030	MoCIA	CCD
AS4	Develop and utilize systems, tools and guides to integrate gender into NAP sector and community action plans and monitor progress.	2024-2045	CCD	MoCIA
AS5	Launch and sustain a NAP public awareness campaign than incorporates elements of public education and behavior change.	2024-2045	CCD, MoCIA	Project partners
AS6	Institute annual assessment polls or surveys of the national lived experiences and opinons on NAP progress.	2024-2070	EPPSO	CCD
AS7	Conduct a labor market analysis that will show current gaps and also future requirements for private and public sector followed by an implementation and training/capacity building plan to have those skills in country starting from early age in high school and appropriate scholarships.	2024-2027	AG, Division Immigration, Division of Labor	MoEST, MoFAT, MICC

Section H:

NAP IMPLEMENTATION III: MONITORING AND EVALUATION FRAMEWORK

Section H: NAP IMPLEMENTATION III: MONITORING AND EVALUATION FRAMEWORK

8.0 Introduction

The monitoring and evaluation framework is based on the Action Plans previously detailed in Sections F and G. These include the Sector, Community, and Gender Action plans and those for All-of-Government and All-of-Society. These monitoring and evaluation frameworks provide Performance Indicators, which are starting points for responsible Ministries, and monitoring and evaluation lead to further defining how to measure progress over time. The Performance Indicator links to a broader, higher-level societal Target that ultimately symbolizes the outcome we want to achieve for our society. The lead ministries/ agencies are repeated as in the Action plans, but an M&E lead is also included to share this function and build another level of performance accountability. A Baseline is provided that communicates an initial estimation of whether there is enough evidence, data, or information about the particular performance indicator to have a comparator to expected progress. A timeframe for implementation is again provided, and a suggested M&E frequency is most suited to continuous evaluation and feedback about progress along the adaptation activities.

8.1 Monitoring and Evaluation Across the RMI Pathway for Survival

This M&E framework focuses primarily on the next ten years of the NAP 2023, which is the first part of the much longer-term RMI Adaptation Pathway outlined in Section E. In ten years, this NAP 2023 must be updated based on the experience of the 2024-2034 period as well as updated data, information, and socio-cultural context that emerges and becomes apparent over the course. Before that, however, it is advised that a midterm evaluation be done at the 5-year NAP implementation midpoint. Figure 26 shows the symbolic representation of the monitoring and evaluation, while Tables 39 – 43 provide detailed summaries of strategies, indicators, and other details for monitoring and evaluating outcomes under Goals 2 and 3.

Baseline

○ No: There is insufficient information to form a baseline.

◔ There is some information to start developing a baseline.

◕ There is a baseline that may need to be reviewed and up dated.

● A suitable baseline has been established.

Timeframe

- Short (2024-2030)
- Short to Medium (2024-2045)
- Medium (2030-2045)
- Medium to Long (2030-2070)
- Long (2045 -2070

Monitoring Frequency

- 1 Annually
- 2 Biannually
- 3-5 Every 3-5 years

Figure 26: Symbol classifications guide to M&E tables.

Table 40: Goal 2: Build And Sustain Adaptive Resilience

Outcome 1: SECTORAL RESILIENCE Sector: Infrastructure, Works, Transportation, Telecommunications						
Activity No.	**Performance Indicator**	**Target**	**Leads/ M&E**	**Baseline**	**Monitoring Frequency**	**Timeframe**
W1	Ministry-led 5-year NAP implementation plan is approved.	All projects are approved and monitored, partly based on climate adaptation responsiveness.	L: Works ME: Works, CCD	○	1	▶
W2	Legislation and policies integrate 'climate proofing' standards, regulations, and guidelines.	All legislation and policies guiding the ministry have mainstreamed climate adaptation.	L: Works ME: Works, CCD, Finance	◔	3-5	▶
W3	Completed quantitative sector-specific risk and vulnerability assessments	Prioritize the most critically vulnerable ministry activities and plans that require climate-proofing.	L: Works ME: Works, CCD, Finance	◔	1	▶
W4	Increased efficiency in multi-agency decision-making is measurable in reduced project times.	Reduced project completion times and stronger multi-agency collaborations	L: Works ME: Works, CCD	◔	1	▶
W5	Increase in the number and capacity of renewable energy on-grid and off-grid.	There is a 50% increase in solar generation in the off-grid sector and national grid capacity.	L: MEC ME: MEC, EPPSO, CCD	◔	1	▶
W6	Build Back Better Best Practice Guideline launched.	Damaged infrastructure is rebuilt based on the Guidelines	L: Works ME: Works, CCD	◔	1	▶
W7	RMI Ports approves a Modernization Investment Plan that considers climate adaptation.	Increased RMI Port efficiencies in scheduled operations.	L: Works, MIMRA ME: Works, CCD	◔	3-5	▶
W8	Number of Marshallese trained and certified in critical renewable energy skills areas.	Enough trained persons to effectively cover all ministry tasks across all RMI communities.	L: Works, MEC ME: Works, CCD	◔	1	▶▶

W9	Number of Marshallese trained and certified in critical telecommunications skills areas.	Enough trained persons to effectively cover all ministry tasks across all RMI communities.	L: Works, MEC ME: Works, NDMO, CCD		1	
W10	The number of communities made aware and educated about how climate impacts their critical infrastructure services.	Communities that can make informed decisions with the government about potential internal migration options.	L: Education, Local Government ME: Local government, CCD		3-5	
W11	A Ministry-approved M&E for all infrastructure operations.	Increased efficiency and accountability for major projects.	L: Works ME: Works, EPPSO		1	
W12	Increased or value-added returns on investments on traditional projects.	New ways to increase measurable ROI on projects.	L: Works ME: Works, Finance, CCD		1	
W13	The ratio of capital finance to long-term maintenance costs.	To make existing and new infrastructure more climate resilient in the long term.	L: Works ME: Works, Finance, CCD		3-5	

Outcome 1: SECTORAL RESILIENCE **Sector: Health**						
Activity No.	**Performance Indicator**	**Target**	**Leads/ M&E**	**Baseline**	**Monitoring Frequency**	**Timeframe**
H1	Climate and health strategy achieves Ministry implementation milestones.	100% of top health priorities are launched	L: Health ME: Health, EPPSO, CCD		1	
H2	Post-disaster recovery policy launched and funded.	Resilience of critical national health infrastructure	L: Health ME: Health, NDMO, CCD		1	

H3	Audit completed for all health centers	Recommendations of the audits become the basis for an improvement plan	L: Health ME: Health, EPPSO, CCD		1	
H4	Increased access and ease of access to inter-island transport for health services.	100% of atoll persons requiring inter-island transport for healthcare can receive it.	L: Health ME: Health, Transport, CCD		1	
H5	All outer atoll communities have a climate and health education and awareness program.	100% of outer atoll communities receive updated climate information useful to them.	L: Health ME: Health, Education, CCD		1	
H6	Launch and implementation of the Healthy Homes program	100% of homes receive help to implement the program.	L: Health ME: MoCIA, CCD		1	
H7	The annual database is populated accurately.	National database of local area migration.	L: Health ME: MoCIA, EPPSO, CCD		1	
H8	The number of recruited staff in critical health sector roles.	For the health sector to become 100% staffed to meet the needs of the RMI people.	L: Health ME: Health, CCD		1	
H9	The program launched for critical infrastructure repairs and upgrades.	All healthcare facilities meet weather resilience standards.	L: Health ME: Health, Works, CCD		1	
H10	Internet and video conferencing capabilities are installed.	100% of Outer Atoll health centers have video conferencing and internet capabilities.	L: Health ME: Health, Finance, CCD		1	

Outcome 1: SECTORAL RESILIENCE Sector: Education						
Activity No.	**Performance Indicator**	**Target**	**Leads/ M&E**	**Baseline**	**Monitoring Frequency**	**Timeframe**
E1	Program of climate resilience audits of schools launched.	100% of schools are audited with recommendations forming an action plan.	L: Education ME: Works, Finance, CCD		1	
E2	Program for repairs and sustained maintenance of schools launched.	100% of schools have funded regular maintenance schedules.	L: Education ME: Works, Finance, CCD		1	
E3	Increased access and ease of access to inter-island transport for education services.	100% of atoll persons requiring inter-island transport for education can receive it.	L: Education ME: Transport, MoCIA, CCD		1	
E4	A formal teacher training program initiated.	100% of schools have at least one formally trained resource teacher.	L: Education ME: Education, CCD		1	
E5	School places available for all needing placements.	All schools meet cost-benefit service justifications.	L: Education ME: Education, Finance, CCD		1	

Outcome 1: SECTORAL RESILIENCE Sector: Fisheries						
Activity No.	**Performance Indicator**	**Target**	**Leads/ M&E**	**Baseline**	**Monitoring Frequency**	**Timeframe**
F1	Survey of fisheries employment and livelihood dependency completed.	Develop a fisheries livelihood dependency risk management plan.	L: MIMRA ME: MIMRA, EPPSO, CCD		2	
F2	Fund and implement a major Fisheries Economics Research Program.	Reliable estimates of fisheries sector economic losses and gains over time due to climate change.	L: MIMRA ME: MIMRA, EPPSO, CCD		3-5	
F3	FAD program reaches local communities not yet involved.	100% of local communities are active in the FAD program.	L: MIMRA ME: MIMRA, CCD		1	
F4	HPO formally preserves traditional knowledge.	Traditional knowledge is formally archived and accessible.	L: MIMRA, HPO ME: HPO		3-5	
F5	The number of outer atoll fishing communities trained in self-monitoring.	100% of outer atoll fishing communities monitor and report to given standards.	L: MIMRA ME: MIMRA, CCD		1	
F6	Regional fisheries agreements signed by RMI with Pacific partners.	An effective working relationship with regional fisheries ministries and agencies	L: MIMRA ME: MIMRA, Foreign Affairs, CCD		3-5	
F7	Reimaanlok program expanded to all atolls.	100% of atoll communities active in the Reimaanlok program.	L: MIMRA ME: MIMRA, MoCIA, CCD		1	

F8	The number of trials increased as the number of trials to commercialization increased.	Increased national income from mariculture as tuna fisheries potentially decline over time.	L: MIMRA ME: MIMRA, MNRC, EPPSO, CCD		2	
F9	Increased ocean transportation access from Majuro markets to outer atolls for the fisheries sector.	A reliable catch to market to processing and sale value chain networking all atolls.	L: MIMRA HE: MIMRA, Transport, CCD		2	
F10	Percentage increased government investment in the sector from license revenue.	Reduce dependence on foreign aid, which may or may not come.	L: MIMRA ME: MIMRA, Finance, CCD		1	
F11	Increased knowledge flow by events, products, and exchanges between fisheries-related agencies.	Greater effectiveness in the sector through collaborative knowledge sharing.	L: MIMRA ME: MIMRA, EPPSO, CCD		1	

Outcome 1: SECTORAL RESILIENCE **Sector: Internal Affairs**						
Activity No.	**Performance Indicator**	**Target**	**Leads/ M&E**	**Baseline**	**Monitoring Frequency**	**Timeframe**
IN1	New data collection surveys include more gendered variables for analysis.	More effective and equitable resource distribution decisions by ministry based on gendered needs.	L: MoCIA ME: EPPSO, MoCIA, CCD		2	
IN2	The number of training workshops that integrate gender aspects in goals.	Build sectoral capacity across ministries and agencies.	L: MoCIA, CCD ME: MoCIA, CCD		1	
IN3	Increased access to family, youth, elderly, and gender-based services to outer atolls.	Increased effectiveness of government-provided social services over the long term.	L: MoCIA ME: MoCIA, EPPSO, CCD		2	

IN4	Tracking system for gender-based budgeting launched and used.	More efficient budget allocations to targeted vulnerable groups.	L: MoCIA ME: MoCIA, EPPSO, CCD	○	1	▶
IN5	Number of polling stations where climate-proofing has been implemented.	Ensure the strength and accountability of the national electoral system.	L: MoCIA ME: MoCIA, EPPSO, CCD	○	3-5	▶▶
IN6	Electorate polling questions show increased interest in politicians' climate actions.	Elected officials recognize the need for a climate action platform.	L: MoCIA ME: MoCIA, EPPSO, CCD	○	3-5	▶▶
IN7	Number of female candidates for elected office.	Gender equity in national decision-making.	L: MoCIA ME: MoCIA, EPPSO, CCD	◔	3-5	▶▶
IN8	The number of local area adaptation plans developed and launched.	Local community-specific, tailored adaptation actions.	L: MoCIA ME: MoCIA, NDMO, CCD	◔	2	▶
IN11	Number and capacity of installations in vulnerable communities.	100% of communities have access to suitable storage facilities.	L: MoCIA ME: MoCIA, NDMO, CCD	○	3-5	▶▶
IN12	Return on investment for increased funding to WUTMI	Increased capacity of the non-governmental sector to assist with gender-related programming.	L: MoCIA ME: MoCIA, NDMO, CCD	◔	2	▶▶
IN13	The number of vulnerable cultural sites made climate resilient.	Protect the remaining cultural heritage of the RMI.	L: HPO ME: MoCIA, NDMO, CCD	◔	3-5	▶▶

IN14	Increased access to participation of communities and content on local climate issues.	Increase public awareness and support for climate actions at the most local levels.	L: MoCIA ME: MoCIA, NDMO, CCD		1	
IN15	Increased access to family-oriented mental services.	Increase the long-term resilience of the traditional family unit as essential to RMI society.	L: MoCIA ME: MoCIA, Health, CCD		2	

Outcome 1: SECTORAL RESILIENCE **Sector: Natural Resources and Commerce**						
Activity No.	**Performance Indicator**	**Target**	**Leads/ M&E**	**Baseline**	**Monitoring Frequency**	**Timeframe**
N1	Technical programs launched, up and running.	Successfully introduce climate-resilient crop varieties for the long term.	L: MNRC ME: MNRC, CCD		2	
N2	Expand agricultural outreach programs to all atoll communities.	Provide all farmers with climate-smart farming skills and tools.	L: MNRC ME: MNRC, CCD		2	
N3	The coastal forest surveys completed, and protection plans are in place.	Utilize coastal forests as nature-based barriers to assist in storm surge and SLR protection.	L: MNRC ME: MNRC, CCD		3-5	
N4	Focus nature-based solutions to specific areas conducive to this practice.	Utilize coastal forests as nature-based barriers to assist in storm surge and SLR protection.	L: MNRC ME: MNRC, CCD		3-5	
N5	Tourism competitiveness study completed and an implementation plan drawn up.	Increase the share of RMI GDP from the tourism sector.	L: MNRC ME: MNRC, Finance, EPPSO, CCD		1	

N6	Increase funding and capacity of the HPO	HPO has the capacity and resources to save and protect RMI historical knowledge.	L: HPO ME: MNRC, HPO, EPPSO, CCD	◔	1	▶▶▶
N7	Modernize the copra sector and increase exports.	Increase the share of RMI GDP from the copra sector.	L: MNRC ME: MNRC, Finance, EPPSO, CCD	◔	1	▶▶▶
N8	Identify high-risk tourism infrastructure and sites for tourism investment for climate protection.	Secure tourism assets and potential tourism assets from climate impacts of the future.	L: MNRC ME: MNRC, Finance, Works, CCD	◔	1	▶▶▶
N9	Launch a coastal reafforestation campaign.	Utilize coastal forests as nature-based barriers to assist in storm surge and SLR protection.	L: MNRC ME: MNRC, CCD	◔	3-5	▶▶▶

Table 41: Goal 2: Build And Sustain Adaptive Resilience

Outcome 2: Community Climate Resilience RMI Atolls and Islands						
Activity No.	**Performance Indicator**	**Target**	**Leads/ M&E**	**Baseline**	**Monitoring Frequency**	**Timeframe**
A1	Price controls/ subsidies system implemented.	Reduced cost of living for outer atoll communities.	L: MoCIA HE: EPPSO, Finance, CCD	○	1	▶
A2	Number of trees planted and sustained in each atoll community.	Sustainable tree ecology for long-term coastal protection, food security, and handicrafts.	L: MNRC, MoCIA ME: MNRC, CCD	◔	2	▶▶

A3	Community garden programs and services launched; or expanded from existing onrd.	Support a viable long-term culture of climate-smart small-scale agriculture.	L: MNRCM MoCIA HE: MNRC, CCD		**2**	
A4	Community acquisition of tools and training to use them.	Improve the competence and capabilities of rural farming communities.	L: MNRCM MoCIA HE: MNRC, CCD		**2**	
A5	Production volume from aquaculture.	Build the aquaculture sector as a viable livelihood and economic contributor to RMI.	L: MNRCM MIMRA HE: MNRC, MIMRA, CCD		**1**	
A6	Fish market up and running.	Improve the fish supply value chain resilience.	L: MNRCM MIMRA HE: MNRC, MIMRA, CCD		**2**	
A7	Marine-protected areas are formally assigned and protected.	Ensure an untouched marine area for fish stock protection, nurturing and recovery.	L: MNRCM MIMRA HE: MNRC, MIMRA, CCD		**1**	
A8	Number and capacity of rainwater tanks installed.	Household-level water security for the long term.	L: MNRCM, Works HE: MNRC, Works, CCD		**1**	
A9	Number of working reverse osmosis units across the RMI and per community.	Household-level water security at sanitary levels for the long term.	L: MNRCM, Works HE: MNRC, Works, CCD		**1**	
A10	Number and volume of potable groundwater sources.	Household-level water security at sanitary levels for the long term.	L: MNRCM, Works HE: MNRC, Works, CCD		**1**	
A11	Number of water tanks elevated and protected.	Household-level water security at sanitary levels for the long term.	L: MNRCM, Works HE: MNRC, Works, CCD		**1**	

A12	Public database and mapping of radiation levels.	Reduce population exposure to harmful radiation levels.	L: Health, EPA HE: EPA, Health, CCD		**2**	
A13	The number of health facilities upgraded to standard and maintained as such.	More effective delivery of community health services.	L: Health, Works HE: Health, CCD		**3-5**	
A14	Number of medical personnel per citizen, especially in remote atolls.	More effective delivery of community health services.	L: Health, MoCIA HE: Health, MoCIA, CCD		**1**	
A15	Maternity ward built, then expanded to meet RMI capacity needs.	More effective delivery of community health services.	L: Health, MoCIA HE: Health, MoCIA, CCD		**2**	
A16	Building codes launched and building inspectorate empowered.	Increase long-term resilience of housing to protect people.	L: Works, MoCIA HE: Works, CCD		**1**	
A17	Investments in alternative housing systems.	Increase long-term resilience of housing to protect people.	L: Works, MoCIA HE: Works, Finance, CCD		**1**	
A18	Number of women and vulnerable persons that can be accommodated atoll.	Increase the stock of community infrastructure resources for social cohesion and care.	L: MoCIA, Works HE: MoCIA, CCD		**2**	
A19	Launch or strengthen programs on road works and maintenance.	Improve long-term resilience of road transport and community access.	L: Works, Finance HE: Works, CCD		**2**	
A20	Volume and types of waste are regularly collected.	Build a robust and sanitary national waste disposal system.	L: Works, Environment HE: Works, Environment		**1**	

A21	The number of houses reinforced to standard.	Build resilience of housing stock across the RMI.	L: Works, Environment, MoCIA HE: Works, Environment		**1**	
A22	Number of homes connected to sewer and water.	Increase the long-term resilience and sanitary standards of RMI housing stock.	L: Works, Environment, EPA, MoCIA HE: MoCIA, CCD		**1**	
A23	Facilities built and number of vendors it can accommodate.	Increase access to markets and earnings for women.	L: MoCIA, MNRC HE: MoCIA, CCD		**2**	
A24	Site surveys completed and prioritized workplan initiated.	Reduce coastal erosion now and protect for future SLR and storm surges.	L: Works, Environment HE: Environment, CCD		**3-5**	
A25	Number of successful nature-based pilots completed and moved to full scale.	Increased use of nature-based solutions as a viable resilience-building option.	L: MNRC, Environment HE: Environment, CCD		**3-5**	
A26	Acreage of coral reefs rehabilitated.	Increased use of nature-based solutions as a viable resilience-building option; enhance a tourism product.	L: MNRC, Environment, MIMRA HE: Environment, CCD		**3-5**	
A27	Number and quality of internet and phone connections per household.	Build community communications resilience for the long term.	L: Telecomm.; MoCIA HE: Telecomm., CCD		**1**	
A28	Number of trained and resourced radio operators per atoll community.	Build community communications resilience for the long term.	L: Telecomm.; NDMO, MoCIA HE: Telecomm., CCD		**2**	

A29	Number of schools and community centers stocked with climate change education and awareness materials.	Provide knowledge and skills-building materials for community engagement.	L: Education; NDMO, MoCIA HE: Education, CCD		**2**	
A30	Launch of a national online learning system.	Build education and training sector resilience for the long term and emergencies.	L: Education; MoCIA HE: Education, CCD		**1**	
A31	Number of atoll communities that have developed local disaster risk management plans.	Build local-level disaster and climate resilience relevant to particular atoll contexts.	L: NDMO HE: NDMO, CCD		**3-5**	
A32	Launched health and hygiene education programs.	Improve community health and hygiene awareness to reduce vulnerability to a changing climate.	L: Health, MoCIA HE: Health, CCD		**1**	
A33	Number of households with solar panels and batteries.	Build off-grid power resilience at household and community levels.	L: MEC HE: MEC, CCD		**1**	
A34	Percentage reduction in domestic violence cases.	Strengthen systems to manage domestic violence as climate stressors could increase cases.	L: MoCIA, Health HE: MoCIA, EPPSO, CCD		**1**	
A35	Increase in fund and grant awards from the fund.	Build a national self-help mechanism for post-disaster recovery.	L: NDMO, Finance HE: NDMO, Finance		**1**	
A36	Increase in funds and number of persons aided.	Build a national self-help mechanism for post-disaster recovery.	L: MoCIA, NDMO, Health HE: MoCIA, CCD		**1**	
A37	Agreements and formal declarations of resolutions made.	Bring equity for all citizens on land rights, should long-term climate impacts force migration.	L: Chief Secretary HE: Chief Secretary, CCD		**3-5**	

A38	Increase in community communications interactions that produce tangible actions and outcomes.	Strengthen national channels of formal and informal direct discourse with citizens.	L: CCD, MoCIA HE: CCD		**1**	
A39	Number of LAPAs developed and implemented.	Tailor adaptation solutions to each specific atoll's character, needs, and community preferences.	L: NDMO HE: NDMO, CCD		**3-5**	
A40	Number of businesses assisted by the subsidies.	Provide climate risk alleviation to keep the business sector afloat.	L: Finance, MNRC HE: Finance, CCD		**1**	
A41	Increase in cost efficiency per shipping and air transport.	Make shipping of goods more accessible to more people and communities.	L: Transport, Finance, MIMRA HE: Transport, CCD		**1**	
A42	Number of canoes built	Keep traditional livelihoods and skills alive and contribute to RMI society.	L: MoCIA, MNRC HE: MNRC, CCD		**1**	
A43	Level of satisfaction with dock facilities registered by users.	Improve the efficiency of dock operations and the service experience received by users.	L: MIMRA, Works, Transport HE: Transport, CCD		**3-5**	
A44	Launch an elderly special transport program.	Build climate-impact resilient systems to protect the most vulnerable, like senior citizens.	L: Health, Transport ME: Health, CCD		**1**	

Table 42: Goal 3: Self Determination Of Our Future

Outcome 5: Inclusivity in Decision-Making						
Activity No.	**Performance Indicator**	**Target**	**Leads/ M&E**	**Baseline**	**Monitoring Frequency**	**Timeframe**
G1	A NAP-aligned schedule of works to implement has been launched.	Elevate gender and vulnerable group actions and conversation to the highest levels.	L: OCS ME: MCIA, CCD	○	1	▶
G2	Number of activities and participants involved in the Gender Equality Awareness Program.	Elevate gender and vulnerable group actions and conversation to the highest levels.	L: MCIA ME: MCIA, CCD	◔	1	▶
G3	Family Development program launched, and activities being implemented.	Elevate healthy family structure as central to RMI society and build resilience to future climate change challenges.	L: MCIA ME: MCIA, EPPSO, CCD	○	1	▶
G4	Baselines established and a data collection system established.	Make data and evidence-driven decisions.	L: MCIA ME: MCIA, EPPSO, CCD	◔	1	▶
G5	Participants and audiences reached gender and climate change programming.	Societal involvement and awareness building.	L: MCIA ME: MCIA, EPPSO, CCD	◔	1	▶
G6	Baseline established.	Need a baseline to monitor future progress.	L: MCIA ME: MCIA, EPPSO, CCD	○	1	▶
G7	Sex-disaggregated database is established.	To monitor and make decisions on gender-based climate adaptation.	L: MCIA ME: MCIA, EPPSO, CCD	○	1	▶

G8	Analytical capacity established to serve RMI government.	To monitor and make decisions on gender-based climate adaptation.	L: MCIA ME: MCIA, EPPSO, CCD		**1**	
G9	Establish an M&E system alongside data collection and analysis.	To monitor and make decisions on gender-based climate adaptation.	L: OCS ME: MCIA, EPPSO, CCD		**2**	
G10	Number of resource personnel/ teachers trained in gender-responsive climate education.	To integrate gender sensitivity as appropriate in the education system.	L: Education ME: Education, EPPSO, CCD		**3-5**	
G11	Number of ministries trained in the series of approved skills.	To integrate gender sensitivity as appropriate in the public service system.	L: OCS ME: EPPSO, CCD		**2**	
G12	Number of women leaders certified in leadership skills.	Increase women's representation in public and private sector leadership ranks.	L: OCS ME: EPPSO, CCD		**2**	
G13	NSP Gender Goals achieved.	To elevate gender sensitivity across RMI society.	L: OCS ME: HOD, CCD		**2**	

Table 43: Goal 2: Strengthen the Enabling Environment

Outcome 3: All-of-government commitment to sustained climate adaptation and resilience Gender and Vulnerable Groups						
Activity No.	**Performance Indicator**	**Target**	**Leads/ M&E**	**Baseline**	**Monitoring Frequency**	**Timeframe**
AG1	National Declarations made.	Symbolic action to signal the highest levels of commitment and engage the national community.	L: OCS ME: CCD	○	3-5	▶
AG2	Discourse held with commitments to action made.	Rationalize fair and equitable agreements with landowners around potential movements for climate adaptation.	L: OCS ME: Nitjela, CCD	○	3-5	▶
AG3	Planning Act updated and entered into force.	Establish clear rules for future climate-resilient land-use planning.	L: OCS, Planning ME: Finance, CCD	◔	3-5	▶
AG4	SLR Policy implementation plan approved and resourced.	Institutionalize SLR consideration as a priority in all relevant government decision-making.	L: OCS, Works ME: Works, CCD	◔	3-5	▶
AG5	Disaster Risk					
AG6	Policy on critical government services is approved for implementation.	To develop a framework for decision-making on the provision of government services as it becomes more challenging to do so with climate impacts.	L: OCS, MoCIA, Transport, Telecom., MEC ME: CCD	○	3-5	▶
AG7	Implement the Coastal Conservation Act	To support coastal hard infrastructure protection and NBS for SLR.	L: Works HE: Works, CCD	○	2	▶
AG8	Operational alignment of EIA process with NAP objectives.	To ensure that the EIA process adequately considers climate impacts in the regulatory approval process.	L: EPA, Environment ME: EPA, CCD	◔	1	▶

AG9	Oversight Board established and fully operational.	Provide a high-level mechanism for national accountability and transparency.	L: OCS ME: OCS	○	1	▶
AG10	CCD expansion strategy approved and resourced.	Coordinate all national climate activities.	L: OCS ME: OCS	○	1	▶
AG11	A comprehensive climate activities coordination system is developed and operated through CCD.	Have a national coordinated approach to climate action to increase effectiveness and efficiency.	L: CCD ME: OCS, CCD	○	1	▶
AG12	Number and value of successful proposals funded by the GCF and other donors.	Increase funding for national climate action efforts.	L: Finance, CCD, OCS ME: Finance, EPPSO, CCD		2	▶
AG13	Climate action is a major criterion for all budget allocations.	Increase funding for national climate action efforts.	L: Finance, CCD, OCS ME: Finance, EPPSO, CCD	◔	1	▶
AG14	Increase in financing to the Trust Fund	Increase funding for national climate action efforts.	L: Finance, CCD, OCS ME: Finance, EPPSO, CCD	○	1	▶
AG15	Amount of Compact Funds used for climate activities.	Increase funding for national climate action efforts.	L: Finance, CCD, OCS ME: Finance, EPPSO, CCD		1	▶
AG16	Public financial management systems integrate climate financing.	More efficient coordination and allocation of climate finance.	L: Finance, CCD, OCS ME: Finance, EPPSO, CCD	○	1	▶
AG17	Cost-Benefit analysis procedures are in place and being used.	More efficient coordination and allocation of climate finance.	L: Finance, CCD, OCS ME: Finance, EPPSO, CCD	○	1	▶

AG18	EPPSO has full functionality and capacity to support the NAP M&E requirements.	Better data and reliable information for evidence-based climate decision-making.	L: EPPSO ME: CCD, OCS		1	
AG19	RMI Position Paper finalized and moved to draft Policy for approval.	Increase funding for national climate action efforts.	L: Finance, CCD, OCS ME: Finance, EPPSO, CCD		1	

Table 44: Goal 2: Strengthen the Enabling Environment

Outcome 4: All of Society Involvement in climate adaptation and resilience building.						
Activity No.	**Performance Indicator**	**Target**	**Leads/ M&E**	**Baseline**	**Monitoring Frequency**	**Timeframe**
AS1	Active involvement of stakeholders in participatory processes.	Improve democratic governance traditions.	L: OCS ME: CCD		2	
AS2	Active involvement of targeted stakeholders in participatory processes.	Bring new voices in to improve democratic governance traditions.	L: OCS ME: CCD		2	
AS3	National Gender Policy implemented.	Institutionalize gender-based equality in governance processes.	L: OCS ME: CCD		2	
AS4	Development and use of new management tools.	Operationalize gender integration.	L: OCS ME: CCD		2	
AS5	Campaigns launched for public awareness, education, and behavior change.	Increase public support for climate adaptation, especially if drastic actions are needed.	L: OCS ME: CCD		2	
AS6	Regular polls conducted and results analyzed.	To gauge public support for climate actions over time.	L: EPPSO, CCD ME: CCD, EPPSO		2	

Art and Imagery

The artwork and images used throughout this document have been sourced from a range of generous contributors, each offering a glimpse of the Marshall Islands and her people through a different lens. The aim has been to connect and share with the reader a unique journey through this large ocean nation, presenting many cultural, social and economic facets that influence the nations' plan for adaptation to the impact of climate change.

Special acknowledgment is given to the young artists whose works are included. The nation's future, yours will be the generation most impacted by what lies ahead. Lean into your heritage as navigators and you will successfully steer a course along the narrow road.

Page 36 Artist: Jinghui Joy Huang
Title: "Our Culture, Our Pride"
Description: My painting is about Marshallese culture. It is our culture and our pride.

Page 41 Artist: Joenathan Defan
Title: "Tomorrow"
Description: This painting is about what will happen tomorrow, sea level is gonna rise up and since the water keeps rising year after year to safeguard our people and culture we would have to elevate and build things bigger or higher. Due to global warming we will have to adapt to all these changes in our environment.

Page 51 Artist: Mailynn Bias
Title: "The Sunken Horizon"
Description: With climate change we are dealing with coastal erosion and pollution from gasses not only in the air but also in the ocean. The painting shows a sailboat using renewable energy because it is better for the environment. Using speedboats damages our environment because of the fuel they use.

Page 73 Artist: Hazel Peter
Title: "Cheers"
Description: This painting represents our rising sea levels. As the sea level increase, I wanted the coconuts to represent our current livelihood and future. The coconut on the left (bad coconut) represents our future. It represents oil in our ocean. With no animals. The coconut on the right (good coconut) represents our current livelihood with our fresh water and beautiful land. I painted two hands to have a "cheers" with one another, so we all can help each other to save our beautiful islands.

Page 92-3 Artist: Debby Schutz
Title: Ijunamnam
Description: To unwind from a long day of workshops and community work, the team swam the pristine waters of Aur-Tobal, being offered bob and swimming out to play ijunamnam. As the sunset dipped into the water, a school of fish flew out of the surface in such a uniform, organized pattern across the multi-colored sea and sky, mere feet away from us. We looked in awe and couldn't contain our excitement at the beauty we just experienced. It was too perfect an experience to not capture.

Image Supplied by Webmedia South Pacific

REPUBLIC OF THE MARSHALL ISLANDS

National Adaptation Plan
2023