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# REPUBLIC OF MARSHALL ISLANDS

## CLIMATE SECURITY RISK ASSESSMENT

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# Acronyms

| | |
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| **ADB** | Asian Development Bank |
| **Boe Declaration** | 2018 Boe Declaration on Regional Security |
| **COFA** | Compact of Free Association |
| **CROP** | Council of Regional Organizations of the Pacific |
| **EEZs** | Exclusive Economic Zones |
| **ENSO** | El Niño-Southern Oscillation |
| **FRDP** | Framework for Resilient Development in the Pacific |
| **GBV** | Gender-based Violence |
| **GCF** | Green Climate Fund |
| **GDP** | Gross Domestic Product |
| **GEF** | Green Environmental Facility |
| **GHG** | Greenhouse Gas |
| **IDMC** | Internal Displacement Monitoring Centre |
| **ILO** | International Labor Organization |
| **IMF** | International Monetary Fund |
| **IOM** | International Organization for Migration |
| **IPCC** | Intergovernmental Panel on Climate Change |
| **JNAP** | Joint National Action Plan for Climate Change Adaptation and Disaster Risk Management |
| **MSC** | Marine Stewardship Council |
| **NAP** | National Adaptation Plan |
| **NDCs** | Nationally Determined Contributions |
| **NGO** | Non-Governmental Organizations |
| **NSP** | National Strategic Plan |
| **OECD** | Organization for Economic Cooperation and Development |
| **PBF** | United Nations Secretary-General's Peacebuilding Fund |
| **PICs** | Pacific Islands Countries |
| **PICT** | Pacific Island Countries and Territories |
| **PIF** | Pacific Island Forum |
| **PIFS** | Pacific Islands Forum Secretariat |
| **PIK** | Postdam Institute for Climate Research |
| **PNA** | Parties to the Nauru Agreement |
| **RMI** | Republic of Marshall Islands |
| **SPC** | The Pacific Community |
| **SPCZ** | South Pacific Convergence Zone |
| **UN** | United Nations |
| **UNDP** | United Nations Development Programme |
| **VDS** | Vessel Day Scheme |

# Glossary

**Adaptation:** The process of adjustment to actual or expected climate change and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities (UN-FCCC, 2022a).

**Adaptive capacity:** The ability of systems, institutions, humans, and other organisms to adjust to potential dam-age, to take advantage of opportunities, or to respond to consequences (IPCC, 2014).

**Climate Security:** Security threats that climate change poses at the international, national, and individual level. Climate-related security concerns include impacts on food and water supply, increased competition for natural resources, natural disasters and loss of livelihoods, migration, and displacement (NAOC 2020).

**Exposure:** The presence of people; livelihoods; species or ecosystems; environmental functions, services, and resources; infrastructure; or economic, social, or cultural assets in places and settings that could be adversely affected by climate change impacts (IPCC 2019). Exposure points to changes in climate parameters that might affect socio-ecological systems either directly or indirectly through, for example, disrupting the flow of goods, finance, information or people into an area.

**Human security:** An approach that aims to identify and address "widespread and cross-cutting challenges to the survival, livelihood and dignity" of people. It calls for a "people-centred, comprehensive, context-specific and prevention-oriented responses that include economic, food, health, environmental, personal, community and political security" (UNGA 2012). The framework relies on the definition of the Organization for Economic Cooperation and Development (OECD) of instability and fragility as "the combination of exposure to risk and insufficient coping capacity of the state, system, and/or communities to manage, absorb, and mitigate those risks" (Desai and Forsberg 2020). Political instability, (organized) crime, urban violence, terrorism, and violent conflict are different ways in which insecurity manifests itself.

**Rapid-onset event:** Events such as cyclones and floods which take place suddenly, in days or weeks (IPCC 2022).

**Resilience:** The "capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure". Resilience is a positive attribute when it maintains capacity for adaptation, learning and/or transformation (IPCC 2019, adapted from the Arctic Council, 2013).

**Risk:** "The potential for adverse consequences" (Reisinger et al. 2020). This definition of risk refers only to negative ("adverse") consequences and applies to "human or ecological systems". It applies to both the impacts of and responses to climate change: In the context of climate change impacts, risks result from dynamic interactions between climate-related hazards with the exposure and vulnerability of the affected human or ecological system to the hazards. Hazards, exposure and vulnerability may each be subject to uncertainty in terms of magnitude and likelihood of occurrence, and each may change over time and space due to socio-economic changes and human decision-making (Ibid.).

**Sensitivity:** The degree to which a system or species is affected, either adversely or beneficially, by climate variability or change. The effect may be direct (e.g., a change in crop yield in response to a change in the

mean, range, or variability of temperature) or indirect (e.g., damages caused by an increase in the frequency of coastal flooding due to sea level rise) (IPCC 2014).

**Slow-onset event:** Changes in climate parameters – such as temperature, precipitation -, and associated impacts, such as water availability and crop production declines – that occur over long periods of time. These refer to "the risks and impacts associated with: increasing temperatures; desertification; loss of biodiversity; land and forest degradation; glacial retreat and related impacts; ocean acidification; sea level rise; and salinization" (UNFCCC 2022b).

**Vulnerability:** The "propensity or predisposition to be adversely affected" and encompasses "a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt" due to environmental pressures and climate-related changes has differing impacts depending on other demographic factors such as how gender intersects with ethnicity, race, caste, class, age and disability, as well as marital status; all of which are related to differing degrees of vulnerability (IPCC 2019).

**Tension:** A state in which people, groups or countries disagree or dispute. Tension does not necessarily lead to violent conflict.

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# Introduction

## BACKGROUND

*"Climate change remains the single greatest threat to the livelihoods, security and wellbeing of the peoples of the Pacific".*

**- Boe Declaration on Regional Security, 2018**

*"For the Marshall Islands, our first and most threatened priority is to never cease to safeguard our nation's land, ocean and maritime boundaries, as seas are rising, and to ensure our communities have a safe, secure and fully democratic sovereign future. Our vulnerabilities, and those shared in our region, are severe and diverse."*

**- H.E. Mr. David Kabua, President of the Republic of the Marshall Islands, 77th Session of the United Nations General Assembly**

Security in the Pacific context, especially the context of atoll nations, takes on a more varied form beyond traditional conceptions of security. While such traditional concepts remain important in this context, the region is unique for expanding that concept to be inclusive of other, no less consequential risks. That conception has been shaped and crafted through various communities, country- and regional-level initiatives, statements, and declarations, which have all collectively acknowledged climate change as the single greatest threat to Pacific Island Countries and Territories (PICT).

The region's wide understanding of climate change as a security risk is largely in response to its recent past and to the current lived experience of Pacific islanders. The reality is climate change has threatened and will continue to threaten the Pacific in various ways, with important consequences for individuals, communities, and governments. The threats of climate change to livelihoods, food, water, and land, with cascading effects for social relations, health, political stability, and identity, will continue to pose serious challenges for PICT. The region is already experiencing some of the consequences climate change can have on society. If left unaddressed, social relations and cohesion can weaken, political instability can ensue, and countries with a generally long history of peace and compromise can risk succumbing to instability and/or conflict. How climate-related security risks manifest is highly dependent on the country context. Before policy makers can begin to tackle these challenges, a thorough and context-specific understanding of the climate-security relationship needs to be better articulated and developed for each country. From this point, country stakeholders, including regional and international partners, can make better risk-informed decisions to prevent and avert some of these risks.


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With the goal of improving the understanding of climate-related security risks, the region embarked on an effort to more comprehensively define the security implications for PICT to bolster national and regional security. This was first articulated in the regionally endorsed Boe Declaration on Regional Security in 2018 (Boe Declaration) and the subsequent Action Plan (Plan) in 2019. The Plan outlines a comprehensive set of "proposed actions" to shape the regional security environment through national- and regional-level action and priorities. The first strategic area of the Plan specifically focuses on climate security. One key proposed action is understanding and contextualizing the impact of climate change, specifically considering its impact on the regional security landscape through its interaction with human security and conflict, through research and evidence-based knowledge products. This national climate-security risk assessment for Republic of the Marshall Islands (RMI) is one of these knowledge products and is a part of a series that includes two other assessments conducted in Kiribati and Tuvalu.

## AIM

This climate security risk assessment for RMI is intended to meet priority action 1.3 of the Boe Declaration Action Plan to improve understanding of climate-related security risks in RMI. It is the first of its kind of assessment for the country and provides an in-depth understanding of the security implications from climate change. It goes beyond traditional security and conflict assessments by looking at how climate change and environmental factors can contribute to increased insecurity. Even though this assessment acknowledges the dynamic, rapidly evolving, and complex nature of the issues covered it does not intend to constitute an exhaustive and conclusive analysis. This assessment is a living document that further adds to traditional climate assessments by looking at the social and political dimensions of climate change and its knock-on effects on the stability of society and state.

Chapter 3 identifies key climate security concerns that affect RMI that are outlined in five interlocked and interacting pathways. From this risk identification, Chapter 5 presents overarching entry points that aim to support Marshallese stakeholders to begin to respond to climate-related security challenges. Additionally, the national and regional frameworks that guide the Marshallese response to some of these challenges are presented in Chapter 4 to contribute to mapping where some of these entry points could be embedded to enhance response.

## TARGET GROUP

This document targets national-level government actors, international organizations, regional bodies, and interested individuals and practitioners working on climate-related security risks. In particular, this includes those working on peace, security and conflict, climate change, disaster risks, and resilience building as well as those working on development, land, water, and/or food security and humanitarian action. Ultimately, this document seeks to ensure all relevant actors have access to, and are better informed by, evidence-based analysis of climate change-related security risks.

## DEVELOPMENT PROCESS AND APPROACH

The Weathering Risk methodology underpins the analytical approach for this assessment, and this methodology was tailored to meet the context needs of the Pacific through a regional review and consultation process (Rüttinger et al. 2021). Therefore, this assessment included a combination of quantitative and qualitative assessment approaches to study the interaction between climate change and socio-political, economic, and demographic factors and their impacts on livelihoods, economic security, political stability, and human security.

The Potsdam Institute for Climate Impact Research (PIK) provided the latest and state-of-the art climate modeling and projection, while adelphi led, in coordination with government and United Nations (UN) counterparts, an extensive literature review that captured both scholarly work and grey literature. Special focus was given to research conducted by Pacific institutions and organizations, especially the Council of Regional Organizations in the Pacific (CROP) agencies. Furthermore, virtual and in-person group consultations were held with RMI stakeholders, which involved government actors from various ministries, UN agencies, associations and civil groups, and non-governmental organizations (NGO). A set of interviews with government, academia, UN agencies and civil society representatives were also conducted.

## CLIMATE SECURITY IN THE PACIFIC PROJECT

This assessment was developed as part of the Climate Security in the Pacific project, jointly implemented by the United Nations Development Programme (UNDP) and International Organization for Migration (IOM), in collaboration with the Pacific Islands Forum Secretariat (PIFS) and the governments of RMI, Tuvalu, and Kiribati, with funding provided by UN Secretary-General's Peacebuilding Fund (PBF). This project represents the first multi-country initiative of its kind in the region and proposes concrete assessment and actions at all levels to address climate-related security risks. This project focuses on empowering low-lying atoll nations, in particular RMI, Tuvalu and Kiribati, in order to address the security threats linked to climate change by strengthening the understanding, implementation, and coordination of risk management strategies for key climate-related security risks.

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# Context Factors

The chapter provides important context elements that shape and influence how climate change impacts various aspects of RMI. The factors can be separated into five broad categories:

1. Geography and Climate
2. Economy
3. Water, Sanitation, Food, Health, and COVID-19
4. Demographics and Social Trends
5. Security

# 1. GEOGRAPHY AND CLIMATE

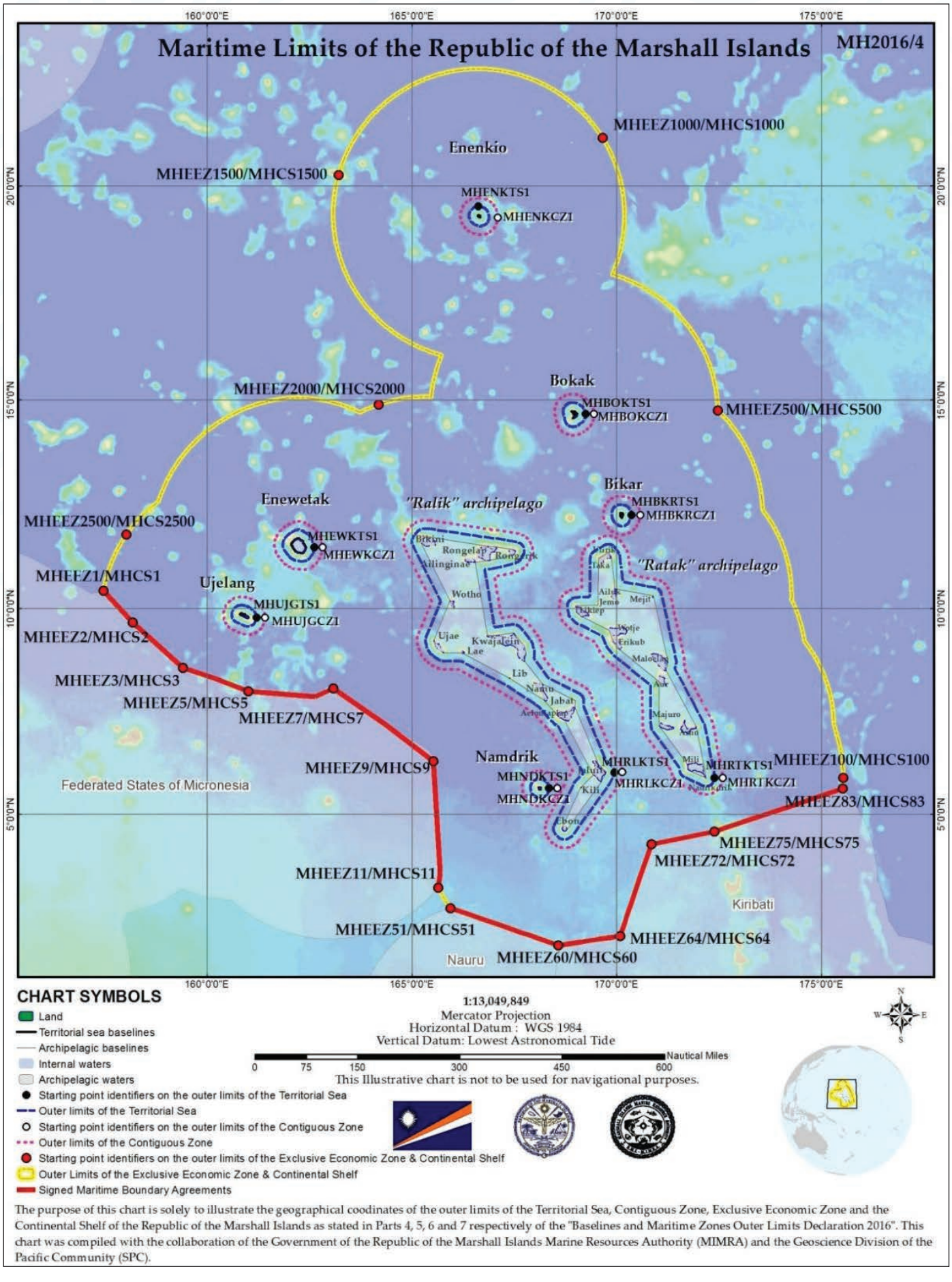


**FIGURE 1:** Section (I) – Chart illustrating the outer limits of the contiguous zone of the Republic of the Marshall Islands.

RMI comprises 29 coral atolls and 5 low-lying coral islands, with a total land area of only 70 square miles (181 $km^2$), spread across more than 770,000 square miles of ocean (2 million $km^2$). The country is made up of two almost-parallel island chains: the Ratak (Sunrise) chain in the west and the Ralik (Sunset) chain in the east. Most RMI atolls average merely 6.6 feet (two meters) above sea level (CIA 2022).

The climate in RMI is generally hot and humid. Temperatures are relatively constant year-round at approximately 80.6°F (27°C) on average. RMI has a single rainy season that starts in May and extends until October. Annual precipitation varies significantly with the southern atolls receiving approximately three times as much rain as the northern atolls. The northeast trade wind belt brings trade winds from December to April, but winds are weaker from May to November. RMI borders the typhoon belt, but storms and typhoons are rare. Climate variability in RMI is high and influenced by the El Niño-Southern Oscillation (ENSO) which, during its extreme phases, the El Niño and La Niña phases, ENSO poses an increased risk for extreme events, including storms and typhoons, flooding, and drought. Rising sea level and more frequent extreme weather events pose an existential threat to the future habitability of RMI (RMI adaptation communication 2020).

## 2. ECONOMY

RMI is classified as an upper middle-income country with a per-capita income of USD $4,171 in 2021 (World Bank 2021c). However, because of the country's small size and remote location, its potential for economic productivity is limited. The country has experienced a negative growth rate of -2.21% and -2.5% of its gross domestic product (GDP) in 2020 and 2021, respectively. (World Bank 2023).

The service sector predominantly makes up the RMI economy given it accounted for 67.2% of the country's GDP in 2020, followed by the agricultural sector (including fisheries) at 21.8 % and industry at 12.8% (World Bank 2021c). Agricultural production is primarily subsistence-based. Copra (coconut) is the only cash crop and serves as the major source of income on the outer islands. Subsistence fisheries, typically located close to the shore, have an important role for basic nutrition and food security for RMI. Also, the fishing sector has become Increasingly more formalized. Following a series of strategic investments by the government in the 1990s, export-oriented industrial fishing, targeting mainly tuna and other pelagic fish species[1], has significantly increased. As a result, the commercial fisheries sector has become a strong driver of the economy, representing 6.6% of the nation's total GDP growth between 2000-2018 (Republic of the Marshall Islands 2019). RMI is one of eight Parties to the Nauru Agreement (PNA)[2], which jointly manages the world's largest purse seine tuna fishery. As part of the PNA, RMI earns income from licenses to fish in its Exclusive Economic Zone (EEZ) as part of the Vessel Day Scheme (VDS)[3], with the scheme generating a record USD $28.1 million for RMI in 2019 (Johnson 2020).

Despite these economic benefits, increasing commercialization of fisheries has led to increasing overexploitation of coastal and maritime fisheries resources (Vianna G. et al. 2020; FAO 2018). However, several of the region's fisheries are certified by The Marine Stewardship Council (MSC). The MSC is a voluntary programme that supports the government to ensure purse seine tuna fisheries are complying with sustainable fishing practices, and RMI is a fully supportive member (Marine Stewardship Council 2022). Other major industries include copra[4] production from coconut harvests, as well as handicrafts and tourism (CCD, RMI 2020).

The United States (US) military's presence on RMI is also an important contributor to the country's economy as RMI earns lease payments from the US to utilize the Kwajalein Atoll as a US army garrison. This represents an important source of income with many Marshallese employed at the bases.

Given RMI's limited economic resources and potential for private sector-driven growth, its economy is highly dependent on foreign aid and development assistance. The majority of this assistance is sourced from the US under the Compact of Free Association (COFA), which has granted USD $1.5 billion (Thomas 2019) in aid over the lifetime of the agreement when the current version was signed in 2003. The agreement is up for renewal in 2023 (Thomas 2019). Between 2011 and 2016, RMI received more than USD $466 million in foreign assistance with USD

[1] Pelagic fish species are species that live in the pelagic zone of ocean waters, which is the upper layers and midwaters of the oceans.

[2] The Nauru Agreement (PNA) is a sub-regional agreement on terms and conditions for tuna purse seine fishing licenses in the region enacted in 1982. The Parties to the Nauru Agreement are Federated States of Micronesia, Kiribati, the Marshall Islands, Nauru, Palau, Papua New Guinea, Solomon Islands and Tuvalu.

[3] The Vessel Day Scheme (VDS) was instituted in 2007 and is a scheme where vessel owners can purchase and trade days fishing at sea in places subject to the Parties to the Nauru Agreement (PNA). According to the Forum Fisheries Agency, "the purpose of the VDS is to constrain and reduce catches of target tuna species and increase the rate of return from fishing activities through access fees paid by Distant Water Fishing Nations (DWFNs). The total allocation of fishing days is set and apportioned between Pacific Island members for one-year periods up to three years in advance."

[4] Copra is dried coconut meat that is used for the production of coconut oil.

$314 million from the US and the remainder being distributed by Japan, Taiwan, Australia, and others, such as multilateral development organizations like the Asian Development Bank and International Monetary Fund (Lowy Institute 2021). These grants represent a significant proportion of national income. In 2016, payments to RMI by the US under the COFA represented 32% of national income (CCD, RMI 2020). RMI is also the recipient of a growing volume of climate finance, in particular from the Green Climate Fund (GCF). As of 2020, the GCF had provided USD $78 million to RMI in approved funding across regional and local projects (Sancken, Jayawardhan, and Wheeler 2021). Other lending institutions, including the World Bank and the Global Environment Facility (GEF), also provide finance for climate action in combination with more traditional forms of development.

From the onset of the COVID-19 pandemic, the Government of RMI implemented swift containment measures to mitigate transmission of the virus. Consequently, there was an expectation of significant economic fallout from these measures, which included a complete travel ban that lasted for long periods of the pandemic. Even though GDP contracted by 2.5% by 2021 and 257 private sector jobs were impacted as a result of the pandemic, these numbers remained modest and within the normal range of RMI's economic activity. High levels of public sector employment and growth in combination with substantial assistance from the donor community helped mitigate worse economic outcomes. However, this is according to the most recent analysis produced in 2021 and therefore does not consider economic conditions such as commodity price shocks and the continued imposition of restrictive containment measures (Graduate School USA 2021).

## 3. WATER, SANITATION, FOOD, HEALTH, AND COVID-19

Similar to other low-lying atoll countries, freshwater resources in RMI are extremely scarce. The country has no rivers, streams, or lakes and small surface ponds are extremely limited (World Bank 2009). Marshallese are heavily reliant on rainwater harvesting for their freshwater. On the neighboring islands, drinking water supply is covered by rainwater for 79% of households while groundwater is only used by 9% of households (SPC 2020). Water supplies are acutely threatened by king tides and storm surges, which lead to saltwater seeping into freshwater lenses (Green Climate Fund). RMI also faces significant risk from drought, especially in the 4-6 months following an El Niño event. RMI and the US declared states of emergency in RMI, and later states of disaster, in both 2013 and 2016 because of prolonged unseasonable droughts. (U.S. Embassy in the Republic of the Marshall Islands 2016; Pacific News Center 2013)[5].

Water insecurity has an impact on food insecurity because it affects the ability to grow subsistence crops that are staples of the Marshallese diet. Traditionally, Marshallese people subsisted on foods like green and mature coconut, breadfruit, pandanus, and fruit. The sources of protein come from locally caught seafood (UNCCD 2002). However, as a result of several factors, including the decline of marine ecosystem and challenges associated with subsistence farming, the Marshallese diet is now primarily composed of imported foods, in particular canned tuna, meat, white rice, and other processed foods.

Sanitation services in RMI are at various stages of development. The urban centres of Majuro and Ebeye have reticulated sewage, but, in general, the treatment of raw sewage before it is disposed of in the ocean is inadequate. While some households in the urban centers are connected to city utilities, many still have individual septic tanks. There is a risk that when septic tanks overflow, they can contaminate groundwater resources and exacerbate outbreaks of diseases like gastroenteritis and cholera. In the neighboring atolls, not all households have septic systems with some still relying on traditional methods. Additionally, within many of the government buildings, water and sanitation facilities are not always operational and require improvement.

Due to the quick implementation of complete border closure as a COVID-19 containment measure, RMI had adequate time to prepare for COVID-19 and experienced the lowest death rates in the world when the virus began transmitting in the country in August 2022. (Worldometer 2022; Graduate School USA 2021). Given the close relationship with the US, RMI was able to benefit from early and sufficient access to vaccines through US federal funding and other donor agencies to support its response (Graduate School USA 2021). However, notable challenges existed, for example, the available logistic systems to access neighboring atoll locations inhibited immediate uptake of vaccines (ibid). Even with challenges like this, the health situation in RMI remained robust with no notable implications reported on the health system or the health of those living in RMI (Bell et al. 2022).

[5] Under the COFA agreement, the US-Affiliated Pacific Islands (USAPI) as freely associated states retain various military and administrative links with the US considering the historically close ties. This includes the ability to receive funds from US federal agencies including FEMA, as specified under Article II: Program Assistance of the 1986 COFA between the US and RMI.

# 4. DEMOGRAPHICS AND SOCIAL TRENDS

The preliminary and unofficial figures from the 2021 census suggest that the population of RMI is 41,499 persons (Journal 2021). This is considerably lower than the 2011 census which indicated the population was 53,158 and suggests the national population has decreased by more than 11,000 people within a 10-year period. This is counter to a historical period of population growth where the population grew by 3.8% between 1958 – 1988 and then by 0.04% from 1999 – 2011 (RMI 2021).

The RMI population remains heavily urbanized as more than two thirds of the population live on the atolls of Majuro and Kwajalein (Ebeye) (CIA 2021). However, 99% of the inhabitants live along the coast, which makes a significant portion of the country's economy, infrastructure, and livelihoods highly vulnerable to climate change related coastal hazards (World Bank 2021).

Internal migration from the neighboring islands and atolls towards the urbanized islands Majuro and Kwajalein (Ebeye) has increased significantly in recent years and is expected to continue in the upcoming decades. Education, health, and work in the urban centres are among the major reasons for internal migration. This is due to worsening environmental conditions and subsequent increased risk of climate-induced natural hazards on the neighboring atolls (CCD, RMI 2020). Such increasingly challenging livelihood conditions have also increased international emigration, the vast majority of whom currently reside in the US6 (Heslin 2019; van der Geest and M. Burkett, J. Fitzpatrick, M. Stege and B. Wheeler 2019). By altering land and resource availability, climate-related stressors are expected to become a main driver of relocation and outmigration in the future, especially if no large-scale climate change adaptation measures are adopted (World Bank 2021).

Land is "an important focal point for Marshallese culture and social organization" (Permanent Mission of the Republic of the Marshall Islands to the United Nations 2009). Land is divided into *wetos*, which are strips of land that run across an atoll from the lagoon to the ocean. Traditionally, each of these parcels of land are communally held by *bwij*, which are extended family groups that incorporate any number of kin. *Wetos* are matrilineally passed through generations, and, as a result, women are afforded many responsibilities. These responsibilities can include resolving disputes and making decisions on land use. However, the public facing aspects of their station are often managed by male family members. Each *bwij* is headed by an *alap* who can be a man or woman. Furthermore, each island has an *Iroijlaplap*, who is a "paramount chief". The RMI Constitution preserves traditional rights of land tenure such that decision-making powers over land are vested in the traditional, hereditary chiefs of the RMI. A nation-wide Council of Chiefs (*Iroij*) presides over traditional land and customary matters as defined within the Constitution in an advisory capacity (Huffer 2008).

The above alludes to the reality that the role of women in society is complex. Given the importance of women in passing down lineage and land entitlements, they employ power, influence, and authority within their *bwij*. However, that power and influence is changing due to several social and economic forces[7] (Huffer 2008; UNWomen 2022). For example, women often live away from their lands and with their spouses where they may be isolated from their communities. Furthermore, legal attempts have been made to disallow women to hold the position of *alap* or clan head, which demonstrates how women's positions are under pressure (UNWomen 2022).

Regardless of the matrilineal nature of society, women are still at a disadvantage in a number of categories, which includes politics where only 6.1% of the legislature are women and only 1 of 13 executive branch (Cabinet Ministries) positions is headed by a woman. Though women can sit alongside males in the Council of Iroij, currently only 25% of council members are women today and 38% seats were held by women, on average, between 1999-2015. Women also remain underrepresented in board positions at firms as they only account for 25% of the positions. This only further indicates the limited decision-making power that is prevalent across society. Women are also economically disadvantaged in comparison to men. Only 27.9% of women participated in the labour force in 2019 compared to 61% of men and 28% of women were likely to participate in informal employment at 28% compared to 19% of men. Furthermore, women are also subject to gender-based violence. 48% of women in long-term relationships have experienced physical violence from partners and 21% have been sexually assaulted by their partners, with 51% of women having experienced both. (UNWomen 2022). Women themselves tend to think physical violence is justified, which demonstrates the deeply embedded nature of gender roles and harmful stereotypes. However, the government has stepped up efforts to combat these issues, such as enacting the Domestic

[6] The COFA guarantees the United States military access to particular Marshallese islands and ocean territory. In return, Marshallese citizens may live, work, and study in the United States without a visa (Heslin A. 2019).

[7] The role of women in land management is steadily eroding as more modern norms around gender roles infiltrate Marshallese society, coupled with the increased commercialisation of land and formal registration systems being introduced. For more information, see Huffer (Ed.) 2008.

Violence Prevention and Protection Act (2011), which criminalizes domestic violence, and also establishing units within law enforcement in 2013 to combat the issue and a national support service for female survivors 14 years and above (2016 Ibid).

## 5. SECURITY

RMI has been an active proponent of recognizing climate change as a key security threat. In 2009, The Permanent Mission of RMI to the United Nations submitted a white paper positioning that "there is little distinction between the force of an invading human military force and rising seas caused by international anthropogenic activity... [and that] the outcome (the loss of territory) from either scenario is equivalent in its direct and physically coercive effect" (Permanent Mission of the Republic of the Marshall Islands to the United Nations 2009). That view was reinforced by the RMI President during a 2009 General Assembly speech who stated, "if wars have been waged to protect the rights of people to live in freedom, and to safeguard their security, why will they not be waged to protect our right to survive from the onslaught of climate change?" (ibid). Collectively, these were the first statements made by the RMI Government outlining climate change as a security threat. More recent declarations from independent and regional bodies, such as the Pacific Island Forum's (PIF) Boe Declaration, reaffirm the importance RMI places on climate change as a security issue (Lederer 2013). As a result, and in partnership with other PICT, RMI continues to advocate for recognition of climate change as a key national and regional threat.

Following World War II, RMI continues to remain peaceful and without any traditional threats, such as incidents of war and terrorism, to its security. Internally, there have been no armed conflicts on the island and people enjoy stable and democratically-elected governments. Internal security is managed by the national Marshall Islands Police Department, including Sea Patrol, and local government police departments. Crimes do occur in RMI, but this is petty crime for the most part, including theft, burglary, and personal assault. There is a high prevalence of gender-based violence (GBV), including family and intimate-partner violence (UNWomen 2022). Other illicit activities, such as faking of passports for entry into the US and corruption and fraud issues also occur. RMI is also affected by transnational criminal activity, including illegal fishing and trafficking in drugs, people and stolen firearms (SPREP 2022).

RMI is unique to many other PICT because of its relationship with the US. Following independence in 1986, RMI transitioned from a US protectorate administered as a United Nations Trust Territory to an independent nation in 'free association' with the US. This arrangement is formalized in COFAs, which mandate the US to deliver financial aid to RMI among other benefits (US DoS 2021). In exchange, the US is granted exclusive military rights to more than two million square miles of ocean and are the main arbiters of RMI's security and defense. To that effect, RMI has no military of its own, instead it hosts a US naval military base on Kwajalein Atoll. The base includes the U.S. Army Kwajalein Atoll (USAKA) Reagan Missile Test Site and has been used for a range of missile tests (USDoD 2019).

Though integral for its security, the relationship with the US has long been fraught. This is largely due to the usage of RMI as a test centre for the US nuclear programme. Following World War II, the US held trusteeship over RMI until 1986, and during this period, the US used RMI as the site of its nuclear weapons testing programme. Between 1946 and 1958, the US tested 67 nuclear devices on the Bikini and Enewetak Atolls, which destroyed islands and ecosystems and led to 'environmental dispossession' (Van der Geest et al 2019:39). The radioactive fallout of the nuclear tests also caused health issues in the Marshallese population that are still ongoing, including birth defects and increased cancer rates (Ahlgren et al 2014). The US paid USD $150 million in compensation payments to victims of the nuclear tests and their families in the 1980s under the condition that the Marshallese would not seek future legal remedy (Ahlgren et al 2014).

Nuclear waste represents an ongoing threat to the Marshallese people and the environment because of the risk that nuclear waste stored in the Runit Dome cannot be contained. The Runit Dome is a containment structure that was built in the 1970s to house soil and debris contaminated with radioactive waste produced from nuclear weapons testing by the US on Enewetak atoll. Although the US maintains there is no immediate danger of radioactive waste from the dome contaminating the surrounding environment, there are concerns that the dome could crack, contaminated groundwater could seep into the local marine environment, or rising sea levels and/or increased storm surges could damage the dome and, in turn, contaminate groundwater (US Department of Energy 2020).

2

# Climate Risks

## CURRENT AND PROJECTED CLIMATIC CHANGES

### *Limitations*

As a low-lying atoll nation, RMI is highly exposed to risks related to climate change. However, a number of factors make it extremely difficult to project these future risks for RMI. Records of past climate data are largely lacking and the current global climate models do not provide spatial resolution that is sufficient to account for the small size of the islands.

The typical global climate model grid cell size is approximately 19.3 – 38.6 square miles (50-100 $km^2$), but the total combined land area of RMI is 70 square miles (181 $km^2$) spread across more than 770,000 square miles (2 million $km^2$) of ocean. Even for small island states with relatively larger total land areas, current models are not sufficiently downscaled to allow for regionally explicit and sound projections to be made (Mycoo et al 2022). Furthermore, there is still limited scientific knowledge on how climate change will affect large-scale climate drivers, such as the ENSO, in the future. There is also limited ability to project future shifts of the South Pacific Convergence Zone (SPCZ) and associated impacts on precipitation, drought, and typhoon formation (Pringle 2018). The limits of current climate models for small island states present challenges for decision-makers and highlight the need for future research, better data collection, and the availability and development of climate models with higher resolutions.

The climate projections and impacts to be presented in Chapter 2 need to be carefully assessed and interpreted, as these projections face the same challenges as described in the above. The climate model grid cell size underlying the line plots represent an area of 19.3 x 19.3 square miles (50 x 50 $km^2$). As a result, the projections also incorporate expected changes of the nearby ocean, meaning the line plots in the proceeding sections should only be considered as approximations.

### *Underlying Models, Data, and Scenarios*

The following climate change projections are based on data and modelling from PIK's Inter-Sectoral Impact Model Intercomparison Project (ISIMIP)[8] (Frieler et al. 2017) and are complemented by a comprehensive literature review. The line plots included in this section provide an overview of projected climate change impacts in RMI in two different climate change scenarios described as Representative Concentration Pathways[9] (RCPs). RCP2.6 represents a low emissions scenario that aims to keep global warming likely below 3.6° F (2°C) above pre-industrial temperatures and RCP6.0 represents a medium to high emissions scenario. Projections are provided until 2080, with each year depicting the multi-model mean value of a 31-year period. Staying within RCP2.6 scenario would require very ambitious climate action in the next 10-20 years beyond action that is currently being undertaken. At this point in time, it seems increasingly unlikely this ambitious action will be taken and so prudent planning

[8] See www.isimip.org

[9] The Representative Concentration Pathways (RCPs) describe four different pathways for future greenhouse gas emissions and atmospheric concentrations, as well as land use and emissions of air pollutants. These pathways serve as the basis for climate impact assessments. The RCPs are defined by their total radiative forcing through the end of the century, and are named accordingly (i.e., from 2.6 to 8.5 W/m2) (Van Vuuren et al. 2011).

should be based on the medium to high emissions scenario RCP6.0.

There are two additional future emissions scenarios included in this analysis. RCP4.5 represents a moderate future emissions scenario (between RCP2.6 and RCP6.0), while RCP8.5 represents a high future emissions scenario, which is higher than in RCP6.0. Since some scientific analyses also refer to the RCP4.5 and RCP8.5 scenarios, they are also considered in the following analysis.

The proceeding sections utilize the future emissions scenarios to describe the projections of specific factors related to climate change. The factors analyzed are:

1. Air Temperature
2. Precipitation
3. Sea Level Rise
4. Coastal Flooding and Inundation
5. Tropical Cyclones
6. Droughts

| TIME PERIOD | | 2046 – 2065 | | 2081 – 2100 | |
|---|---|---|---|---|---|
| **RCP pathway** | **Description** | **Mean** | **Very likely range** (5-95 percent confidence interval) | **Mean** | **Very likely range** (5-95 percent confidence interval) |
| RCP2.6 | Stringent mitigation scenario | 1.6 | 1.0 – 2.2 | 1.6 | 0.9 – 2.3 |
| RCP4.5 | Lower intermediate scenario | 2.0 | 1.5 - 2.6 | 2.4 | 1.7 - 3.2 |
| RCP6.0 | Higher intermediate scenario | 1.9 | 1.4 - 2.4 | 2.8 | 2.0 - 3.7 |
| RCP8.5 | High emissions scenario "business as usual" | 2.6 | 2.0 – 3.2 | 4.3 | 3.2 - 5.4 |

*Source of the table: IPCC 2014*

**TABLE 1:** Overview of global mean temperature change projections (°C) in the four Representative Concentration Pathways (RCPs) against a pre-industrial reference baseline. Note that mean warming over land has been and will be higher than over the oceans.

**How to read the line plots**

- historical
- RCP2.6
- RCP6.0
- best estimate
- likely range (central 66%)
- very likely range (central 90%)

## A. AIR TEMPERATURE

Average annual air temperature is approximately 80.6° F (27°C). Seasonal changes are relatively small with monthly temperature averages varying from 80.4° F (26.9°C) to 80.8° F (27.1°C) and the air temperature changes are strongly related to changes in the ocean temperatures. Consistent with global warming trends, increasing air temperature surrounding RMI has been observed since the 1950s (Subbarao and Mucadam 2015), and specifically, air temperature has increased by an average of 0.11° F (0.6°C) since the 1980s. The number of warm nights has risen as well, while the number of cool nights has declined (World Bank 2021c). Since the 1970s, sea surface temperatures have also increased by approximately 0.13° F (0.07°C) per decade around the northern atolls and approximately 0.16° F (0.09°C) per decade around the southern atolls. However, these changes in sea temperatures might also be related to natural interannual and interdecadal variabilities (CSIRO 2014).

### Future Projections:

As a result of increasing greenhouse gas (GHG) concentrations, air temperatures over RMI will increase. Compared to pre-industrial levels, air temperatures are likely to rise by 1.8 – 2.3°F (1.0-1.3°C) by 2030 and 2.3 – 4.7°F (1.3- 2.6°C) by 2080, depending on the future GHG emissions scenario.

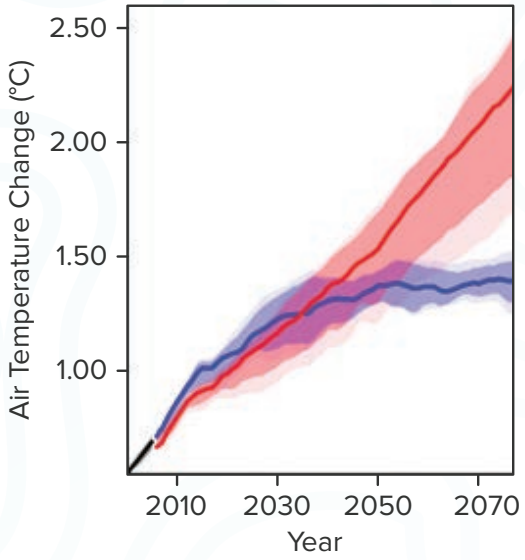


**FIGURE 2:** Air temperature projections for RMI for different GHG emissions scenarios10.

The general increase in air temperatures will be accompanied by an increased frequency and intensity of very hot days. Additionally, the median climate model temperature over RMI will inc5rease by approximately 2.2°F (1.2°C) by 2030, 25, 2.7° F (1.5°C) by 2050, and 4.1° F (2.3°C) by 2080. However, projections for further in the future are associated with less certainty in the degree by which temperature will change.

Similarly, sea surface temperatures are projected to continue rising during the next 80 years (Australian Bureau of Meteorology and CSIRO 2011). In the RCP2.6 scenario, changes in average sea surface temperatures between 2050 and 2090 will be relatively low across the Pacific. However, in the RCP8.5 scenario, the temperatures are projected to increase by approximately 1.5 °C. Sea surface changes of this magnitude is likely to increase the frequency and magnitude of marine heatwaves and lead to coral bleaching events in most regions, including Kiribati, RMI and Tuvalu (Duvat et al. 2021).

[10] Changes are expressed relative to year 1876 temperature levels using the multi-model median temperature change from 1876 to 2000 as a proxy for the observed historical warming over that time period.

## B. PRECIPITATION

RMI has two main seasons: a wet season that occurs from May to October and a dry season that occurs from December to April. The climate is highly influenced by the trade winds and the movement of the SPCZ11 and so annual precipitation varies strongly across the islands. There are significantly higher amounts in the southern atolls with 118”-134” (3000-3400 mm) per year compared to the northern atolls with 39”-69” (1000-1750 mm) per year (Subbarao and Mucadam 2015). Rain typically occurs in the form of short, intense downpours or thunderstorms. Interannual rainfall variability is high, particularly due to the ENSO12 with El Niño and La Niña phases occurring every two to seven years. While La Niña events typically bring above-average rainfall, El Niño years initially see more rainfall and then steadily declines to well below average, which increases the risk of major droughts (Pacific Risa 2015). The ENSO also affects wind and sea level conditions (Fletcher and Sussman 2014).

According to the observational data, the average annual rainfall on the capital of Majuro has decreased since the 1950s. This decrease was accompanied by a decrease in the number of very wet days. However, apart from the decreasing rainfall trends in the capital, rainfall trends do not show significant changes over the last decades.

### Future Projections:

Overall, the long-term average rainfall over RMI is projected to rise, with a more pronounced increase in the RCP6.0 scenario. However, future projections on the change in precipitation are subject to high modelling uncertainty. Different models underlying those predictions differ substantially in projected precipitation amounts and the directions of change for both the RCP6.0 and RCP2.6 scenarios.

[11] The South Pacific Convergence Zone (SPCZ) is a band of convection that splits from the Intertropical Convergence Zone (ITCZ), the global low-pressure trough through which northern and southern trade winds converge.

[12] The El Niño–Southern Oscillation is a recurrent climate phenomenon through which variation in winds and sea surface temperatures occurs in the central and eastern tropical Pacific Ocean. Changes in water and atmospheric circulation occur every two to seven years and result in changes in regional weather systems, particularly in relation to precipitation and cyclone intensity. El Niño and La Niña events are the extreme phases of the ENSO cycle.

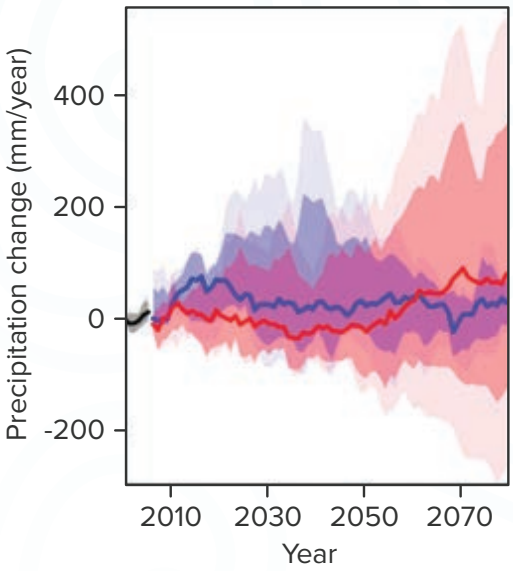


**FIGURE 3:** Annual mean precipitation projections for RMI for different GHG emissions scenarios, relative to the year 2000.

Of the four climate models underlying this projection, two models predict a moderate increase in precipitation, one predicts a high increase, and one predicts a strong decrease. These diverging model results translate into a broad range of projected changes. The RCP2.6 scenario reveals a change range of -0.98" to +5.78" (-25 mm to +147 mm) per year by 2050 and of -0.23" to +3.66" (-6 mm to +93 mm) per year by 2080. Though the best estimate in the RCP6.0 scenario projects a significant increase in rainfall at approximately 29.5" (750 mm) by 2080, uncertainties in this scenario are even higher. One model predicts an extremely high increase in precipitation, while another model projects a significant decrease.

Furthermore, interannual rainfall variability will continue to be high. Projections also point towards an increase in heavy precipitation events in the medium to high emissions scenarios by 2050 compared to the period from 1986–2005, but these projections are still made with very limited confidence (World Bank 2021c).

## C. DROUGHTS

Droughts across Pacific Islands Countries (PICs) are common, but they have been more pronounced during the period of 1981–2010 than 1951-1980. This more recent increase in drought frequency, duration, and magnitude across PICs has been predominantly related to interannual and decadal climate variabilities. The ENSO has a strong influence on interannual rainfall variability over the islands and influences the occurrence of droughts in the region (Iese et al. 2021).

Droughts across RMI primarily affect the northern atolls, where total annual rainfall amounts are relatively smaller and the freshwater storage capacities lower (Barkey and Bailey 2017). El Niño-induced droughts, which usually occur during the first six months of the year after the onset of an El Niño event, are particularly severe (Barkey and Bayley 2017). During severe El Niño events, rainfall can be reduced by up to 80% with the dry season beginning earlier and lasting longer compared to the neutral phases of the ENSO (CSIRO 2011). Especially on small islands, less than 984 ft (300 m) wide, that have only thin freshwater lenses, droughts during El Niño events lead to rapid depletion of water resources (Barkey and Bailey 2017).

In 2013, a prolonged drought significantly damaged food crops and deteriorated people's health conditions with the northern atolls being particularly affected. Between 2015 and 2017, one of the strongest observed El Niño-induced drought events severely affected many PICs in the Pacific, including RMI. Between November 2015 and September 2016, there was 40% less rainfall compared to the typical level on the atoll of Majuro. The few remaining groundwater sources were rendered undrinkable due to rising levels of salinity. More than 80% of the RMI population had very limited access to water and suffered major damages of food crops (Barkey and Bayley 2017; Iese et al. 2021). In 2022, persistent La Niña conditions, once again, resulted in dry conditions and water shortages across the northern Marshall Islands (IFRC 2022).

### Future Projections:

High variations in future drought occurrences can be expected across the PICs with both particularly wet and dry years continuing to occur. Projecting future drought risks across the PICs is difficult due to insufficient historical documentation, limited ability to simulate interannual climate variabilities, granular resolution of climate models, and future ENSO activities. Future global warming will increase the frequency of extremely severe El Niño and La Niña events, which might translate into increased severity of related drought and flooding events (Collins et al. 2019).

Uncertainties related to future changes in precipitation and the ENSO complicate the analysis of future drought frequencies and durations for RMI. Drought projections based only on rainfall[13] suggest that in the RCP2.6 scenario the frequency of mild drought will remain stable, while the models indicate a decrease in moderate, severe, and extreme droughts. In the RCP8.5 scenario, drought frequency could decrease,

[13] Drought projections are based on the Standardised Precipitation Index which is only based on rainfall (i.e. does not consider other indicators such as soil moisture content or evapotranspiration).

but drought duration is expected to remain at current levels in both scenarios. Other projections[14] suggest that the southern atolls are more likely to experience severe droughts by 2050 in the RCP8.5 scenario, but the uncertainties are high (World Bank 2021c). Sea-level rise and the associated intrusion of saltwater through coastal flooding and inundation will increase the population's vulnerability to droughts in the future.

## D. TROPICAL CYCLONES (TYPHOONS)

The RMI is in a region known for frequent typhoons with damaging winds, rain, and storm surges throughout the year. Between 1977 and 2011, 78 typhoons, an average of 22 typhoons per decade, that developed within or crossed the EEZ of RMI (Pacific RISA 2013; CSIRO 2014). RMI is located east of the most active concentration of typhoons within the western tropical Pacific. So, while typhoons and strong storms frequently originate in the area, often they do not strike the RMI (Ford et al. 2018; Subbarao and Mucadam 2015). However, a number of catastrophic typhoons have been documented, like Typhoon Paka in 1997 that caused an estimated $80 million in crop damage and damaged 70% of the homes on Ailinglaplap Atoll on the Ralik chain (GFDDR 2015).

Typhoon season occurs between June and November and the typhoons are much more frequent and intense in El Niño years when ocean warming favors the formation of typhoons. The northern atolls are prone to typhoons than the southern atolls because they are closer to the typhoons' paths (Pacific RISA 2013; CSIRO 2014). RMI is further threatened by swells that are generated from distant storms and typhoons, which increase the risk of wave-driven flooding during the winter season. Between 1905 and 2016, approximately half of all documented severe inundation events for RMI were related to tropical storms and typhoons that passed nearby the country (Smith and Juria 2019).

### Future Projections:

According to the latest scientific findings, the frequency of global tropical typhoons is likely to decrease or remain unchanged, but the intensity of future typhoons is very likely to increase as a result of climate change (IPCC 2021). Given that extreme storms are "rare, short-lived and local" (Seneviratne et al. 2021) and that individual storms are highly influenced by variability, it is difficult to quantify the effect of climate change on typhoons (Seneviratne et al. 2021).

Congruent with the global projections, the number of future tropical typhoon formations affecting RMI also show a decreasing trend, but, given the challenges in projecting future typhoons, this projection can only be made with low confidence (CSIRO 2014). Chand et al. (2017) simulated future ENSO-driven variabilities in typhoon occurrence and found that, by the end of the 21st century, typhoons around RMI will become more frequent during El Niño years, but will decrease in frequency during future La Niña years in comparison to current frequency. The Internal Displacement Monitoring Centre (IDMC) states that typhoon winds represent the Marshall Islands' highest disaster displacement risk. According to its estimations, there is a 64% chance that approximately 100 people will be displaced by typhoons in the next 50 years (IDMC 2022).

## E. SEA-LEVEL RISE

Regional and seasonal fluctuations of sea level are driven by multiple factors, including short-term changes due to tidal systems, weather-related events, such as typhoon occurrences, storm surges and ocean winds, and the impacts of large-scale atmospheric circulation systems, such as the ENSO. The combination of these components can result in extreme sea levels[15], with significant impacts on low-lying islands (Mycoo et al. 2022).

Around RMI, there is high seasonal and short-term variability in sea level. This is primarily a result of the influences of tides, including spring tides and high tides. This can also include king tides, which are tides well above the average height. The change in tides is caused by gravitational forces which arise from the movement of our planet, moon and sun (NOAA 2019). Such events are thus predictable and are likely to occur once or twice per year. In the case of RMI, king tides typically occur between January and March (Ford et al. 2018) and lead to significant inundation of low-lying land (Republic of the Marshall Islands 2020). Furthermore, the ENSO contributes to seasonal and interannual sea-level fluctuations, resulting in lower sea level during the El Niño phase and higher sea level during the La Niña periods (Ford et al. 2018; Storlazzi 2018).

[14] Those models are based on the standardised precipitation evapotranspiration index (SPEI), thus also consider evapotranspiration.

[15] Extreme sea levels are exceptionally high local sea levels that occur for short periods of time (usually hours) (Gregory et al. 2019).

Long-term rise in sea level is driven by climate change. Between 1971 and 2006, global sea level rose at an annual average rate of 0.07" - 0.11" (1.9 - 2.9 mm) and between 2006 and 2018 this rate increased to 0.12" - 0.16" (3.2 - 4.2 mm) (IPCC 2021a). The sea-level rise experienced in many parts of the Western Pacific Ocean are substantially higher than the global average, making low lying atolls in the Pacific region particularly vulnerable to climate change-induced sea-level rise and its associated impacts, including coastal erosion, flooding, and inundation (USGS 2022). In RMI, between 1993 and 2011, sea level rose by approximately 0.27" (7 mm) annually, which far exceeds the global average. However, this high rise has also been related to interannual and interdecadal variabilities (CSIRO 2014).

### Future Projections:

As a consequence of global warming, sea level at the coasts of RMI are projected to rise. Compared to the year 2000 levels, the RCP2.6 scenario projects sea level to rise 5.1" (13 cm) by 2030, 9" (23 cm) by 2050, and 15.3" (39 cm) by 2080. The RCP6.0 scenario projects sea level to rise 4.7" (12 cm) by 2030, 9.4" (24 cm) by 2050, and 18.9" (48 cm) by 2080. Long-term sea-level rise will be much higher in the RCP6.0 scenario than the RCP2.6 scenario, but increase in sea level is projected to be even higher at 24" (61 cm) by 2080 in higher emission scenarios like RCP8.5. However, uncertainty about the magnitude of sea-level rise will increase when projecting further into the future, and interannual variability of sea level around RMI will continue to be high (CSIRO 2014).

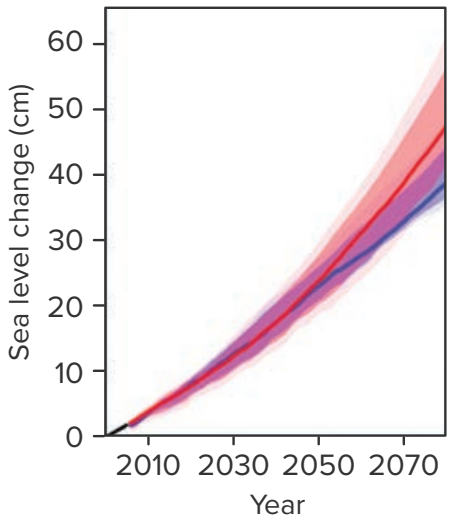


**FIGURE 4:** Projections on sea-level rise off the coast of RMI for different GHG emissions scenarios

Furthermore, natural interannual sea level fluctuations around RMI, with periods of both higher and lower regional sea levels, are likely to continue (Meteorology Service and PACCSAP 2015). Although how the ENSO phenomenon will affect regional sea level variability and extremes is not yet fully understood. Extreme El Niño and La Niña events are projected to become more frequent as GHG emissions increase. In addition, climate change will increase the overall frequency of El Niño-related extreme sea-level rise, particularly in the tropical southwestern Pacific (Widlansky et al. 2015).

The combined effects of average and extreme sea-level rise threaten low-lying island nations, including RMI, and affect its future viability through a number of hazards. These hazards include temporary and permanent land inundation, increased coastal flooding and erosion, increased salinization of water and soil, and changes in coastal and terrestrial ecosystems (see section on flooding (Oppenheimer et al. 2019).

## F. COASTAL FLOODING AND INUNDATION[16]

The low-lying islands on RMI are very vulnerable to coastal flooding and inundation. Between 1993 and 2016, 18 significant inundation events were recorded on Majuro alone, with more than half of them being reported since 2013 (Smith and Juria 2019).

The underlying processes of flooding and inundation are diverse and often interact. Coastal flooding and periodical inundation can result from several factors, including high tides and king tides, storm surges from tropical storms and typhoons, and swell wave events (Smith and Juria 2019). All these factors can be exacerbated by longer-term natural variabilities due to regional ocean-atmosphere oscillations, such as the ENSO or the Pacific Decadal Oscillation (PDO). The risk of coastal flooding and inundation increases with rising average sea level (Oppenheimer et al. 2019).

Compound events play a significant role in flooding and inundation. For example, the occurrence of high tides, in combination with high water levels resulting from storm surges, can lead to storm tides with exceptionally high coastal water level. In 2011, the lagoon coast of Majuro experienced heavy flooding from the combination of high sea level during a

[16] Coastal inundation is the "covering of normally dry land with water" (NOAA, 2020). This refers to both the long-term effects of sea-level rise, and temporary effects such as those caused by floods or storm surges (NOAA, 2020).

La Niña phase and seasonally high tides (Ford et al. 2018). In March 2014, the combined effects of extremely high tides and large swells flooded many islands. In Majuro, 940 people had to be evacuated and 70 homes were damaged. The groundwater level around Roi-Namur in Kwajalein Atoll temporarily rose by almost 3.3 ft (1 m). Measurements have shown an increase in groundwater and its salinity further inland as well, which is evidence that seawater had infiltrated the groundwater in some places (UGSG, UNOCHA, Storlazzi et al. 2018).

Flooding and inundation also occur during storms or typhoons. Typhoons can produce significant wave heights and result in extreme coastal water level. Even when typhoons pass at a far distance, the associated incoming swell events can cause severe short-term sea-level extremes and trigger substantial flooding and inundation. In December 2008, severe inundation occurred at multiple locations across the western tropical Pacific, including Majuro, Kwajalein, and Arno atolls in RMI. The inundation event was primarily caused by remotely generated swell waves from distant storms, but the severity was greatly increased by anomalously high regional sea level linked with La Niña conditions and average sea-level rise (Hoeke et al. 2013). The estimated damages were USD $1.5 million (Smith and Juria 2019).

Flooding and inundation events can have significant disruptive consequences, including coastal erosion, destruction of biodiversity and infrastructure, loss of land, increased salinity of soil and groundwater lenses, and adverse health impacts (Smith and Juria 2019). The severity of such impacts on the islands depends on various factors, including their natural geomorphological conditions and responses, human influences on the coastal environment, and the magnitude of the flooding and inundation events (Tuck et al. 2019; Smith and Juria 2019). How people respond depends on their exposure, resilience, and adaptive capacity.

## Future Projections:

According to Think Hazard (2022), a web-based tool that assesses natural hazards across different countries, the risk of future coastal flooding for RMI is high, which means the probability of a potentially damaging coastal flooding to occur within the next 50 years is more than 20%[17].

Future impacts of coastal flooding and inundation are complex and site-specific and therefore difficult to project. Generally, increasing average sea level relative to land will continue to inundate low-lying land and contribute to shoreline erosion and saltwater intrusion into soil and freshwater bodies. According to World Bank projections, without any adaptation measures, 37% of Majuro's building stock will be at risk of permanent inundation if sea level rises by 3.3 ft (1 m). In Ebeye, a 3.3 ft (1 m) rise in sea level would put over 50% of the buildings at high risk of permanent inundation (World Bank 2021a). Furthermore, the annual damages from the effects of flooding and coastal erosion are estimated to increase to USD $5.7- 9.1 million, depending on the emission scenario, by the end of the century for Ebeye Island alone, which is significantly more than the USD $2.4 million recorded in 2017 (Giardino 2018).

Climate-induced rise of average sea level also increase the platform for storm surges, tides, and waves, meaning even a relatively small rise average sea level can significantly increase the frequency and intensity of coastal flooding and inundation (Oppenheimer et al. 2019, Vitousek et al. 2017). Rising sea level is also projected to increase wave energy and wave-driven flooding across small island states, with a significant increase in magnitude, duration, and frequency from 2050 onwards. Where coral reefs currently buffer attenuating waves, as seen on RMI (Ford et al. 2018), coastal flooding will be exacerbated because of climate change-related reef dieback (Mycoo et al. 2022). Rising average sea level will also substantially increase the frequency of extreme sea level events. By 2050, extreme water level events are projected to more than double in the tropics, as compared to the period of 1993-2013 (Vitousek et al. 2017).

At the same time, reef islands are dynamic landforms and impacts on flooding and inundation differ depending on terrestrial factors, including vertical land movement, geomorphology, and sediment availability (ADB 2022). So far, reef islands have been able to respond to changing boundary conditions, such as changing sea level, wind, and wave regimes, and extreme events, like typhoons and tsunamis. With the projected rise in average sea level and variations in the topography of reef islands, it is unclear to what extent reef islands will maintain their adjustment capacities in order to delay the onset of annual wave-driven flooding. Others project that many low-lying atolls in the Pacific will become uninhabitable by as early as 2060-2070 in the RCP8.5 scenario due to annual flooding resulting from the compound effects of sea-level rise and wave-driven flooding and overwash. Furthermore, Strolazzi et al. (2018) found that increased salinity levels of freshwater, like groundwater, will

[17] Think Hazard also sees a medium risk for tsunamis to evolve in the future. However, tsunamis are not climate change-related hazards, but result from earthquakes or volcanic eruptions, for example.

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exceed a threshold of potability between years 2030-2040 on Roi Namur in the RCP8.5 scenario. Even if the lack in freshwater resources could be compensated through processes such as rainfall capture, water imports, or desalinization, most of Roi-Namur Island will be annually flooded by 2060-2070 in the RCP8.5 scenario (Storlazzi et al. 2018).

Enhancing the understanding of local reef and island characteristics, like erosion and sedimentation, regional ocean-atmosphere oscillations, and local impacts of ocean swell, storm surges, and tides is critical to assessing future flooding and inundation (Donner and Webber 2014). However, regardless of the extent to which atolls can physically withstand future flooding and inundation, coastal erosion will continue to take place and islands' low elevation and permeable structures will expose them to flooding, inundation, and saltwater intrusion. Furthermore, the cumulative risks posed by the multiple impacts of climate change, including sea-level rise, changes in precipitation, large-scale ocean-atmosphere circulations affecting future storms and hurricanes, and ocean warming and acidification, will increasingly threaten the future habitability of atoll islands by negatively impacting land availability and quality, freshwater and food supply, as well as settlements, infrastructures and economic activities (Duvat et al. 2021).

3

# Climate Security Pathways

Despite the uncertainty inherent in some of the projections Chapter 2, it is clear that climate change will have a profound impact on RMI. Climate change impacts threaten RMI's vital infrastructure, such as health, food, water resources, and capacity for economic growth. The human cost of these impacts are threats to health, productivity, livelihoods, employment, and human security. Together, these effects undermine social bonds among groups in RMI and could exacerbate the risk of conflict.

Chapter 5 identifies and explains how climate change impacts livelihoods, politics, and society and how, in turn, it contributes to insecurity for RMI. Five interrelated climate security pathways for RMI are identified. These pathways are not meant to be static or linear, but instead seek to illustrate the dynamism of how climate change, environmental, socio-economic, and political factors interact to increase insecurity and conflict risks (see Figure 5). Given the systematic nature of climate security risks, overlap between pathways is unavoidable, so these pathways will work in dialogue with one another.

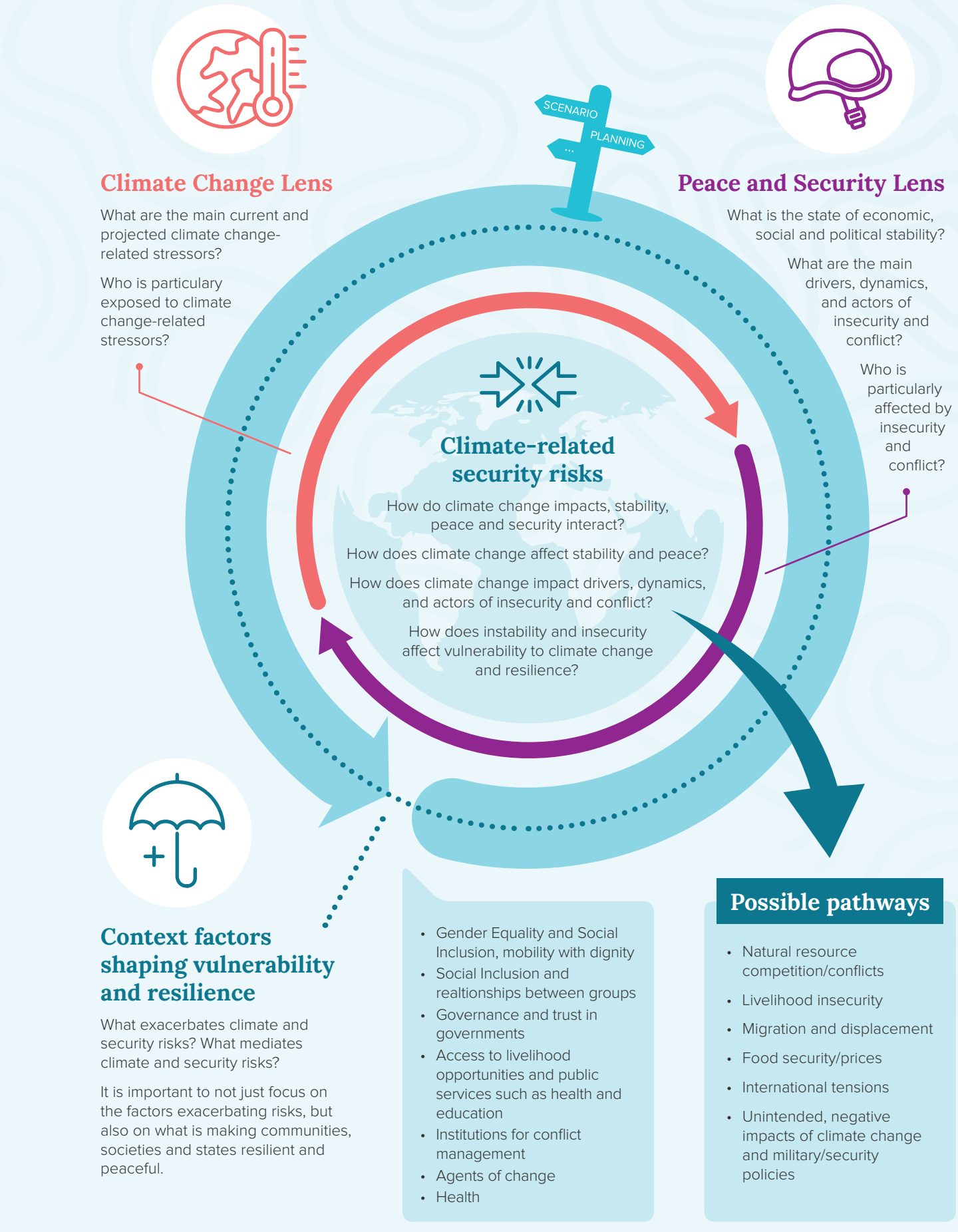


**FIGURE 5:** Graphic illustration of the climate security analytical framework leading to identified pathways (Rüttinger et al. 2021)

## PATHWAY 1: Climate impacts increase land, water, food, and health insecurity

It is vital to note that the discussion presented on land below must be considered across all pathways as the land tenure system in the RMI does not align with modern solutions to climate security risks and donor priorities. In future iterations of this climate security assessment, more dialogue must take place to ensure mainstreaming of land tenure ship and ensure it is consistent with local, judicial, and traditional processes. When exploring the climate security risks in all other pathways and all entry points, potential risk, and opportunities from the current land tenureship system must be considered and incorporated to avoid maladaptation which may result in further conflicts.

Land, water, food, and health are interconnected in RMI and threatened by the compounding impacts of climate change. The combined impacts of coastal erosion from sea-level rise and storm surges that are worsened by increasing extreme weather events put land usability and land resources under increasing pressure, especially in urban areas. Freshwater resources are extremely scarce and threatened by drought and saltwater intrusion. Water management occurs at the household and community level where social bonds are critical for sustainable management, but these bonds come under pressure in times of scarcity. Lack of water resources threaten the viability of subsistence agriculture, which undermines food security and increases RMI's reliance on food imports. This imported food impacts health because the food contributes to increased rates of obesity and malnutrition. Extreme heat and flooding also increase the prevalence of vector-borne diseases. Taken together, these threats to water and food security and health impacts threaten human security in RMI and undermine its future resilience.

### LAND INSECURITY

Coastal erosion, flooding and inundation due to sea-level rise in combination with high tides, storms, and typhoons threaten RMI's land usability and subsequent habitability. Atolls and islands in RMI that are most at risk are those with unstable coastlines. Coastline stability depends on the extent of fringe sandy or conglomeratic beach rock, and the existence of natural beach rock accumulations (World Bank 2021c). Therefore, not all atolls and islands in RMI are at risk of near-term erosion or the same degree of flooding and inundation. Nonetheless, scientists suggest that even those islands and atolls with more stable coastlines are likely to be affected in the future, especially in the high emissions scenarios, like RCP 8.5.

Key areas of RMI are already experiencing coastal erosion with important implications for the country. For example, Majuro and Kwajalein-Ebeye Island are home to approximately 75% of the population but are facing increased risk. Majuro's coastline is already eroding at a considerable rate, as coconut trees and coastal vegetation fall when the soils are washed away from beneath them (World Bank 2021c). Additionally, a World Bank study found that rising sea level of 3.3 feet (1m) will permanently inundate 37% of Majuro's and 50% of Ebeye's buildings without adaptation activities (World Bank 2021d). Furthermore, the study found these areas are likely subject to recurrent inundation adding to pre-existing land, food, and water stress as a result of other climate-induced forces.

Land pressures are already mounting in urban areas due to historical and accelerating population trends. The interaction between reduced usable land and increasing population pressures have significant social implications. For example, as a result of increased land scarcity, competition over land is increasing with *weto* boundary disputes becoming more common (Huffer 2008). Housing rents are rising and often rising to unaffordable levels in urban areas, which can lead to further social inequalities. Together, these pressures increasingly alter how benefits from land are redistributed among bwij, the extended kin network, shifting from a collectivist to an increasingly individualistic approach centred on the primary titleholder. As a result of these forces, disputes are increasingly common between landowners and non-kin tenants. These disputes are often handled in formal courts, which clashes with the traditional land conflict resolution practices that follow traditional land management norms[18].

[18] See study by Huffer 2008 for more information.

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Given there is no public land in RMI[19], the government also needs to contend with these dynamics. The land tenure system is enshrined in the constitution and supported by the government, but this system does impose certain constraints that can complicate meaningful and efficient cooperation and development of national, social, and public interests. In addition, key concerns related to climate change, such as land for displaced persons or for relocation, can interact with current and future climate pressures, possibly leading to friction between landowners and government as the situation worsens.

## WATER INSECURITY

In addition to land pressures for settlement, these risks from climate change threaten vital water resources in RMI. Like many low-lying atolls, RMI's lack of surface water and very limited groundwater resources means freshwater resources are extremely scarce. Sea-level rise, coastal erosion, tropical storms and typhoons, and coastal flooding all contribute to saltwater intrusion further inland.

The Marshallese depend on precipitation for more than 90% of their water supply, so water resources are also threatened by droughts, given lack of groundwater. RMI is recurrently affected by El Niño-induced droughts (Barkey, B. et al. 2017). During severe El Niño events, rainfall can be reduced by as much as 80%, with the dry season beginning earlier and lasting longer than in normal years (CSIRO 2011). In 2013, a prolonged drought season resulted in critical water shortages, which damaged food crops and led to poor health conditions. Over 6,300 people were estimated to be affected by the drought, with northern atolls being impacted in particular (Reliefweb 2013). As explained in Chapter 2, between 2015 and 2017, one of the strongest observed El-Niño-induced drought events severely affected many SIDS in the Pacific. Consequently, between November 2015 and February 2016, RMI only received 25% of its usual rainfall and the few remaining groundwater sources were rendered undrinkable due to rising salinity levels (Barkey, B. et al. 2017).

Stable community and equal infrastructure planning are critical to water security in RMI. Unlike many geographic contexts where water supply is the responsibility of a public utility, RMI rainwater must be harvested at the household level, which transfers significant responsibility for water security to individuals and communities (Green Climate Fund 2019). There is also a lack of water governance and coordination mechanisms at the national level (Green Climate Fund 2019), which places further pressure on local or national water management. A community survey undertaken by the stated-owned Majuro Water and Sewer Company (MWSC) found that over 52% of residents use their own or their neighbors' rainwater catchment for drinking water (Green Climate Fund 2021), which suggests relationships within communities are critical to sharing water resources. Increasing scarcity, in particular on the neighboring islands, will increase pressure on, and competition over, access to water. This will also put additional pressures on these relationships and cooperation structures, which raises questions about whether they will be able to withstand the additional pressures.

[19] The government must lease land from customary landowners.

Water scarcity also reveals economic disparities within communities, as some households are better equipped to retrofit rainwater tanks to prevent leaking, which is critical for rainwater harvesting, and can more easily afford supplies of bottled water. The Green Climate Fund (2021) suggests that because water infrastructure planning tends to be dominated by men, both in government and at the community decision-making level, drought can have a greater negative impact on women's livelihoods. For instance, water management decisions made by male-dominated forums may privilege water use for traditionally 'male' livelihoods, such as copra production, rather than prioritizing conserving water for kitchen gardens or households where women are more represented. As a result, women may suffer disproportionately from drought because water scarcity will also make it more difficult to feed and care for their families. Therefore, gender equality in water management and the planning of new water infrastructure is critical to ensure women and other vulnerable groups experience increased suffering from the effects of water scarcity.

## FOOD INSECURITY

Climate change also threatens food security from its impacts on ecosystems, and, in turn, on subsistence agriculture and fisheries. There is substantial evidence that RMI's biodiversity is deteriorating, specifically in coastal and nearshore areas (Office of Environmental Planning Policy Coordination, Republic of the Marshall Islands, 2017). For instance, coastal vegetation that provide valuable ecosystem services like coastal protection from storms, flooding, and erosion, are highly sensitive to climate change impacts[20]. Coastal vegetation grows between the average sea level and average high-water level, so sea-level rise is expected to reduce this vegetation stock in the Pacific Islands, potentially by as much as 13% by the year 2100 (Gilman et al 2006; Ellison 2018). Furthermore, rising water temperatures and ocean acidification are associated with extensive coral bleaching and migration of whole fish populations to more favourable water temperatures, both of which could significantly decrease future fish stocks in tropical regions (IPCC 2019). Based on surveys of coral cover, the coral reefs of RMI are currently mostly intact and in a healthy condition, particularly outside of urban areas (Office of Environmental Planning Policy Coordination, Republic of the Marshall Islands, 2017). However, the number of days on which coral reefs around RMI were exposed to heat stress between 1982 and 2016 has increased by 128% from 11 to 25 days per year (Marra, J. et al. 2017). Warming oceans and acidification combined with human impacts, such as pollution, overfishing, and waste run-off, also undermine the fish biodiversity in RMI. Serious reductions in fish and shark biodiversity has already occurred in Majuro, and is understood to be a potential warning signal for neighboring islands where biodiversity loss is less severe (Office of Environmental Planning Policy Coordination, Republic of the Marshall Islands, 2017).

Ecosystem changes, combined with severe water shortages, have significant impacts on the already vulnerable food systems in RMI. Traditionally the Marshallese diet was based on self-sufficient agriculture and locally-caught fish, but currently, between 80-90% of all food eaten is imported (RMI Food Security Policy 2013). Ecosystem changes reduce the biodiversity of marine and coastal habitats and this undermine subsistence crops and reduce the availability of fish as a source of protein, which contributes to the increasing reliance on food imports (Green Climate Fund 2021). Separate to environmental impacts, this level of reliance on food imports leaves the Marshallese severely vulnerable to supply chain disruptions and sudden spikes in the price of food. There is also evidence that these changes are resulting in overfishing around the neighboring islands, as fisherfolks need to shift to alternative fishing grounds, additionally driving urban migration and increased demand for imported fish in urban centres (Office of Environmental Planning Policy Coordination, Republic of the Marshall Islands, 2017).

RMI is likely to experience food stress in the future resulting from a lack of locally caught and grown food and the increased financial barriers that prevent accessible imported food. For instance, if food prices spike as a result of inflation or high energy prices, many Marshallese may not be able to afford key dietary staples. In comparison with other contexts, high prices and food insecurity can be a source of social unrest and potential conflict (Bruck and d'Errico 2019). Food insecurity could exacerbate tensions in RMI's crowded urban centers and lead to dissatisfaction with the government for failing to ensure citizens have adequate sustenance.

Damage to ecosystems threatens subsistence agriculture, which, in turn, can undermine social systems linked to growing seasons. Slow-onset environmental changes alter the seasonal crop calendar with some crops appearing earlier, later, or not at all. Given the seasonal calendar plays an important role in structuring social life, these changes threaten culture and affect social aspects of the community. In this way, environmental changes wrought by climate change disrupt and damage community life.

[20] Including increasing sea water temperatures, sea-level rise and storm surges.

## HEALTH INSECURITY

RMI already experiences a range of health challenges, including a lack of quality health services, difficulty accessing health services in a remote environment, and the legacy of nuclear testing that led to death and serious illness for several generations of Marshallese. Currently, major health challenges in RMI also include morbidity and mortality through high rates of obesity[21] and related diseases, such as hypertension and diabetes, tuberculosis, and cancer (World Health Organisation 2017). Obesity and its related diseases are strongly linked to the increase in food imports, in particular to white rice and canned tuna imports, which are often highly processed and contain high levels of sugar and fat. So, food imports have resulted in overall dietary changes and led to poor nutrition for children. Therefore, ecosystem changes that perpetuate the need for food imports means the risk of malnutrition and related diseases might further intensify in future (Ahlgren, I. et al. 2014; Government of the Republic of Marshall Islands 2020).

An additional impact of climate change on the health of Marshallese is its effect on mental health. Climate change is associated with elevated levels of stress, which contributes to anxiety or post-traumatic stress disorder (PTSD) (Tiatia-seath et al. 2021). PTSD can be a particular problem following disaster events (ibid). Elevated stress levels arise from livelihood pressure or stress on resources, which can contribute to other negative mental health outcomes, such as reliance on, and abuse of, substances to cope (ibid). Youth are especially susceptible to the negative mental health effects of climate change. Youth anxiety about the future is reportedly increasing, which can have important public health effects, if not addressed (Kelman et al. 2021).

Climate change will also likely lengthen transmission periods and alter the geographic range of various diseases due to, for instance, rising temperatures and changes in precipitation amounts. In 2011, the RMI experienced a severe dengue fever outbreak, infecting 3% of the total population (Sharp, T. et al. 201). Another major dengue fever outbreak took place in July 2019, when persistent dry, warm weather, interrupted by short periods of intense rainfall, exacerbated this outbreak. It eventually turned into the worst dengue outbreak in the country's history with over 3,388 recorded cases (IFRC 2019).

Increasing prevalence of health conditions and diseases undermines human security and future resilience. Families who need to care for sick relatives are less likely to participate in the labour force and may see their household incomes decrease as a result. This further undermines their capacity for climate change adaptation, like finding alternative sources of employment, retrofitting their homes, implementing measures to improve food security, like kitchen gardens, or migrating as an adaptive strategy. The increase of disease prevalence is also linked to sanitation services. These services are the responsibility of local councils in RMI, but there is evidence that, because of limited funds at the council level, the local government neglects critical services like solid waste management (World Bank 2009). This not only carries severe health risks, but this neglection of key service delivery could also lead to considerable discontent among citizens.

[21] The current prevalence of obesity in the adult population is with 52.9%, among the highest in the world (FAO 2021).

## PATHWAY 2: Climate change threatens livelihoods and the blue economy

Livelihoods in RMI are already vulnerable because of its low human capital development, an under-diversified economy, heavy reliance on ecosystem services, and scarce job opportunities. Climate change exacerbates this vulnerability by further threatening livelihoods, in particular through agricultural production, subsistence fishing, and commercial fishing. The loss of these livelihood opportunities undermines human security and the future resilience of the Marshallese, especially given that limited alternatives exist. Loss of livelihoods puts more pressure on social structures and the norms of sharing and cooperation. This acts as a push-factor especially for those living in the neighboring islands and increase pressures in urban areas. Finally, the loss of economic opportunities and government revenue from fisheries has an impact on the government's ability to deliver vital services. These vital services, such as healthcare, education, and additional public sector jobs, further increases the vulnerability and livelihood insecurity of RMI communities. In the long-term, these dynamics can also undermine trust in government and contribute to grievances and political instability.

### ECONOMIC VULNERABILITY AND LIVELIHOOD INSECURITY

The RMI economy is vulnerable because it is under-diversified, dominated by the services sector and subsistence agriculture, and heavily reliant on both COFA grants and lease payments from US Army Garrison Kwajalein Atoll (USAG-KA). In addition to these factors, human capital development in RMI is low. Poor human capital development is linked to RMI's very young population, as the median age is 20.6 years, and poor educational outcomes (IBRD 2021). In 2020, RMI's Human Capital Index was 42, meaning children born in that year were likely to be only 42% as productive when they reach adulthood as they otherwise would have been with better access to education and improved health (IBRD 2021). Therefore, livelihoods in RMI can be considered precarious and critically vulnerable to environmental and economic shocks, such as oil price spikes and supply chain issues. Having human capital that is developing and an under-diverse economy means job opportunities are scarce in both rural and urban areas, which leaves Marshallese with few economic avenues to explore (Green Climate Fund 2021).

### AGRICULTURAL SECTOR

Agricultural production is the second largest sector of RMI's economy and a key source of livelihoods, but it is significantly threatened by climate change (ADB 2019). The number of people involved in agricultural work is estimated to be approximately 11% of the labor force (CIA 2022), but it should be noted that this estimation was derived from the last census in 2011. High variation in rainfall, restricted availability of freshwater, recurrent droughts, and salt spray from tidal surges all place strain on copra production and the cultivation of subsistence crops. There is evidence that subsistence crops, like breadfruit, may not survive from further increases in temperature as a result of climate change (Souter et al. 2020). These environmental pressures add to the existing economic stress of declining price of copra (Green Climate Fund 2021). If agricultural production becomes more unviable, there will be loss of livelihoods for people and their families dependent on farming, including those producing copra for export and those involved in subsistence farming. This would also disproportionately affect communities on RMI's neighboring islands, where copra production is concentrated and where more people are engaged in subsistence agriculture (Van der Geest et al. 2019).

### NEARSHORE FISHERIES

A second key source of livelihoods in RMI is subsistence fishing in coastal fisheries. Projections for the broader Pacific region, including RMI, show that climate change impacts on small-scale fisheries, including losses in productivity, are expected to strongly impact small-island countries (Bell et al. 2021; Mycoo et al. 2022). Coral bleaching and declining habitats have already contributed to declining nearshore fish stocks (CCD, RMI 2020). Marine heatwaves compound the issue, as increased ocean temperatures push fish towards cooler waters, and these heat waves are expected to intensify and multiply in future years (Sahib and White 2018). Human-induced pressures, such as overfishing and illegal, unregulated, and underreported activities, have also led to reductions in some fish stock. These negative impacts on fisheries undermines food security as this threatens the livelihoods of those engaged in coastal fishing. This is likely to affect approximately one third of the RMI population living on the neighboring islands for whom small-scale fishing is a common economic

activity (CIA 2022). A survey of RMI citizens pointed to this reality as 'lack of fish' was cited as a key problem by respondents on the neighboring island more than by respondents on Majuro (Van der Geest et al 2019). The negative impacts will also affect other parts of the fishing industry in RMI, including exports of aquarium fish, the tuna lining plant, and shore-based support to the long-line industry (Green Climate Fund 2021). In 2020, the fisheries sector accounted for almost 40% of all private sector employment and so threats to this sector put private sector livelihoods at risk.

The loss of livelihoods has several cascading consequences for the Marshallese. First, loss of livelihoods from farming and fisheries increases pressure on social structures and social cohesion, including the division of labor within households and it affects social norms linked to the sharing of resources, especially fish. Increased competition for declining stocks of coastal fish threatens to undermine social bonds in communities. Urban areas also experience these resource constraints as Majuro faces several overlapping factors, such as high in-migration, high unemployment, and pressures on food and water systems. Second, those experiencing livelihood insecurity and the subsequent cascading effects to food and water security feel more pressure to move from RMI's neighboring islands to urban centres in search of formal or informal employment. This compounds pressures experienced on more populous islands due to urbanization already putting a strain on valuable resources. Given formal economic opportunities remain scarce, this internal migration is likely to lead to sustained rates of high unemployment. The latest data on unemployment from the 2011 census suggested the unemployment rate was 31%. However, RMI unemployment disproportionately affects youth as the International Labour Organisation (ILO) estimated, youth unemployment was 58% in 2017. The most recent data from the US State Department suggests this youth unemployment rate remained until 2020 (ILO 2017; US DoS 2020). High levels of unemployment in urban areas have been linked to social issues, such as increased petty criminality. Recent studies are limited, but a study of youth criminal activity in Majuro from 2009 indicated increased criminal activity among males partially a result of lack of economic opportunities. Other reasons given were related to difficulties in accessing support and services from the government or family, and use of substances, particularly alcohol. Criminal activities were petty in nature, most often related to drunk and disorderly conduct and physical assault (Noble et al. 2011).

Many of the climate risks that affect nearshore fisheries also have consequences on commercial fisheries activities. Climate change is likely to alter the environment of the tropical Pacific Ocean and alter the ENSO, which would ultimately lead to a redistribution of tuna stocks (Bell et al., 2021). Fish stocks are expected to generally move eastward in the medium and high emissions scenarios, which would alter the fish biomass available within many EEZs of PICT. Some countries are projected to experience drastic reductions in the RCP8.5 scenario, but RMI is expected to experience less of a decrease compared to other PICT with a biomass reduction of 0.7%. However, these projections remain hard to predict with certainty. Reduction in fish biomass would have implications for the RMI government. For example, fees from days sold under the VDS are an increasing source of government revenue given these fees represented over 20% of government revenue and more than 13% of RMI GDP in 2020, an increase from 1% of GDP in 2009 (World Bank 2021c). Reduced revenues combined with other costs associated with climate change pose an important challenge to RMI's public sector. The public sector accounts for 40% of its GDP and this is projected to only increase, and a major survey revealed 44% of RMI citizens reported receiving government salaries (Van der Geest et al, 2019). Therefore, decreased government revenue would ultimately undermine the livelihoods of families who depend on this source of income. This would compound the effect of stagnating public sector wages, which have remained fixed since 1997 (World Bank 2021c).

Lower government revenue can overlap with other challenges and lead to broader social issues, which can include ensuring equitable development, providing adequate services, enhancing disaster response, and adapting to, and mitigating the effects of, climate change. Addressing these issues is important, but they also exist in competing policy areas, meaning the RMI government needs to manage country priorities. Weakened management of these policy areas could strain state-society relationships, especially if those who are already disadvantaged and struggling with increasing competing strains do not receive adequate service provision from the government.

To address this possibility, RMI is exploring avenues to improve its fiscal position given the pressures experienced in important economic sectors. For example, the government is making efforts to cooperate with other PNA members, such as increasing the pooling of VDS days, in order to mitigate potential tuna redistribution and to maximize the benefits of the scheme for member countries. This cooperation would not only benefit RMI, but it would also increase resilience of PICT and act as an important regional conflict mitigator in the event of the worst-case scenario projections where there are significant changes in tuna stocks.

## PATHWAY 3: Climate induced mobility presents opportunities and challenges for RMI

Climate change is likely to increase current mobility trends. RMI migration takes two main forms: internal migration among RMI's islands and external or international migration to other countries. Migration can be a positive adaptation strategy that leads to new social and economic opportunities, but, if not adequately managed, can come with significant risks. In particular, unmanaged internal migration to already overcrowded urban centres would increase competition over scarce resources and could contribute to unemployment and unsustainable development. External migration can also be a positive adaptation strategy, both as temporary or permanent movements, but migrants face risks in the US and other receiving countries and they can experience dislocation and cultural loss with future generations. Remittances could increase the adaptive capacity of those living in RMI, but could also exacerbate income disparities and social inequalities. Furthermore, issues of migration and the potential for large-scale relocation interact with RMI's complex colonial history and its history of relocation based on its relationship with the US.

### INTERNAL MIGRATION

Internal migration from neighboring islands to urban centres is a consistent and recurring trend. In 2017, RMI's population was estimated to be approximately 55,000 with more than 70% of people living in the urban centres of Majuro and Ebeye (CCD, RMI 2020). Internal mobility will likely increase as environmental stressors impact livelihoods and food and water insecurity for neighboring island communities increases. Research reveals that although climate change is rarely cited as the primary reason for mobility, "households that had experienced more climate-related stresses and that perceived more negative trends in ecosystem services had higher migration propensities" (Van der Geest et al. 2019).

Increased internal migration will place further pressure on over-crowded urban centres that has multiple cascading effects. These effects include increased competition for resources, like food, land, and water as approximately 50% of the 40,000 people living in RMI's urban centres have no access to arable land (Green Climate Fund 2021). These also include increased competition for scarce economic resources, like job opportunities in the informal cash economy and private and public sectors. In the context of high population pressure, some populations have increased their vulnerability to disaster risks. For example, urban communities disregard traditional approaches to constructing housing and other buildings that would keep these structures a safe distance from the shore. Further, in developed urban centres, human activities, like sand mining, reef rubble and beach rock removal, inappropriate reclaiming of beach areas, and destruction of the vegetated berms, all expose communities to risks of coastal inundation (CCD, RMI 2020).

It is important to note that internal migration can also be a positive adaptation strategy. That is true for both temporary, or circular, migration and/or more permanent migration. For example, those fleeing from a disaster, such as prolonged drought or damages from storms, may seek security with family members on different islands or in urban areas only to return following the disaster (ILO 2014). Others may choose to make more permanent moves to urban areas because urban areas often have better access to services, like healthcare and education, and better access to disaster risk response capacities and livelihood opportunities.

An urban environment characterized by extremely high population density, high levels of poverty and unemployment, scarce resources, and vulnerable infrastructure, has the potential to foster discontent, particularly among marginalized groups, such as the unemployed and recently migrated. This discontent can be exacerbated because these groups are least likely to have access to land as land ownership is controlled through matrilineal family lineage and distributed by social class (US Department of State 2020). This is particularly acute in comparison to Ebeye which has a habitable land mass of roughly 0.11 square miles (0.3 km2), but is home to approximately 10,000 people, while the neighboring US military base on Kwajalein houses only 1,250 people over 1.16 square miles (3 km2). Most of the Marshallese workers on the Kwajalein base live in Ebeye and many were relocated there decades ago by the US to facilitate its weapons testing programmes (Marcoux 2020). This contrast and its roots in RMI's history are likely to highlight feelings of injustice, particularly when compounded by a lack of services and opportunities on RMI's most crowded islands.

Similar to Majuro, Ebeye and Kwajalein Atoll have also experienced population growth, but neighboring islands and atolls, such as Ailuk, Ebon, Likiep, Namdrik, Rongelap, and Ujelang, experienced population decline (Van der Geest et al. 2019). Population decline in the neighboring islands also has negative impacts on the communities, such as the 'brain drain' of skilled workers, like teachers and medical professionals, and income inequality between the urban and neighboring islands (Green Climate Fund 2021). The effects of population decline exacerbates existing poverty on RMI's neighboring islands. The Asian Development Bank (ADB) estimates that two thirds of the people on these neighboring island communities live on less than USD $1 per day (Green Climate Fund 2021). Stakeholders who were consulted for this assessment noted that when communities shrink on the outer islands, communities may be deprioritized in the distribution of scarce resources and/or services and so it becomes harder to access these. This, in turn, can fuel a cycle of worsening water and food insecurity that potentially increases migration and further decreases outer island populations, which ultimately results in an increasingly vulnerable and poor population on the neighboring outer islands.

## INTERNATIONAL MIGRATION

Key drivers of international migration include work opportunities, education, healthcare, or reuniting with family members (Van der Geest et al. 2019). International migration is likely to increase as impacts of climate change and their effects on RMI's economy and society worsen. International migration to the US is common because the COFA allows Marshallese to live and work in the US without a visa. Marshallese that migrate to the US experienced positive changes in well-being from improved employment opportunities, healthcare, welfare, and education, as well as significant improvements in food security (Van der Geest et al. 2019). Migrants are supported by a large diaspora community with 2 out of every 5 Marshallese living in the US (East West Center 2022), which can assist with integration, language barrier, and navigating the US bureaucracy. Marshallese who migrate to the US can send remittances, which can also increase the adaptive capacity of citizens who remain on the islands. Remittances are an important component of the RMI economy, representing 12.4% of the country's GDP in 2021 (World Bank 2022). An analysis conducted by Van der Geest et al. (2019) found that more than 70% of Marshallese survey respondents in Hawaii and more than 85% of respondents in the Pacific Northwest sent remittances. In RMI, approximately one third of survey respondents had received remittances in the past 12 months. Remittances represent a major source of household income, in particular on the neighboring islands, and can help to improve the resilience of Marshallese communities. For example, Marshallese with access to remittance income may be able to retrofit their homes to protect it against coastal erosion or access alternative sources of food. Those that migrate to work internationally or to receive educational training in relevant industries to RMI can return to RMI and utilize their skills and/or knowledge in the local economy, which can contribute to addressing capacity gaps in important sectors or industries. Given the COFA arrangements, which facilitate US market access to the Marshallese, there are no legal constraints to Marshallese undertaking such activities; a rarity across the Pacific (ILO 2014).

However, the Marshallese diaspora still faces important challenges. Though there is a focus on sending remittances, many communities in the US with Marshallese migrants experience high rates of poverty. A report from the World Bank estimated that, prior to the outbreak of the COVID-19 pandemic, approximately 41% of Marshallese in the US were living in poverty. This is linked to their limited qualifications for higher level employment. A 2015 survey found that only 4% of Marshallese over 25 years old living in the US were college graduates and only 75% had graduated from high school (Dong et al. 2020). The Marshallese diaspora were likely to have been disproportionately impacted by job and income losses during the pandemic because they were more likely to work in the leisure and retail sectors (Dong et al. 2020). Marshallese working in other sectors that required in-person work, such as the poultry processing industry, were also impacted by the COVID-19 pandemic because these operations had to stop (McElfish et al. 2021; Joshua 2021). The most recent health statistics gathered in 2015, illustrate concerning health outcomes for the Marshallese diaspora. Marshallese in the US face a 39% risk of type two diabetes compared to the American average of 13%, face higher rates of infectious disease, and, due to affordability issues, 50% of were not able to see a physician in any given year (ibid). It should be noted these statistics are representative of the time before the 2015 Affordable Care Act ruling, which finally granted COFA migrants access to the system[22]. Still, following this act, 48% of the Marshallese diaspora are unlikely to be uninsured, which is approximately five times more likely than the 8 – 9% of other Americans who are uninsured (ibid). Taken together, this led to disproportionately negative health outcomes resulting from the COVID-19 pandemic. According to the US Center for Disease Control, in Northwest Arkansas, Marshallese accounted for 19% of all COVID-19 cases and 38% of the reported deaths, but only made up between 1.5% – 3% of the total population of Benton and Washington counties (McElfish et al. 2021). Furthermore, poor mental health outcomes can also

[22] Prior to 2015, COFA migrants were not eligible for Medicaid coverage.

be associated with migration because migrants can face challenges adapting to their new surroundings and/or being removed from their land, home, communities, and traditions (Tiatia-Seath and Topou 2020). Given climate projections, this mental health risk is likely to intensify in the future as more people choose to move after experiencing recurrent flooding, disasters, and/or reduced livelihoods and well-being (Kelman et al. 2021; Krzezni and Brewington 2021). These issues outline significant challenges affecting migrant communities and the impacts that can emerge in a variety of areas, including health, economics, education, and livelihoods.

## IMMOBILITY, DISLOCATION, AND CULTURAL LOSS

Despite the potential for mobility to an effective adaptation strategy, it is not equally accessible to all Marshallese. There are limited labor migration schemes[23] offered by Australia and New Zealand compared to other PIC and these schemes often require English skills and a certain level of education, which increases the likelihood that those who migrate are better educated and have had access to more opportunities (Van der Geest et al. 2019). Skills needed to earn higher paid work in the US provide similar inhibitors (ILO 2014). Approximately one third of survey respondents in RMI had a household member who wished to migrate but was unable, usually a result of poor health, responsibilities at home, and/or lack of money, transportation, and contacts in the receiving country.

For those that are able, migration is an important livelihood strategy, but, both currently and historically, those that move often experience feelings of dislocation. This is true for both internal and international migration. Research finds that for many people in RMI, their homeland is "a part of their identity, is a link to their ancestors, source of their familial and social networks, and is viewed as central to their culture" (Constable 2017:1036). This is reflected in the poetry of Marshallese poet Jetnil-Kijiner, who uses the metaphor of a pandanus tree with deep roots into the land to describe the Marshallese people. Marshallese who live relatively far away from RMI, like those living in the US, Australia or New Zealand, face "serious challenges of cultural preservation" (Heslin 2019). In these countries, it is more difficult to engage in traditional activities like spear fishing and/or to cook traditional foods with local tropical crops (Heslin 2019). The difficulty of 'cultural preservation' was noted by survey respondents in the US, who said a key challenge of migration was "weakened conservation of language and cultural ties" (Van der Geest et al. 2019). These challenges are compounded by the difficulty of travelling back to RMI. A trip from the US, Australia, or New Zealand is likely to cost thousands of dollars and could take over 50 hours in travel time. This is unaffordable for many Marshallese who may wait years before being able to reconnect with family members and their homeland. Internal migration also implies cultural loss, particularly if people migrate away from subsistence livelihoods in search of employment in the cash economy. This kind of mobility can lead to a loss of knowledge about agricultural production and fisheries management. This, in turn, undermines future resilience and the ability of the Marshallese to maintain traditional subsistence lifestyles.

Cultural loss is not only experienced by those who migrate, but also by those who remain in RMI (McNamara et al. 2021). A policy review carried out by RMI government, the Joint National Action Plan for Climate Change Adaptation and Disaster Risk Management (JNAP) review, found that the decline of the resident population due to migration led to "cultural degradation, human capacity reduction, [and] changes to traditional leadership dynamics" (via Green Climate Fund 2021). Similarly, Heslin (2019:384) finds that large movements of populations can affect social structures in RMI and undermine "the economic and political capacity of the population". If severe impacts of climate change result in a significant increase of migration in the future, cultural loss for the Marshallese diaspora and for those who remain in RMI could become more severe. Ties within communities and traditional social structures that help to maintain the climate change resilience of the population could irreversibly break down. The issues around dislocation and the potential impacts migration can have on Marshallese culture further illustrate the challenges around planned relocation. The strong ties to land and its importance to Marshallese, in combination with the general land scarcity and tenure arrangements, make relocation a difficult and contentious issue for the government to address and is an issue that will likely become increasingly apparent in the future.

[23] Two key labour migration schemes include Australia's Seasonal Worker Programme (SWP) and New Zealand's Recognised Seasonal Employer (RSE) scheme. Around 25,000 seasonal workers from the Pacific participate in these schemes each year, though mostly from Tonga, Vanuatu, and Samoa. These seasonal migration schemes give Pacific migrants an opportunity to live in Australia and New Zealand for a short time to participate in specific types of employment, but neither offer simple paths to permanent residency.

## PATHWAY 4: Disasters undermine Marshallese resilience and challenges the government's coping capacity

Weather-induced disasters pose a severe risk to human security in the form of death and injury. They also threaten physical infrastructure in RMI, including homes, buildings, and transportation infrastructure, making it more difficult to deliver disaster response, and this infrastructure damage then demands significant investment in reconstruction. Despite the importance of this investment, it also poses the risk of 'maladaptation', which are measures that actually increase the vulnerability of communities and infrastructure in an attempt to mitigate disasters. Vulnerable groups are likely to bear the worst of the impacts of disasters, in particular women, poorer families and communities, and people with disabilities. There is pressure on the RMI government to respond by investing in disaster response, but it has limited means to make these investments. Additionally, poor disaster response, as a result of limited funding and capacity, has the potential to lead to discontent among the population and the perceptions of unfair distribution of resources.

### CLIMATE CHANGE AND DISASTER RISKS

Although uncertainties are high, climate change impacts will likely exacerbate some extreme weather events, particularly heavy precipitation, flooding, and coastal inundation. These disasters have broad environmental impacts, including coastal erosion and damage to fragile ecosystems. They also directly threaten the lives and well-being of Marshallese, given their destructive power. Exposure to this risk is highest in heavily populated urban areas (IDMC 2022). Given the population density of the islands with urban areas, they have fewer options to reduce vulnerability compared to the outer islands, which are more sparsely populated leaving room to build settlements further inland and with less density (Government of the Republic of Marshall Islands 2020).

Extreme weather events pose immediate threats to human security, but also cause severe damage to infrastructure. That is especially apparent in the heavily urbanized atolls. Over 98% of RMI's built infrastructure is located within 1640 ft (500 m) of the coastline, with 72% within 328 ft (100 m). The majority of infrastructure is built on soft, sandy soils, which makes it even more vulnerable to climate change-related hazards (Kumar, L. et al. 2015). Buildings on the most populated and urbanized atolls of Majuro and Kwajalein are at high risk of inundation from sea-level rise (World Bank 2021c). In 2008, storm surges coinciding with high tides heavily damaged roads, houses, and other infrastructure on Majuro and Ebeye island. Climate change impacts also threaten inter-island air, road, and water transportation systems. Transport infrastructure gets disrupted, in particular during the typhoon season from June and November when whole areas of RMI are impassable. Plus, in 2013, the seawall protecting the runway of Majuro's airport broke in different places as a result of a heavy storm surge. The waves that inundated the seawall caused homes to flood and resulted in extensive damage to property, and the Majuro airport was forced to close for that day (Pacific RISA 2013). This transportation infrastructure is critical for accessing RMI islands and supplying them with imported goods, including food and fossil fuels (Subbarao et al. 2015; USAID 2018). As a result, these infrastructure damage can impede the provision of basic services and emergency relief and, given the high dependency of RMI on imported commodities, this damage from extreme events are putting the region at risk of limited supplies (ibid).

### VULNERABLE GROUPS

The effects of natural disasters, including threats to human security, damage to infrastructure, and access to transport, more heavily impacts vulnerable groups, such as women, urban communities and recent migrants to urban centres, communities living on neighboring islands, and people with disabilities and/or health conditions. Women are uniquely vulnerable to natural disasters and other impacts of climate change because of the position they hold in society and the history of structural disadvantage. Marshallese women have far less economic power than men as 66% of men are classified as economically active compared to 33% of women, 37% of women are classified as unemployed, and women's wages are on average USD $3,000 less than men in the same job (UNWomen 2022). Women are still primarily seen as caregivers with a social position meant the home while men assume the role of breadwinner and can hold leadership positions. Similar to many PICs, women in RMI are under-represented in traditional development and decision-making forums at the local level (Bhandari 2020) and largely absent from police forces. Also, women are commonly victims of gender-

based violence, including rape. The Family Health and Safety Study found 69% of RMI women had experienced some form of gender-based violence in their lifetime (RMI 2014), even though gender-based violence is a criminal offense under the Domestic Violence Prevention and Protection Act (DVPPA), 2011 (UNWomen 2022).

When extreme weather events occur, women have fewer resources with which to respond, such as moving to a safer location or purchasing food or medical supplies. Furthermore, given that women typically occupy a caretaking role and are responsible for the health and wellbeing of their family (Leenders et al 2017), women are more likely to have to care for children or older relatives under intense pressure during natural disasters. For example, the RMI government's assessment of the impact of the 2015-2016 drought found that families reported an increased burden of household responsibilities as a result of the drought (Leenders et al 2017). Because women are less involved in decision-making forums and infrastructure planning, natural disasters may also be more likely to damage their livelihoods. This risk is particularly acute during natural disasters where decisions about distribution of resources, like food and emergency supplies, must be made quickly. If women are traditionally excluded from these decision-making processes, it is more likely that their needs will be overlooked. Researchers have observed in other contexts how rates of gender-based violence increase in the aftermath of disasters, particularly among internally displaced people and refugees (Anastario et al. 2009; UNWomen 2013). This may also occur in RMI with linkages to stress in families and overcrowding in a smaller number of dwellings. Therefore, women are more vulnerable to abuse while simultaneously facing the burden of caring for family members.

Intersecting with women's vulnerability are the risks faced by urban communities. Workshop and focus group participants engaged in the development of this assessment underlined that more vulnerable communities, such as low-income families and recent migrants are likely to live in urban areas. Poor communities are more likely to live in urban areas that are more exposed to disaster risks, which includes low-lying areas, overcrowded spaces, land where mangrove protection has been destroyed, or land that is highly exposed to coastal erosion, and lack the resources to retrofit their homes to prepare for disasters. Vulnerable groups also tend to be younger because of RMI's very young age profile and these younger groups are likely to be unemployed because of a lack of educational opportunities and a dearth of jobs in the formal sector. Also, recent migrants are likely to move into relatives' homes, where relatives may resent the burden migrants are placing on their families leading to a risk of being exposed to domestic violence, particularly in overcrowded living spaces. On the other hand, migrants without family networks risk falling into poverty or hunger because they lack support from family members to access food if they cannot afford to buy imported food. Recent urban migrants may also experience discrimination from existing urban communities, particularly if these recent migrants face the challenges described. Finally, individuals with disabilities are extremely vulnerable to the impacts of natural disasters. Income, gender, disability, and other elements of vulnerability can intersect, leaving some groups to face greater risks from the extreme events that will likely increase in intensity as a result of climate change.

## GOVERNMENT RESPONSES AND COSTS OF DISASTERS

Climate change-induced disasters pose a threat to RMI because of the capacity constraints that inhibit its ability to respond to, and mitigate, their effects. These constraints exist at both the technical and financial level. The government has developed a robust institutional framework to govern disaster risk management and improve capacities[24], but important challenges remain. According to the latest needs assessment in response to the 2015-2016 drought, the ILO (2018) stated staffing challenges and limited personnel, too much overlap within disaster management bodies, gaps in effective linkages between national and local level disaster actors, strained capacities, and continued challenges in real time reporting all inhibit government response. Financially, the government's limited economic base means investment in disaster preparedness and response remains constrained (ibid). The limited financial capacity forces dependence on external partners, such as the US under the COFA agreement, which remains an unsustainable approach for disaster response. Alternative sources of financing, in particular domestic sources, would enhance disaster risk management capacity (ibid).

The annual damages from the effects of flooding and coastal erosion Ebeye Island alone are expected to rise from USD $2.4 million in 2017 to between USD $5.7 and 9.1 million by the end of the century, depending on the underlying emission scenario (Giardino, A. et al. 2018). To withstand future typhoons and the impacts of sea-level rise and its related flooding and inundation, vital infrastructures, such as ports, roads, health centres, and fuel, electricity and water supply need to become more climate resilient (USAID 2018). This would require significant investment and such high costs of disasters undermines the future resilience of the Marshallese government and its ability to rebuild. Plus, as disaster events increase in severity, they will further undermine the government's ability to respond to future disasters because of their impact

[24] See The Disaster Management Reference Handbook (2019).

on the Marshallese economy and strain on disaster-management resources. For example, the 2015-2016 drought in RMI was estimated to have affected 53,158 people, resulted in approximately USD $4.9 million in economic losses, mostly as a result of damage to the agricultural sector, and required USD $3 million to implement recovery. Such economic losses also undermine RMI's economic and fiscal self-sufficiency, which is a priority for the government because it is already highly reliant on foreign assistance. Between 2011-2016, over USD $466 million was spent in aid and development assistance to RMI, USD $314 million of which was provided by the US and remainder was provided by Japan, Taiwan, Australia, and other aid providers, like the Asian Development Bank (Lowy Institute 2021). RMI is likely to become more reliant on external donors in the future as the pressures of disasters and other climate risks increase and, especially, if support from the US government is reduced or expires under the termination of the COFA agreement. In addition to loss of economic self-sufficiency from foreign aid, this also requires coordination with multiple bilateral partners and fulfillment of conditions attached to the utilization of aid funding. Foreign aid is also more likely to be granted in response to natural disasters, rather than in support of mitigation efforts, which only further undermines RMI's ability to implement mitigation and preparedness initiatives.

Taken together, in a regional environment where government revenue is vulnerable to decrease and there are heightened costs associated with the impacts of climate change, governments have to make increasing trade-offs between crucial expenditures, such as social investment and equitable development, and disaster preparedness and/or other forms of response to climate change. This tradeoff obstructs the governments' ability to deliver crucial services, like education or healthcare, which could also have a compounding effect on human capital development. The World Bank argued in a recent report that "efficient and equitable public service delivery [in RMI] in the social sectors is crucial to build human capital" (World Bank 2021d). If those trade-offs of service provision significantly affect those already disadvantaged, in real terms or perceptually, social grievances can increase, which could put pressure on state-society relations.

Given the limited resources available to respond to disasters in combination with the likelihood these resources will be further strained in the future, it is critical the resources are distributed equitably and that they support a well-functioning community. In other contexts, disaster response can cause grievances between community members or between the community and the state. This normally happens when disaster preparedness or response resources are perceived as being distributed inequitably, for example, if support for rebuilding RMI homes is monopolized by certain groups or if certain communities are seen to receive disaster relief in order for the government to gain political favour. Such perceptions do exist in RMI. In some communities that are dominated by one family group, that family would be the first to receive resources in disaster response or preparedness. The risk that resources are distributed equitably may be greater when the government receives a sudden influx of foreign aid in the wake of a disaster. Amid the chaos that surrounds disaster response efforts and the challenge of directing aid where it is most needed, transparency and equal distribution can be especially challenging.

This also highlights how corruption is another risk factor that is relevant in the context of disaster (Freedom House 2020; US DoS 2020). There have been instances of mishandling funds, including foreign aid tied to donor programming, and personal relationships have been cited as informing government procurement and transfers decisions, among others (ibid). Unfortunately, prosecution of high-ranking officials has been rare, so as not to risk undermining the legitimacy of the government at a time when there is a high reliance on it to mitigate and manage climate impacts (ibid). As people become increasingly affected by climate change, if government actors divert funds that are intended for development, the public may become distrustful of government actors and this can seriously erode state-society relations at the detriment of RMI.

In the context of responding to natural disasters and rebuilding infrastructure, the potential for maladaptation also exists. Maladaptation are measures that increase the vulnerability of communities and infrastructure in an attempt to mitigate disasters, which can worsen human security and/or undermine future resilience. Pertinent examples of this risk are the construction of sea walls and land reclamation. In some cases, these measures may be necessary to prevent catastrophic coastal erosion and damage from storm surges. Yet the process of building seawalls and dredging sand for land reclamation can cause severe damage to marine and coastal ecosystems, which threatens coastal fish stocks and, in turn, livelihoods and food security. Sea walls may also damage mangroves, which provide natural protection from flooding and support coastal ecosystems. Sea walls have also proven to be less effective to address sea-level rise and saltwater infiltration. Therefore, the decision to build sea walls or conduct land reclamation should be balanced with these potential negative impacts to ensure adaptive measures do not undermine RMI's resilience in the future.

## PATHWAY 5: Climate change threatens to undermine habitability and regional cooperation

Climate change-induced sea-level rise poses a multitude of challenges for RMI and raises important questions around land loss and habitability. RMI will face some degree of land loss in the increasingly likely medium to higher emission scenarios. However, more pressing in the short-term is climate-change induced recurrent flooding, which threatens the habitability of highly populated areas in the country. This brings to the fore complex and contentious considerations around international relocation and identity. Total mass relocation in the event of severe climate impacts would threaten RMI's current governance system and stability and echo past relocations of Marshallese communities under colonial and Trust Territory rule. Because of these risks, RMI has moved to protect its maritime entitlements and has strongly resisted the prospect of large-scale migration, preferring in-place adaptation. There is deep uncertainty surrounding the potential outcomes of climate change, but they highlight the deep climate security risks RMI faces as a product of its unique location, vulnerability, and history.

### SEA-LEVEL RISE AND LAND LOSS

The threat to land loss can lead to economic issues since conventional interpretations of the United Nations Convention on the Law of the Sea (UNCLOS) suggest that a state's maritime extent is demarcated through baselines taken from the low-water line along coasts or other geophysical features, such as rocks, low tide elevation, and reefs. It can be argued that this interpretation would have implications for a state's claim to its EEZ and extended continental shelf since a rising low water line directly impacts where a state can claim economic jurisdiction, both today and into the future.

However, mindful of these risks and their impacts and in line with regional initiatives and declarations25 and their own laws26, RMI has clarified its positioning that its EEZ and claimed that once its EEZ is demarcated in accordance with UNCLOS, it cannot be revised as result of climate change impacts. Therefore, RMI has been working to delineate and log their maritime extent and continental shelf claims with the United Nations (UN)27. Since all coastal countries will face similar challenges going forward, this approach is unlikely to be challenged and, in fact, may be embraced by other coastal countries. As of today, RMI has submitted their open ocean maritime extent and completed treaties that came into force with the Federated States of Micronesia. A treaty has been signed with Kiribati and Nauru, but at the time of writing this assessment, it had not yet been approved (in relation to Kiribati) or submitted (in relation Nauru) to the Division for Ocean Affairs and Law of the Sea (DOALOS). No treaty has been signed with the US held Wake Islands to the north of the country.

### HABITABILITY AND RELOCATION

Sea-level rise will have profound impacts on human security in RMI well before the result of permanent inundation. The threat of recurrent coastal flooding facilitated by higher sea levels and other wave events, such as high tides or storm swells, is of particular concern. For example, in the RCP8.5 scenario, most of Roi-Namur Island would face annual flooding by 2060. However, even before this, freshwater on the island may exceed the threshold of potability between 2030 and 2040 (Strolazzi et al. 2018). Recurrent and consistent flooding risks makes water undrinkable and worsen the already limited soil quality, which challenges food and water systems and compounds the threat to habitability.

One potential last resort response to these impacts is planned relocation of communities, either to different islands in RMI's atoll or, in the worst-case scenario, to another country. This is a particularly complex prospect for RMI, which has experienced a history of forced relocation through its colonial, and later Trust Territory, relationship with the US. Thousands of Marshallese were relocated from their home islands to the urban centre of Ebeye during the 1940s to 1960s to allow the US to pursue its nuclear weapons and missile testing

[25] PICT have started to address this issue through various declarations, statements and frameworks, with the most recent being the PIF's 'Declaration on Preserving Maritime Zones in the Face of Climate Change-related Sea-level Rise' in 2021. It outlines the Pacific Island Countries' "view on how the UNCLOS rules on maritime zones apply in the situation of climate change-related sea-level rise" and has been endorsed by RMI (Harm 2021).

[26] See RMI Maritime Zone Declaration Act 2016

[27] States are to submit their claims to the Division for Ocean Affairs and Law of the Sea (DOALOS), in line with DOALOS and UNCLOS protocols to be accepted.


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programmes, which resulted in dislocation and cultural loss, as island communities were unable to go back to their ancestral lands (Marcoux 2021). Moreover, the US has conducted reef dredging to produce landfill to raise the three islands it currently leases (including Kwajalein atoll) to better protect US military personnel and equipment from rising sea levels and king tides. This raises the crucial questions about who would be forced to relocate if environmental conditions become untenable, whether Marshallese would be permitted to relocate to higher US-controlled ground, and whether the US would fund similar investments in island-raising across RMI.

Given the relationship between the two countries under the COFA Agreement, if planned relocation were to occur, it would seem most likely that Marshallese would relocate to the US. However, it is unclear how the US, in the context of local anti-immigration sentiment, would respond to this prospect and whether it would put in place the necessary support systems to make any necessary relocation successful. Finally, if this mass relocation was to occur, it would pose a severe threat to the current way of life and governance of the Marshallese people.

In recognition of the many risks associated with this adaptation strategy, the RMI government has strongly advocated against mass relocation and has instead encouraged long-term adaptation options. Casten Nemra, RMI's former Minister of Foreign Affairs and Trade, stated in 2021 "Let's put it that way. It's not an option for us to relocate or become so-called climate change refugees. It's something we don't accept" (Radio New Zealand, 2021). As part of its National Adaptation Plan (NAP), RMI is considering a range of adaptation options to respond to sea-level rise, including land reclamation and elevation, infrastructure retrofitting, and the extreme option of potentially building new islands (Jetñil-Kijiner and Heine, 2020). These options would allow the Marshallese to preserve their cultural identity and attachment to land to a certain extent, but they also come at significant costs. Despite the prioritization of different alternative options, the United Nations High Commissioner for Refugees (UNHCR) recommends that, even though relocation should be seen as a measure of last resort, PICT still plan for relocation as part of their adaptation plans to ensure that any relocation consider human rights principles, consent, meaningful participation, compensation, and an appropriate standard of living in the destination country (Weerasinghe 2014).

RMI is also undertaking other activities to safeguard their statehood and culture. This includes the recently launched Rising Nation Initiative that was jointly launched with Tuvalu, which seeks to establish global declaration and commitment to preserving the resilience and cultural heritage of Pacific atoll states, even if habitability becomes compromised in the future.

## REGIONAL COOPERATION UNDER PRESSURE

Many PICT across the region are experiencing similar climate change pressures as RMI and so PICT have taken a collective and regional approach to working through many of these issues. As a result, an impressive framework of regional organizations and institutions has gradually developed, of which RMI is intimately involved and is an active member state. For example, RMI chairs the Coalition of Low-Lying Atoll Nations on Climate Change (CANCC) to advocate for action to be taken in defense of these nations. This framework helps countries collect data, undertake research, and crucially advocate for the interests of PICT in global fora. This regional approach has been integral to the success the Pacific region has enjoyed in advancing its agenda across several of the policy domains.

In addition, this collectivist approach has helped to mitigate conflict among member states, and, therefore, has an important conflict resolution element. This is not to say disputes between PICT do not happen. As recently as 2021, RMI itself, in conjunction with their fellow Micronesian states, formally requested their secession from the PIF, the premier political body in the region. That was due to a dispute over who should be elected as Secretary General of PIFS, which Micronesian states suggested should be someone from their sub-region[28]. The issue has since been resolved among most of the members but it does highlight that sub-regional dispute nonetheless can challenge the unity so crucial and unique to the region.

That potential for disunity does exist in the Pacific region because it is an environment of increased geopolitical interests, particularly large global powers, namely the US and China, and also Australia and New Zealand, albeit to a lesser degree. These countries are increasingly seeking to assert themselves in the region on several fronts, including economics, politics, geopolitical strategy, and military presence. As these countries become more invested in the region, they may seek to influence the governance of PICT, many of whom are already dependent on foreign aid and international relationships. RMI is in a particularly difficult position given its relationship to, military arrangement with, the US and so RMI is more implicated in these tensions than many PICT. Under COFA, the US has control over RMI's territorial waters for military purposes and has the power to establish military bases in RMI, subject to Military Use and Operating Rights Agreements. If tensions between China, US, and the major regional power, Australia, increased further, RMI would find itself in a critical strategic position as a result.

Ultimately, the potential issue here is that countries may begin to have competing perspectives on regional matters. This could undermine the outsized diplomatic power from which the region has benefitted through its collective approach. The increased focus on hard security concerns also risks deprioritizing the climate-oriented security concerns being advocated for by the region.

However, so far RMI, and the Pacific region more broadly, have been able to utilize this geopolitical struggle to better advocate for, and receive, support in the fight against climate change. COFA negotiations, currently ongoing at the time of writing, will incorporate climate change as an integral component of the new agreement. This has been replicated to varying degrees among the other large Pacific powers, which demonstrates how the region can utilize this moment to encourage global powers to take more effective action to address climate change.

[28] A "gentleman's agreement" was previously understood to signify that the Secretary General rotate their seat among the three sub-regions, namely Melanesia, Micronesia, and Polynesia.

4

# Climate Security Framework Architecture for RMI

## NATIONAL-LEVEL FRAMEWORKS AND POLICIES

RMI has developed a range of policies and strategies to respond to the impacts of climate change, which can also help to address the climate security risks outlined in this assessment. Since 2018, RMI has taken a more purposeful approach to climate change adaptation, beginning with the publication of its Tile Til Eo 2050 Climate Strategy. Building on the 2011 RMI Climate Change Policy Framework, the Tile Til Eo 2050 Climate Strategy focuses on how RMI can achieve climate change mitigation targets of net-zero GHG emissions and 100% renewable energy by 2050 (Government of RMI 2018a). This strategy broadly leaves adaptation measures to other policies, but it does include provision for a more coordinated approach to applying for overseas climate aid and investment.

RMI's approach to climate change adaptation is the focus of its NAP, which has been under development since 2019. The NAP aims to improve on RMI's previous joint adaptation plan, the 2014-2018 JNAP, which failed to deliver against some of its goals because of weak coordination and a lack of funding. This latest NAP will develop short-, medium-, and long-term strategies to adapt to the impacts of climate change, as well as a plan to fund implementation through climate finance. A key feature of the NAP is its "progressive adaptation pathways". These pathways acknowledge the uncertainty inherent in future climate change impacts, particularly beyond 2050, and, therefore, include a range of potential adaptation options based on the level of climate change impacts and the feasibility of adaptation options. Though these documents do not specifically reference climate security, they do contain language that aligns with addressing climate security concerns. A focus on gender and marginalized groups is a prominent component of the NAP, which demonstrates there is intentional attention paid to those who suffer most from climate insecurity.

RMI's National Strategic Plan 2020-2030 (NSP) and RMI's National Environment Management Strategy 2017-2022 contain a range of approaches to address the climate security risks outlined in this assessment. The NSP, which was developed to align with the NAP, identifies adaptation to climate change as a key strategic challenge and describes climate resilience as a cross-cutting issue. Further, they specify the importance of ensuring the security of Marshallese in the face of climate change by referencing the threat climate changes poses to well-being, identity, human rights, and survival (IDMC 2022). The National Environment Management Strategy contains a number of measures to prevent further environmental damage, including protecting existing vegetation and special ecosystems, promoting sustainable agricultural practices, implementing better management of inshore marine environments,

and improving waste management. These activities will help to support ongoing subsistence lifestyles on the outer islands and help to prevent the cascading effects of loss of livelihoods, migration, and increased urban vulnerability.

## REGIONAL AND INTERNATIONAL FRAMEWORKS AND POLICIES

In addition to national-level policies and strategic frameworks, RMI operates within a broader Pacific policy architecture aimed at addressing climate security risks. RMI is a member of the Pacific Community, participates in the Pacific Island Forum Fisheries Agency, and is a member of the PNA. RMI is also a member of PIF, which is distinguished by its focus on regional cooperation. The PIF's Framework for Pacific Regionalism, first endorsed in 2014, set an intention for the group to work more cooperatively to "enhance sustainable and inclusive development" (Pacific Islands Forum Secretariat 2014). Under the Framework, RMI subscribes to the idea of a 'Blue Pacific Continent'[29] identity and collective action.

RMI is also intimately tied to the US through the COFA agreement. The COFA provides some consideration for responding to climate security risks through migration opportunities to the US. The COFA also aims to protect RMI from 'hard' security risks, by designating the US military as the responsible party for the country's defense and security. As of 2023, the COFA is under negotiation for the third iteration of this bilateral agreement.

Given RMI maintains close ties with regional bodies and other states, regional organizations and frameworks represent key mechanisms through which climate security risks can be addressed. The 2018 Boe Declaration on Regional Security describes climate change as the "single greatest threat to the livelihoods, security and wellbeing of the peoples of the Pacific", and, under this declaration, PIF leaders affirmed their "stewardship of the Blue Pacific" and an expanded concept of security that includes human security and the security of the environment and resources.

The 2018 Boe Declaration provides a foundation from which to respond to the myriad human security risks arising from climate change. Added to this the Boe Declaration is the Framework for Resilient Development in the Pacific (FRDP) that was endorsed in 2016 by PIF leaders. The FRDP aims to "reduce [SIDS] exposure to climate and disaster risk, support low carbon development, and improve disaster response and reconstruction" (Pacific Islands Forum Secretariat 2014). To achieve these goals, the FRDP established the Pacific Resilience Facility, which is a fund to invest in adaptation and preparedness to respond to the risks of climate change. Unlike other sources of climate finance, the Pacific Resilience Facility provides full-grant financing with no associated debt. Its goal is to invest in community resilience-building and complement existing finance options. Although the Pacific Resilience Facility fund exists, it does not adequately address the financial need of RMI.

Responding to climate security risks and building resilience requires substantial investment. The International Monetary Fund (IMF) estimates the cost of 'climate-proofing' infrastructure among PICs is between 6.5% and 9% of GDP, annually (Fouad et al. 2021). In a 2016 report, the World Bank estimated that the cost of making coastlines resilient to climate change would be between 1% and 13% of each island's GDP and that this cost would be much higher for atoll island countries, like RMI (World Bank 2016). It should be noted that these estimates were for hard infrastructure investment, which were anticipated to increase with inflation, and do not account for social sectors and other associated costs with infrastructure development.

## ACCESSING CLIMATE FINANCE

To implement adaptation projects, RMI must negotiate the "climate finance architecture", which is a complex system of institutions at the regional and international level that provide and administer funds for climate change adaptation (Thwaites and Amerasinghe 2017). This system includes a range of different stakeholders, including individual donors, like the US or Germany, climate funds, like the Green Climate Fund (GCF) and the Global Environment Facility (GEF), and multilateral institutions, like the World Bank, ADB and the UN.

RMI interacts with this climate finance architecture in several ways, but most often it is the recipient of projects supported by international climate finance and implemented by implementing entities. For example, the Pacific Resilience Project Phase II for RMI, which focuses on improving the resilience of the country's coastal infrastructure, is being funded by a grant of USD $59.9 million from the GCF and the World Bank. RMI relies mainly on multilateral sources of climate finance (Fouad et al. 2021).

RMI has accessed climate finance, in particular since the advent of the GCF in 2015. As of 2020, the GCF had provided USD $78 million to RMI in approved funding across regional and local projects, but prior to the

[29] The 'Blue Pacific Continent' emphasizes how countries in the Pacific are connected by their shared ocean, resources, and heritage, and aim to work together as a region to steward this vast area. The concept is present in the PIF's Framework for Pacific Regionalism and notably in the PIF's 2050 Strategy for the Blue Pacific Continent, released in 2019.

GCF being established, RMI's climate finance equaled only USD $7.9 million between 2010-2014 (Sancken, Jayawardhan, and Wheeler 2021). The climate finance RMI secured over the period 2014-2019, mainly from the GCF, represented more than 40% of its 2019 GDP, which was high among PICs (OECD Climate-related Development Finance Database, 2020). Although the GCF has become the dominant fund in the Pacific region, the GEF continues to fund smaller, shorter-term projects in RMI. Other sources of multilateral finance are available in the form of the Least Developed Countries Fund (LDCF) and the Pilot Program for Climate Resilience (PPCR). Though it is not clear what the role of private climate finance will be in the future, RMI's previous president, Hilda C. Heine, is a member of the Global Commission on Adaptation, which calls for greater private adaptation funding, suggesting RMI could seek to gain these kinds of funds in the future.

Despite these successes, like many developing countries, RMI faces a range of challenges accessing and implementing climate finance for adaptation. First, despite a major push from developed countries to contribute to climate finance funds, there is still insufficient funding available for the scale of the adaptation required. The IMF estimates that the total funding approved by the GCF over its lifetime is under half of the estimated annual funding needs among PICs (Fouad et al. 2021: 8). Second, large volumes of climate finance have traditionally been granted in response to, rather than mitigation of, natural disasters or to address specific adaptation needs, such as improving access to drinking water. Though this funding is necessary, it does not cover large-scale adaptation measures like constructing artificial islands or planning resettlements. Third, given a majority of adaptation funding is likely to flow from multilateral climate funds in the future, RMI is experiencing lengthy delays in the journey from application to implementation. Funding from large funds, like the GCF, is slow to be implemented because it comes with several fiduciary, social, and administrative obligations attached. Finally, RMI lacks the human capacity and technical resources to apply for, and administer, these funds (Government of the Republic of the Marshall Islands Adaptation Communication, December 2020). Therefore, additional technical support and expertise is needed while simultaneously continuing to build the capacity of RMI government to obtain and administer climate finance in an effective and transparent manner.


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**TABLE 2:** Relevant Climate Security Strategies in RMI

| KEY NATIONAL POLICIES AND STRATEGIES | | | |
|---|---|---|---|
| **SECTOR** | **TYPE** | **DOCUMENT** | **DESCRIPTION OF RELEVANT SEGMENTS** |
| **Climate Change** | Strategic Plan | Tile Til Eo 2050 Climate Strategy | • Builds on 2011 RMI Climate Change Policy Framework<br>• Mitigation: Achieving zero greenhouse gas emissions and 100% renewable energy by 2050<br>• Coordination: On applying for overseas aid and investment |
| | Strategic Plan | National Strategic Plan 2020-2030 (NSP) | • Identifies climate change as strategic issue<br>• Recognizes resilience as cross-cutting |
| | NDC | The Republic of Marshall Islands Nationally Determined Contribution (2018) | • Goal to reduce GHG emissions to zero by 2050 at latest |
| | Policy | Adaptation Communication Report (2020) | • Mapping climate risks and adaptation planning and pathways |
| **Disaster and Risk Management (DRM)** | Strategic Plan | Joint National Action Plan for Climate Change Adaption and Disaster Risk Management, 2014-2018 | • Short-, medium-, and long-term strategies<br>• Funding through international climate finance<br>• Progressive adaptation pathways, considering uncertainty, including around relocation |
| | Governance | National Disaster Risk Management Arrangements 2017 | • Streamlining RMI DRM in one document<br>• Harmonizes all RMI disaster risk reduction, management, response, relief, and recovery policies |
| **Environment** | Law | Ministry of Environment Act (2018) | • Establishing an independent Ministry of Environment comprising the Environmental Protection Authority, a newly established Climate Change Directorate, the Director of the National Energy Office, and a newly established National Council on the Environment |
| | Strategic Plan | National Environment Management Strategy 2017-2022 | • Response to results of State of the Environment Report (2021) i.e., rapidly deteriorating environment<br>• Aims to curb migration and other climate effects by protect livelihoods<br>• Livelihood protection:<br>- Protecting vegetation and ecosystems<br>- Promoting sustainable agriculture<br>- Improving inshore marine environments<br>- Improving waste management |
| **Energy** | Strategic Plan | National Energy Policy and Energy Action Plan (2016) | • Outlining vision for revising national energy policy, including reviewing national energy targets |

| KEY NATIONAL POLICIES AND STRATEGIES | | | |
|---|---|---|---|
| **SECTOR** | **TYPE** | **DOCUMENT** | **DESCRIPTION OF RELEVANT SEGMENTS** |
| **Food** | Governance | Food Security Policy (2013) | • Identifying five priority action areas for a food security policy framework |
| | Strategy Plan (draft) | Food Systems Pathway: Transforming the Marshall Islands Food System by 2030 (2021) | • RMI strategy and policy review for the United Nations Food System Summit 2021<br>• Identifying five priority areas for building a sustainable food system by 2030 |
| **Water** | Strategic Plan | National Water and Sanitation Policy & Action Plan (2014) | • Master plan mapping of policy areas for intervention |
| **Waste** | Strategic Plan | Majuro Atoll Waste Company Solid Waste Management Plan for Majuro 2019 – 2028 (Action Plan: 2019-2023) | • Central government sanctioned local plan for waste management |
| | Strategic Plan | Kwajalein Atoll Local Government Kwajalein Atoll Solid Waste Management Plan 2019 – 2028 (Action Plan: 2019-2023) | • Central government sanctioned local plan for waste management |
| **Gender** | Governance | Marshall Islands Gender Equality Overview: Key Statistics for Informed Decisions-Making (2020) | • Providing data on gender dynamics |
| | Policy | National Gender Mainstreaming Policy Republic of the Marshall Islands (2016) | • Comprehensive document defining goals, objectives, and outcomes of RMI gender mainstreaming including a policy strategic plan of action |


HARDWARE

5

# Entry Points and Suggested Actions

The climate-related security risks outlined in this assessment illustrate the scale of the threat climate change poses to RMI's security. Implications are already beginning to manifest and they will continue to intensify without concerted action. Impacts on land, food, and water security are leading to the worst outcomes for Marshallese and residents, as livelihoods, health, and well-being are being negatively impacted. The RMI Government is already being pulled in various policy directions with limited financial reserves and so it is at risk of being unable to cope as the costs of addressing5 climate change needs intensifies and effectively provide necessary public services. Improving development, ensuring adequate disaster relief, and improving overall well-being are critical actions to avoid worsening disenfranchisement or grievances. These risks undermine social cohesion and state-society relations and exacerbate trends that already put pressure on social systems, such as increased unplanned mobility, rapid urbanization, and family stressors, like domestic violence. Though the Marshallese do not have a history of violent conflict, these threats need to be taken seriously as the risks to human security substantially increase social tensions.

Undertaking climate security risk assessments is the first step to identify climate security issues and also how to manage them. Entry points and suggested actions listed below are aligned to the 2018 Boe Declaration and supports the implementation of its Action Plan, in particular Strategic Area 1: Climate Security.

Entry points and suggested actions provide actors with concrete support in two main ways: helping to outline how interventions can address climate security concerns and helping to outline what activities can be implemented. With this support, Marshallese actors are given a framework and starting points to ensure that the security implications of climate change are mitigated and prevented through a more targeted and comprehensive approach. Suggested actions are the main vehicle through which concrete examples will be provided. However, they are not meant to make up an exhaustive list nor be exclusively prescriptive. Many of the suggested actions apply across sectors and can be used to address the overlapping and interacting risk pathways. These entry points and actions are meant to highlight activities needed to address future challenges that actors can adopt, adapt, or emulate in their own work. Therefore, the proceeding entry points are intended to provide guidance on how and what to target with regards to climate security based on the risks identified in the five pathways for RMI and to highlight which pillars of Strategic Area 1 of the Boe Declaration are advanced as a result.

## ENTRY POINT 1: Target vulnerable communities while ensuring no one is left behind

The consequences of climate security risks affect some populations and groups more than others. Therefore, interventions, whether government-, community-, or internationally led, should accommodate the groups most vulnerable. Groups for consideration include: women and girls, persons with disabilities, youth, recent migrants, those unemployed, those under employed, those who lack access to mobility options, and people living on remote outer islands. Intersectionality of multiple variabilities can contribute to compounded vulnerability. Prioritizing vulnerable groups can help to alleviate some of the worst impacts of climate security risks and can protect against increasing social or political tensions that arise from grievances.

### THIS ENTRY POINT HELPS ADVANCE AND IMPLEMENT:

**Boe Declaration Action Plan Proposed Action 1 (ii):** maintaining the dignity and wellbeing of our communities in the face of the impacts of climate change

**Suggested actions to help address climate security risks:**

**Action 1.1:** Ensure disaster management and adaptation actions reach the most vulnerable and/or marginalized. This can include:

- In line with the RMI National Gender Mainstreaming Policy (2015) to better integrate women into decision-making and planning processes at all levels, involving women in disaster risk reduction and climate change adaptation planning. This is to ensure the potential impacts on and perspectives of women are considered and their voices are included in the design and implementation of initiatives.
- Making sure that support in disaster management and disaster resilience, including disaster coordination, data collection and analysis and early warning systems, integrate conflict sensitive approaches and doesn't exacerbate existing vulnerabilities.
- Specific actions to provide livelihood support, such as access to financing, training, and capacity building for those who are particularly vulnerable and affected by climate security risk.

**Action 1.2:** Encourage the continued development of neighboring island communities to build resilience and ensure mobility is a choice. This can include:

- Investing in economic development and resilience in neighboring islands with a focus on transport and water infrastructure, in line with RMI National Strategic Plan 2020-2030 'Outer Island Development' objective.
- Supporting to improve resilience against disasters and climate security risks by providing contextualized guidance and ongoing training to disaster committees and community members, in addition to enhancement of early warning capacities and information management systems.
- Providing accessibility resources to address current community needs to climate security risk.

**Action 1.3:** Promote gender equity, including the women, peace and security (WPS) agenda, through policies and programmes that advance action on gender issues related to climate security risks, especially on gender-based violence. This can include:

- Reviewing existing climate-related policies and plans to ensure they are inclusive of gender considerations specific to the RMI climate security risks.
- Devising and implementing strategies to challenge negative and harmful practices associated with gender roles that prevent participation in formalized decision-making.
- Extending the 2015 National Gender Mainstreaming Policy's 'Priority Outcome 3: Elimination of GBV and protection for survivors' by ensuring that GBV does not increase following natural disasters.
- Providing legal and holistic health support and protection for community members experiencing GBV.
- Undertaking information and education campaigns that are inclusive and create awareness to inform on support services available.

**Action 1.4:** Foster inclusive urban development processes that simultaneously build resilience and social cohesion at the community level. This can include:

- Ensuring efforts to improve the resilience of urban infrastructure extends to all while continuing to focus on most vulnerable groups.
- Ensuring meaningful participation of marginalized groups in development processes and actions towards resilience and social cohesion, for example, by implementing community cohesion programming centered on diversity.

**Action 1.5:** Reinforce and expand opportunities for safe and secure migration. This can include:

- Better support of the integration of rural-urban and international migrants into their new environments through community initiatives that build social cohesion.
- Providing targeted and enhanced capacity building initiatives to exposed and involved communities and security agencies on the importance of well-planned and inclusive migration processes.
- Working closely with key landowners and other stakeholders to discuss future challenges around land tenure and develop arrangements that can simultaneously protect rights of land holders and provide more tenure security for migrant communities. There can be an emphasis on ensuring dispute mechanisms for migrants and landowners are in place and accessible to all concerned parties and for shifting homes away from disaster prone areas.

## ENTRY POINT 2: Improve knowledge, capacities, and communication to inform action

To confront the security risks posed by climate change, policymakers in RMI, regional and international actors, and community members need a comprehensive understanding of climate security risks. Although the 2018 Boe Declaration has raised the profile of climate security issues across the Pacific region, knowledge of these issues is still limited. Such a lack of knowledge makes it difficult to integrate climate security factors into policies and planning. In practical terms, this could mean local stakeholders may not apply for a relevant piece of climate finance or fail to include security considerations in the design of policies.

Therefore, there is a need for professional development on climate security at all levels of public services operations, as well as within NGOs and the private sector. For example, police and other people working in the RMI justice system may lack awareness of how climate change increases stress among communities and the resulting implications for domestic violence and conflict within communities. Community leaders also require an understanding of climate security issues to help to mediate social tensions to limit conflict.

Contextualized information needs to be accompanied with comprehensive, measured, and cautious communication to ensure that this knowledge is disseminated to relevant parties, such as practitioners, regional actors, government representatives, community leaders and community members, including marginalized groups, and research and academia actors. Communication should be cautious, measured, and based on scientific evidence, to not reinforce fatalist and harmful 'sinking nation' narratives, which may undermine the agency of affected communities. Overly fatalist narratives can increase feelings of hopelessness, which severely impacts the mental health and wellness of citizens. Instead, communication needs to underline the risks that climate change poses for security and stability while simultaneously acknowledging the resilience of islanders and their communities and providing a positive vision of the future.

### THIS ENTRY POINT HELPS ADVANCE AND IMPLEMENT:

**Boe Declaration Action Plan Proposed Action (iii):** Understanding and contextualizing the impact that climate change will have on the regional security landscape through its interaction with human security and conflict through research and evidence-based knowledge products.

**Boe Declaration Action Plan Proposed Action (v):** Strengthening national and regional efforts in support of the implementation of the Paris Agreement, including progressing work around National Determined Contributions (NDCs) and access to climate and disaster risk finance.

**Boe Declaration Action Plan Proposed Action (vi):** Promoting the FRDP as supporting national efforts to incorporate climate and disaster risk considerations into development plans and budgets at the national,

sectoral and sub-national levels and to effect the necessary systemic changes to facilitate these and other relevant risk governance initiatives.

**Suggested actions to help address climate security risks:**

**Action 2.1:** Improve data on climate-related security risks. This can include:

- Conducting further research, improving data availability, and developing higher resolution climate models to improve the evidence base for future climate risks and their impacts on livelihoods and the islands' habitability.
- Where necessary, conducting sector and thematic climate security assessments to identify and develop sector- and thematic-specific responses.
- Reviewing and revising this assessment on a regular basis and considering testing the findings by stress testing responses identified through scenario activities.

**Action 2.2:** Build specific climate security capacities at local and national levels. This can include:

- Developing a climate security capacity building programme for RMI policymakers, civil society, community members, marginalized groups, and other stakeholders involved in climate security related projects and service provision. This programme should be tailored to RMI's cultural context and be accessible to a range of stakeholder groups, in particular youth and women leaders.
- Undertaking peer-to-peer knowledge exchange with other PICs by involving respective climate-security focused departments and utilizing CROP agency forums, UN agencies, or other opportunities where applicable.

**Action 2.3:** Develop and expand comprehensive climate security risks communication strategies that can reach a multitude and range of relevant stakeholders. This can include:

- Incorporating new multimedia materials that are viewable across multiple formats.
- Focus on capturing national or local examples of resilience in confronting climate security risks through participatory methods that include marginalized groups.

**Action 2.4:** Better incorporate climate security and its operationalization across policies and planning. This can include:

- Better coordination for climate security action at the national level. Given climate security is a cross-cutting issue and typically does not have an institutional home, a cross-sectoral coordination structure, such as a working group, can be an effective tool to coordinate and spur action across government.
- Ensuring that climate security is mainstreamed across, and integrated into, key policies and plans, in particular the National Adaptation Plan.

## ENTRY POINT 3: Avoid mal-adaptation and mitigation through climate- and conflict-sensitive approaches

Mitigation and adaptation activities are critical to respond to the impacts of climate change and prevent damage to human security on RMI. However, if done incorrectly, well-intentioned adaptation measures could have negative consequences, especially for conflict and the environment, that are both seen and unseen. To avoid maladaptation, climate change mitigation and adaptation initiatives should be cognizant of RMI's unique history, culture, and political and social context. Wherever possible, decision-makers should draw on traditional approaches to manage environmental and social risks because they are familiar to communities and encoded centuries of learned resilience. Adaptation approaches should also seek to empower vulnerable groups. Mitigation and adaptation actions also risk creating maladaptation if climate finance and adaptation projects create structures of dependence on foreign aid and/or foreign support. Wherever possible, projects should be designed to support existing grassroots initiatives and be implemented by local actors. Additionally, tracking the success and/or failure of adaptation projects and increasing transparency about how aid money is distributed can prevent the perception that international support is unfairly distributed to more powerful or privileged groups in RMI.

The following proposed actions complement the existing adaptation priorities and actions for RMI as outlined in national strategies and policies, and specifically focus on how to avoid exacerbating climate security risks and how to create synergies between adaptation, livelihoods, and conflict prevention.

## THIS ENTRY POINT HELPS ADVANCE AND IMPLEMENT:

**Boe Declaration Action Plan Proposed Action (ii):** Maintaining the dignity and wellbeing of our communities in the face of the impacts of climate change

**Suggested actions to help address climate security risks:**

**Action 3.1:** Ensure links between climate, gender, conflict-sensitivity, and peacebuilding approaches are analyzed through dedicated analysis and that emerging issues are properly addressed and integrated into policy development, policy implementation, and programmatic interventions.

**Action 3.2:** Reinforce thorough reviews of ongoing and planned adaptation initiatives with a particular focus on identifying possible social and ecological implications. This can include:

- Screening, monitoring, and evaluating projects to assess the potential negative impacts of the implementation of adaptation projects or the use of climate finance.
- Including risk mitigation measures that address possible risks of emerging unsustainable practices in all projects designs, including, for example, through grievance redress mechanisms. This is particularly relevant in the context of infrastructure development and disaster response.

**Action 3.3:** Ensure extensive participation of community groups when undertaking sensitive adaptation measures, for example, land reclamation and community relocation. This can include:

- Improving the transparency and good governance of adaptation and mitigation projects at the local level.
- Promoting continuous and comprehensive communication by publishing and communicating information about project goals, funding, and outcomes in culturally representative and contextualized means.
- Developing dialogue processes for major adaptation initiatives, especially for initiatives that may include negative impacts and risks, such as sea walls or coastal reclamation. Dialogue approaches must be culturally sensitive and should be designed to include representatives from a range of community groups to help to balance the benefits and long-term risks. Special consideration should be given to the continued meaningful inclusion of women during these discussions given their central role in land tenure throughout the country.

**Action 3.4:** Develop integrated, cross-sectoral projects that link livelihoods, climate change adaptation, and conflict prevention. In particular, these projects should try to link livelihoods and adaptation action with actions that strengthen social cohesion by considering potential future threats, improving conflict prevention and management, and addressing marginalization and inequalities.

## ENTRY POINT 4: Promote and work with local knowledge and approaches to build and shore up resilience

Given RMI's long and shared history with its environment, there exists a breadth of knowledge and experience to better manage, mitigate, and cope with a changing climate and environment. Utilizing this knowledge will help support resiliency on various fronts, including food and water insecurity, disaster management and preparation, and the resolution of conflicts stemming from stress on livelihoods and resources. Areas of particular focus for utilizing this knowledge should include agricultural practices, ecological regeneration and preservation, and traditional forms of community relations, especially in conflict resolution. However, certain cultural practices also need to be cognizant of harmful biases that perpetuate vulnerabilities of certain groups. Reforming and revising some of these practices in light of climate change and climate security risks would be useful in supporting community resilience broadly.

Therefore, customary approaches and knowledge should be front and center in decision-making related to addressing climate security risks. This is especially true around economic diversification activities, disaster management and response, resilient agriculture, building codes, and conflict management approaches. Furthermore, doing so can help reinforce agency and ownership over activities and approaches, which can help lead to better overall results. Though knowledge sharing is an ongoing challenge due to outward migration from neighboring islands, knowledge must continue to be passed down to the next generations to encourage the continuation of resilient activities that have been developed over long periods of RMI's history.

## THIS ENTRY POINT HELPS ADVANCE AND IMPLEMENT:

**Boe Declaration Action Plan Proposed Action 1 (ii):** Maintaining the dignity and wellbeing of our communities in the face of the impacts of climate change.

**Suggested actions to help address climate security risks:**

**Action 4.1:** Identify and scale up customary and traditional practices that have proven effective against climate change. This can include:

- Using traditional building materials and/or methods that are better able to withstand climate hazards.
- Harnessing nature-based solutions around sea-level rise and coastal erosion.
- Encouraging the planting of agricultural products better equipped to withstand climate impacts, especially for neighboring island communities who are most susceptible to price shocks.
- Reinforcing traditional conservation techniques and crop diversification in order to move away from import dependency and in support of enhanced food security.

**Action 4.2:** Foster and strengthen knowledge transfer and exchange. This can include:

- Focusing on generational exchange by integrating traditional practice into school curriculums, community level workshops, and mentorship programmes.
- Reinforcing spaces for knowledge exchange to improve linkages with central government and more traditional actors, such as chiefs, councils, and religious figures.
- Integrating local knowledge with scientific evidence to inform policies and approaches like the Reimaanlok Conservation Framework, which brings together community groups and their local knowledge with scientific actors in Local Resource Committees to support community-led resource management for enhanced conservation.

# ENTRY POINT 5: Improve land, water, and food security

The interaction between water and food security, agriculture, and health implications are some of the most pressing issues facing communities in RMI, in particular on the remote islands. In all instances, these compounding climate security risks are highly relevant in terms of insecurity and instability and must be targeted with a broad range of interventions. This means not only adopting strategies and activities which bolster against land insecurity or ameliorate food and water insecurity, but also ensuring conflict mitigation measures are in place to allow for conflict resolution that can result from these compounding risks. Activities need to integrate climate change adaptation, livelihoods, and insecurity, in an holistic approach, providing space for conflict management and prevention. RMI experts confirm that initiatives related to water management, agricultural development, protection of fisheries, and ensuring access to food are top priorities to address the climate security risks discussed in the five pathways of this assessment.

## THIS ENTRY POINT HELPS ADVANCE AND IMPLEMENT:

**Boe Declaration Action Plan Proposed Action (ii):** Maintaining the dignity and wellbeing of our communities in the face of the impacts of climate change

**Suggested actions to help address climate security risks:**

**Action 5.1:** Increase food security by focusing on local and traditional knowledge and practices and by adopting nature-based solutions where possible. This can include:

- Focusing on initiatives to protect against marine and terrestrial biodiversity loss. This can include better understanding the impact of temperature increases and ecosystem changes on key subsistence crops in RMI, including breadfruit and copra.

- Targeting activities that contribute to reversing ecosystem degradation.
- Continuing to invest in sustainable agricultural approaches, including developing and cultivating resilient crop varieties and promoting community farming. Where possible, doing so by utilizing intergenerational practices and knowledge transfer.

**Action 5.2:** Increase water security with a focus on equitable distribution. This can include:

- Continuing to retrofit all buildings with water catchment and storage systems, especially in urban areas, while supporting community-level distribution mechanisms by formalizing water sharing practices.
- Improving public awareness around water conservation in preparation for drought.
- Improving desalination capacities and providing technical maintenance training and resources to ensure their long-term sustainability and maintenance, while working in tandem with public water utility companies.
- Ensuring best practices and training on water quality are in place to ensure that water catchment systems are not contaminated or lead to public health concerns.

**Action 5.3:** Reduce land management pressures, including those resulting from misalignment between traditional and state approaches. This can include:

- Ensuring empowerment of women, who are fundamental to traditional land management, are well represented in state land management authorities, for example, in the Land Registration Authority and relevant courts.
- State actors consulting land holders to ensure legislation reflects the different forms of land ownership when reviewing or enacting new legislation governing land usage
- Exploring and opening dialogues through the climate security risk lens on land conflict management structures, including traditional land conflict resolution practices, the judicial process, community members, and residents.
- Developing a better system to align formal processes with traditional land tenure arrangements, such as registration of customary lands.

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