Disaster Risk Reduction in the Republic of the Marshall Islands

Status Report
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About this report

The disaster risk reduction status report provides a snapshot of the state of disaster risk reduction in the Republic of the Marshall Islands under four priorities of the Sendai Framework for Disaster Risk Reduction 2015-2030. It also highlights progress and challenges associated with ensuring coherence with key global frameworks and provides recommendations for strengthening disaster risk management governance by government institutions and stakeholders at national and local levels.

This report was prepared by the United Nations Office for Disaster Risk Reduction (UNDRR) with support from the Asian Disaster Preparedness Center (ADPC) and Tonkin + Taylor through country consultations and a desk review of key documents, including legal instruments and disaster risk reduction frameworks, policies, strategies, and plans.

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This report serves as a reference document for implementing and monitoring the Sendai Framework. The findings, interpretations, and conclusions expressed in this document do not necessarily reflect the views of UNDRR or the United Nations Secretariat, partners, and governments. They are based on the inputs received during consultative meetings, individual interviews, and the literature reviews conducted by the research team. The presentation of the material in this report concerning the legal status of any country or territory or its authorities or concerning the delimitations of its frontiers or boundaries, as well as the text and the tables, is intended solely for statistical or analytical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. While every effort has been made to ensure the accuracy of the information, the document remains open for any corrections in facts, figures, and visuals.
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(GermanWatch, 2021)

**Climate Risk Index**
- Rank 172, Score of 164.83*

**INFORM Risk Index**
- Rank 95 / Medium Risk**

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* Climate Risk Index of 2021 analyses the extent to which countries have been affected by weather-related losses between 2000-2019 (GermanWatch, 2021).

** INFORM risk index is a global tool that measures the risk of humanitarian crises and disasters based on three dimensions: hazard & exposure, vulnerability, and lack of coping capacity. (INFORM, 2021)
1. Introduction

The Republic of the Marshall Islands (RMI) is located north of the equator in the Pacific Ocean. The country consists of 29 atolls and five coral islands, 24 of these islands are inhabited. In total, the land mass makes up 181 km² but the islands are scattered among nearly 2 million km² of ocean. The capital, Majuro, is in Majuro atoll, and, as of the 2011 census report, is home to over half of the population. [Republic of the Marshall Islands and SPC, 2012]

Over the last two decades, the RMI has experienced strong economic growth and the county’s public debt has declined. The impact of COVID-19 has been severe, however, with real gross domestic product (GDP) contracting in 2020 and 2021. The largest contributor to the economy is the public sector, which accounts for 40% of the nation’s gross domestic product (GDP), and grant contributions from the United States under the Compact of Free Association (COFA), which accounted for 15.4% of GDP in 2019. Moreover, the United States missile test site on Kwajalein atoll contributes about 20% to national GDP. The Marshall Islands is highly reliant on its fishing sector, particularly fishing license fees, which contribute approximately 10% of GDP. The economic output of the agricultural sector has been steadily declining due to limited land availability and a reduction in soil fertility. [IMF, 2021]

The average annual temperature and monthly mean temperature are generally consistent at around 27°C, with a maximum daily variation of about 7°C. There is variable rainfall throughout the year, with two distinct seasons: a dry season between December and April and a wet season between May and November. Rainfall also varies between the drier northern islands and the wetter southern islands. The climate is highly influenced by the El Niño-Southern Oscillation, with higher rainfall during La Niña events compared to El Niño events. Figure 1 shows the variation in rainfall between the El Niño and La Niña events. This variability in rainfall can result in droughts. The Marshall Islands are also highly vulnerable to coastal hazards, such as tropical storms and typhoons, storm surges, large swells, which can result in coastal erosion. The RMI has a relatively low climate risk ranking according to the Global Climate Risk Index, which measures the fatalities and economic losses from extreme weather events – in 2019, RMI was ranked 130th globally for impacts of climate related extreme weather events. [Australian Bureau of Meteorology and CSIRO, 2011] [Republic of the Marshall Islands, 2011] [Center for Excellence in Disaster Management & Humanitarian Assistance, 2019] [World Weather & Climate Information, 2021]
The RMI has high levels of marine biodiversity. The marine environment is made up of over 1,000 species of fish, 1,600 mollusks, and 250 species of algae and coral. There is a concern that offshore fisheries may be declining as most tuna species have reached their maximum sustainable yield due to a high increase in tuna fishing. The terrestrial ecosystem provides habitat for coastal and marine species, such as birds and land crabs that rely on terrestrial habitat for mating and foraging. [Office of Environmental Planning Policy Coordination, 2017]

In line with the Sustainable Development Goals (SDGs) and the Paris Climate Agreement, the RMI is presently pursuing energy independence. The RMI has committed to 100 percent renewable energy generation and net zero emissions by 2050. The RMI has also recently published its 2020-2030 National Strategic Plan, which prioritizes climate change adaptation, policy coherence and coordination between local and national governments, and improvement of health and education access. [NDC Partnership, 2017] [Republic of the Marshall Islands, 2020]

### 1.1 Demographic Characteristics

The latest Marshall Island census was completed in 2011 and reported a total population of 53,158, of which 51.2% of the total population are male. The population increased by 4.6% since the previous census in 1999.

Nearly 73.8% of the total population live in the overcrowded urban areas of Majuro atoll and
Kwajalein atoll, approximately 52% of the population residing in Majuro atoll and 21.5% living in Kwajalein atoll. The remainder scattered on more than twenty populated atolls. The annual population growth rate for both of these atolls has been decreasing recently due to emigration – the annual growth rate of Kwajalein was 1.5% between the 1988 and 1999 censuses and the annual growth rate between the 1999 and 2011 censuses was 0.4%. [Republic of the Marshall Islands and SPC, 2012]

In the 2011 census, 39.9% of the total population was below the age of 15, which is a decrease from the 1999 census where 43% of the total population was below the age of 15. In rural areas, 46.1% of the population is below the age of 15 due to a higher fertility rate. Due in part to internal migration of the working age population, 58.2% of the population between the ages of 15 and 59 are living in urban areas.

An estimated 7.9% of the population is under the poverty line. Poverty varies by the geographic location, education level and labor market characteristics of the household. People living in rural areas are much more likely to be poor than people in urban areas. The highest rate of poverty is for those in rural areas at 22.1%, but much lower in urban areas at 2.3% in Majuro and 5.8% in Kwajalein. The RMI had an HDI of 0.704 in 2020, with an average life expectancy of 74.1 years and 10.9 mean years of schooling. Education in the Marshall Islands is free and compulsory from ages 6 to 18. Moreover, 13.1% of men have a college education compared to 9.9% of women. [Republic of the Marshall Islands Environment, 2012] [Republic of the Marshall Islands, 2021] [UNDP, 2020]

There are no significant minority groups in the Marshall Islands though there are residents from other Pacific Island states, the United States, Taiwan, and the Philippines. There is substantial migration to the United States where many migrants remain marginalized. Approximately one third of the Marshall Islands’ citizens live in the United States, with many living in the state of Arkansas. The disability prevalence in RMI is 11.7%, with 6,210 people disabled. [UNDP, 2020] [Minority Rights, 2018]

While the representation of women in politics since independence has been low, in 2016 the Marshall Islands elected its first female president, Dr. Hilda Heine. Dr. Heine is the first female president among Pacific Island Countries (PICs). Moreover, two out of 33 (6.1%) MPs were women as of January 2022. The Marshall Islands is a matriarchal society in which land rights are traditionally inherited down the matrilineal line. This tradition, however, is changing as the population and the rate of urbanization increase. [UN Women, n.d.] [Pacific Women in Politics, n.d.] [PacWIP, 2021].

The RMI has ratified several Human Rights Conventions, including the Convention on the Rights of the Child and the Convention on the Elimination of All Forms of Discrimination against Women, but gender outcomes remain poor. Men dominate formal employment, with 66% of men considered to be economically active compared to only 33% of women. This disparity is also present for unemployment rates, with women having a national average unemployment rate of 37% compared to 28% of men. Gender-based violence is also a concern with 3 in 10 Marshallese women having experienced physical violence and 22% of women reporting that they have experienced physical violence in the last year. The most common offender of physical violence, in 72% of cases, is the husband or partner. [Pacific Women in Politics, n.d.] [UN Women, n.d.]

### 1.2 Economic Impact of Disasters

There have been several disasters caused by natural that have affected the RMI economy. With the RMI’s remote geography, small economy and limited production capacity, the economy is highly vulnerable to hazards. According to the International Monetary Fund’s report on the economic impact of disasters in the Pacific Island Countries, the Marshall Islands has a 16.2%
likelihood of a disaster being caused by a natural hazard per year. It is estimated that a disaster caused by natural hazard would cause an average of 10.5% of the population being affected. [Lee, Zhang, & Nguyen, 2018]

Between 1998 and 2008, there have been a total of 18 disasters that have affected 12,700 people with an estimated direct cost of these events being USD $317 million. These disasters range from slow-onset disasters, such as droughts affecting agricultural production, to sudden disasters, such as storm surges, tsunamis and typhoons, that damage infrastructure. From 1995-2015, tropical cyclones have caused an average of USD $63 million in damages per event. The average annual loss from tropical cyclones, earthquakes and tsunamis is estimated to be $3.1 million USD. [World Bank, 2015] [Republic of the Marshall Islands, 2016]

The Marshall Islands have had several droughts that have resulted in significant economic impacts. In 2015-2016, a drought impacted 21,000 people and reduced GDP growth by 0.4%. Figure 2 shows the fiscal year GDP growth that was projected and what actually occurred during the drought. This drought resulted in particularly severe impacts to the agricultural sector, with the production of breadfruit decreased by 42% and coconut decreased by 40% and total losses estimated to be USD $1.7 million. [Leenders, Holland, & Taylor, 2017]

Flooding events also cause substantial economic impacts, with past events damaging roads, houses and other infrastructure. A State of Emergency was declared in 2008 when storm surges from a tropical depression impacted Majuro and Ebeye, leading to severe damage to roads, homes, and cemeteries (with the latter resulting in sanitation concerns). It was reported that at least 600 people had to leave their homes and stay in designated shelters, churches or with other family members. In 2013, moreover, another flood resulted in a storm surge that resulted in seawalls breaking in multiple locations, flooding Majuro atoll and causing the airport to close. [SPC, 2012] [The Sydney Morning Herald, 2018] [World Bank, 2015]

1.3 Social Impact of Disasters

The distinct vulnerabilities of individuals or communities, including gender, age, disability and other socio-economic characteristics, are key determinants of risk. These shape how disasters are experienced, and the recovery from disaster impacts. Having limited access to public information broadcasts and communications also increases vulnerability to disasters.

Urbanization, inequality, and societal changes have affected the welfare of households, resulting
in higher vulnerability to natural disasters. Traditional community-based social protection systems have been eroded in past decades, especially in more urban areas. For instance, the RMI is traditionally a matrilineal society in which women have considerable rights to land, but women are now less likely to live on their own land and husbands are less likely to move to join their wives’ families after marriage. This may have increased the vulnerability of women to disasters caused by natural hazards due to reduced adaptive capacity from declining authority, power and access to resources. [UN Women, 2011]

In the 2015 - 2016 drought, there were over 21,000 people affected due to reduced water security, with particular impacts to women and children. During this drought, some urban households needed to wait long periods to collect water from overcrowded filling stations. Women were often responsible for collecting water, which increased their vulnerability. A RMI Family Health and Safety Study showed that 65% of women believed it was acceptable for their partner to beat them if they did not complete their chores – the lack of water access, combined with the increased time burden for both men and women to secure water for household use, potentially exacerbates gender-based violence. The drought also affected students, as many schools closed due to lack of drinking water and reduced access to sanitation. When the school re-opened, many students could not attend as they were needed by the family to help collect water for their homes [Leenders, Holland, & Taylor, 2017].

Flooding events also have a large impact on the well-being of the Marshallese. In 2014, due to flooding from king tides, a state of emergency was declared. In Majuro atoll, a total of 70 homes were damaged and 940 people had to evacuate. This resulted in damage to infrastructure and sanitation facilities, which caused sewage to spread to many locations causing health problems. This event impacted many households, but vulnerable populations were particularly affected – as these households often lack the resources needed for post-disaster recovery. [UNOCHA, 2014]

The nuclear testing that took place in the RMI has also increased vulnerability to natural disasters. The US government tested a total of 67 nuclear weapons over a period of 12 years starting in 1946 on two atolls: Bikini and Enewetak. The nuclear tests caused unprecedented environmental contamination and long-term adverse health impacts for the people living on Bikini and Enewetak, as well as the people of Rongelap and Utrik due to radioactive fallout from the testing. It has been found that levels of radioactivity on all four atolls remains high, and there are also concerns about the stability of the Runit Dome on Enewetak atoll. The dome is the crater of one of the tests where contaminated waste and debris were stored and covered by a layer of concrete. With sea level rise, the dome may be damaged and radioactive leaks could occur. These nuclear tests destroyed or irradiated much of the highest ground in the country, reducing land availability and increasing vulnerability to sea level rise and disasters caused by natural hazards. Marshallese from the islands where testing took place are especially impacted, as these communities have relocated to smaller, lower islands and have limited access to resources and economic opportunities. [Bastian, 2017] [Geggel, 2019] [Abella, Molina, Nikolić-Hughes, Hughes, & Ruderman, 2019]
2. Disaster Risk Profile

2.1 Governance and Institutional Mechanism

There are several institutions and stakeholders that are responsible for Disaster Risk Management (DRM) in the RMI [SPC, 2014].

The National Disaster Management Office (NDMO) is responsible to the Chief Secretary for the identification, development, and implementation of disaster management programs, and for the maintenance, testing, and review of disaster management plans and operational procedures used within RMI. The NDMO Strategic Plan 2020-2023 outlines three priority areas to strengthen DRM.

- Priority Area 1: Resilience to Disasters and Risks. Strengthening resilience and disaster management in the neighboring islands.
- Priority Area 2: Preparedness, Response, and Recovery. National DRM arrangements and structure

The National Disaster Committee (NDC) was established under the Disaster Assistance Act in 1994. The NDC is comprised of the Chief Secretary as Chair, with other Government Secretaries as representative members. The NDC's role is to ensure multi-stakeholder coordination and collaboration across government ministries for all disaster-related management activities.

The Climate Change Directorate (CCD)'s role is to:

- (i) act as an advisory body to the Office of the President, Cabinet, the Ministries and government agencies on environmental planning and policy matters – including issues related to climate change;
- (ii) be the focal point in coordination, management and implementation of international environmental projects/programs; and,
- (iii) act as the national point of contact in all negotiations with external partners and lending institutions on programs and/or projects of assistance. OEPCC prepares strategies to mitigate the negative impacts of climate change and prepare adaptation plans. It has the domestic climate change coordination role and is Secretariat to the National Climate Change Committee (NCCC).

The Office of the Chief Secretary (OCS) reports to the Office of the President and is responsible for the functioning of government ministries. OCS also houses the national Disaster Management Office, which is responsible for disaster preparedness, risk reduction and response, and the National Disaster Committee (NDC). OCS also has administrative responsibility for Climate Change Directorate (CCD) and the Economic Policy, Planning and Statistics Office (EPPSO), and the Chief Secretary chairs the NCCC.

The RMI has committed to further developing and enhancing the existing DRM and climate adaptation framework to build upon existing frameworks and strategies, including through the development and implementation of the National Adaptation Plan (NAP). Other initiatives underway include the integration of DRM into development planning, protection of traditional culture and ecosystem resources, and pursuing facilitative, stakeholder-driven approaches to improve resilience. RMI has several governance and institutional mechanisms, including legislative and regulatory approaches, to support these aims. Key frameworks are listed below. [Manley et al., 2016]

NDMO Strategic Plan 2020-2023 outlines the actions, outcomes, and performance measures to
achieve a safer and more resilient nation and communities. These outcomes are focused on strengthening reporting, preparedness and planning, resourcing, legislation, and policy and procedures.

National Climate Change Policy Framework (NCCPF) sets out the Government of RMI’s commitments and responsibilities to address climate change. This policy framework is intended to guide the development of several measures, including those related to adaptation and DRM, to respond to RMI’s needs with an “All Islands Approach”, strengthen the enabling environment, and provide a blueprint for building resilience in partnership with regional and global partners. In the NCCPF, the RMI has identified a series of priority areas for urgent response. It is clear that the RMI faces major impacts on its communities’ livelihoods and infrastructure from numerous natural hazards, including sea level rise, storm surges, and extreme weather events.

RMI has also developed an innovative Joint National Action Plan (JNAP) for Climate Change Adaptation and Disaster Risk Management National Action Plan (DRM NAP) that set out actions to adapt against the effects of natural disasters and climate change. The JNAP is an important and integral mechanism for achieving RMI’s sustainable national development imperatives. However, its implementation was not successful. It is currently in the process of being replaced by the National Adaptation Plan (NAP) and the National DRM Plan, both in development.

RMI National Adaptation Plan (NAP) process has commenced, and this has been undertaken by the Adaptation Working Group under the oversight of the Tile Til Eo Committee chaired by the Chief Secretary and the Minister of Environment. Several working groups and taskforces are supporting the NAP development process by providing inputs on specific topic. A series of workshops and dialogues were held with RMI stakeholders to ensure the NAP process addresses key national issues, such as managing the impacts of sea level rise on atolls.

The key governance and institutional frameworks in RMI are summarised in Table 1.

<table>
<thead>
<tr>
<th>Implementation</th>
<th>Legislation/Policy</th>
<th>Scope</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government of Marshall Islands</td>
<td>National Strategic Plan 2020 - 2030</td>
<td>National</td>
<td>Framework to coordinate the articulated long-term development goals and objectives of the RMI government at the national levels. Used by government leaders and progress in the long-term (2020-2030)</td>
</tr>
<tr>
<td>Government of Marshall Islands</td>
<td>National Action Plan for Disaster Risk Management 2008 - 2018</td>
<td>National, Local</td>
<td>Mainstream disaster risk management needs in the national and local policies, plans, budgetary provisions and decision-making process with the10 goals and outcomes</td>
</tr>
<tr>
<td>Government of Marshall Islands</td>
<td>Joint National Action Plan for the Climate Change Adaptation &amp; Disaster Risk Management 2014 - 2018</td>
<td>National, Local</td>
<td>Built upon the DRM NAP with an updated action plan that identifies the national priorities for reducing risk and vulnerability in RMI. Currently expired; will be replaced by a NAP and a DRM Plan</td>
</tr>
<tr>
<td>Government of Marshall Islands</td>
<td>National Climate Change Policy Framework - 2011</td>
<td>National, Local</td>
<td>Establishes the responsibilities of the Government to address climate change through five strategic goals such as disaster preparedness, energy security, and reducing risks for a climate resilient future</td>
</tr>
</tbody>
</table>
2.2 Hazard and Exposure

RMI experiences various natural hazards. It ranks 95th among 191 countries on the INFORM 2021 index with a score of 3.6. As described by the Marshall Islands National Disaster Management Office, natural hazards of significance impacting RMI are sea level rise, droughts, and tropical storms and typhoons. Air temperatures are generally constant year around with a 1°C difference separating the warmer and cooler months. Much more variation is noticeable in rainfall patterns, seasonally and from the north to the south parts of the islands. Atolls further north are much drier than atolls in the south and receive about half the average annual rainfall: about 50 inches (1250 mm). The dry season runs from December to April and a wet season from May to November. For Kwajalein there is a significant difference between the seasons, receiving only 4 inches of rain in the dry season and 12 inches in the wet season. [Australian Bureau of Meteorology and CSIRO, 2011] [Republic of the Marshall Islands, 2016]

As a result, the Marshall Islands has a propensity for droughts and their occurrence is attributed to the El Niño-Southern Oscillation (ENSO). When El Niño is established over the Marshall Islands, it brings above average wet season air temperatures and below average rainfall during the dry season. Generally, drought occurs in the first 4-6 months following the El Niño and a severe El Niño event can suppress rainfall by 80%. During the severe 1998 drought, groundwater levels shrunk considerably, to the extent that the Laura groundwater supply to households had to be supplemented with reverse osmosis machines donated by Japan and the US. Half of the natural hazards experienced by the Marshall Islands between 1998 and 2008 were droughts. [Australian Bureau of Meteorology and CSIRO, 2011] [Republic of the Marshall Islands, 2014]

Sea level rise and associated coastal flooding also pose a significant threat to the Marshall Islands. Several instances over the last two decades are demonstrative of the impact sea level rise, wave action, and coastal flooding has had on the atoll nation. In December 2008, long-period swell waves generated by an extra-tropical storm impacted Marshall Islands several times (World Bank, 2015). The waves caused widespread flooding in Majuro and other urban centres and a state of emergency was declared on Christmas morning. In 2013, moreover, coastal flooding and storm surges forced the airport on Majuro to close, breaking the seawall protecting the runway in four places. Given the low elevation of the atolls, Marshall Islands is highly exposed to such hazards. [World Bank, 2015]

Tropical cyclones affect the Marshall Islands. Tropical cyclones usually form between September and November and are often weak when they pass through the region but during El Niño years, with higher sea-surface temperatures, more intense tropical cyclones form in the North Pacific.
Typhoon Paka in 1997 caused US$80 million of damage to crops and affected 70 percent of houses on Ailinglaplap Atoll. On average cyclones have caused US$63 million in damages per cyclone. It is predicted that over the next 50 years there is a 50 percent chance of experiencing a per-event loss exceeding US$53 million, and a 10 percent chance of experiencing a per-event loss exceeding US$160 million. [World Bank, 2015]

According to the EM-DAT database, the Marshalls have experienced cyclones, droughts and floods, with droughts having affected a larger proportion of the population. In 2013, the Marshall Islands declared a state of emergency due to severe drought that required US$4.6 million of assistance on WASH, health, food and logistics needs and affected 6,384 people (Republic of the Marshall Islands, 2016). In 2016, a similar declaration was issued by the Government of the Marshall Islands due to severe drought brought by El Niño. The declaration was made after a group of atoll islands received just a quarter of their usual rainfall during the November to February period. The 2015-2016 drought affected 21,000 people in 1,257 areas, requiring US$8.99 million in emergency response needs. There is no record of a tsunami related disaster impacting the Marshall Islands on the EM-DAT database. [Spennemann, D. H. 1996] [Leenders, Holland, & Taylor, 2017] [IOM, 2016]

### 2.3 Socio-economic Vulnerability

The vulnerability of households and communities to natural hazards is a function of their adaptive capacity. With its geographic isolation, limited natural resources, narrow production and export base, households in the Marshall Islands have limited economic opportunities. According to the 2011 census, out of the 7,738 households in the Marshall Islands, 39% reported income below the poverty threshold and 11.92% reported no monetary income. Income in the urban areas is generated mainly through wage income from the services sector – the government is the largest employer, supporting a third of the workforce. In the outer islands and rural areas, subsistence farming, fishing, copra production and handicrafts contribute to household income generation. In general, Marshallite in urban areas have more economic opportunities and higher incomes than their counterparts in the outer islands. [Republic of the Marshall Islands and SPC, 2012] [Leenders, Holland, & Taylor, 2017]

Social protection programming is used in the Marshall Islands to maintain livelihoods, including following extreme weather events. The RMI spends 4% of GDP on social protection, more than most Pacific Island Countries, with pensions making up 71% of all social protection spending. Pension beneficiaries total about 3,400, in a population of about 53,600. The fund is facing financial stress, however, with the number of beneficiaries increasing and a heavy reliance on The Compact of Free Association (COFA) assistance. Although there are negotiations to continue, with the ending of COFA payments in 2023, social protection programming will be negatively affected, which may increase socio-economic vulnerability to natural disasters. [ADB, 2013; Leenders, Holland, & Taylor, 2017]

The RMI’s economic geography limits trade and tourism revenue, and the country is highly reliant on development assistance. Formal employment opportunities are therefore limited, resulting in high vulnerability of households to economic shocks, including disasters caused by natural hazards. There are also inequities in income generation between men and women, which may result in women having higher levels of socio-economic vulnerability.

In addition to inequities in the workplace, the erosion of the customary land tenure practice - matrilineal succession of land rights – means many women no longer have autonomy over land. Women were afforded a position of influence through the matrilineal customary land rights, and it is now more common for married couples to live on land belonging to the husband’s family. These new social arrangements could result in additional socio-economic vulnerabilities for women [Republic of the Marshall Islands, 2016].
The RMI’s socio-economic conditions, coupled with the country’s susceptibility to global economic and environmental shocks, results in high vulnerability. Food insecurity is a particular concern due to limited land availability, poor soil conditions, water scarcity, lack of investment, lack of adoption of appropriate technologies, difficult transportation and poor market access. Domestic agricultural production consists of traditional food crops, small livestock, and copra—the country’s only cash crop. Limited local food production on the islands and changing dietary patterns have propelled importation of goods, outstripping exports.

The RMI’s high dependence on imported food also results in economic vulnerabilities, as food goods were 30% of the national import bill in 2016. The food and fuel price crises of 2008 were a stark reminder of the country’s vulnerability to commodity prices and inflation, which undermined poverty alleviation gains. To mitigate this vulnerability, commercialized vegetable farming has increased on Majuro Atoll and there has been investment in aquaculture. This has diversified economic opportunities and provided alternative livelihoods and sources of reliable protein for the Marshallese (Hicks & Murashige, 2017). Food security is still at risk from disaster events caused by natural hazards, particularly if port infrastructure is damaged which results in impacting trade linkages, and if the production of domestic food sources, more nutritious than imported food goods, is impacted. [FAO, 2014] [Tumbarello, 2008] [Republic of the Marshall Islands, 2016]

### 2.4 Physical Vulnerability

Being a remote mid-ocean low lying atoll, with a limited resource base, the RMI is considered one of the most vulnerable countries to environmental change. Being an atoll, small freshwater lenses on each islet support life, supplemented by variable rainfall. A recent study predicts that once sea level rises 16 inches, atolls in the Marshall Islands can expect to be hit by wave-driven floods, with high probability of making freshwater on Roi-Namur on Kwajalein Atoll too saline for consumption. As the primary source of potable water, salinization of groundwater may result in atolls in RMI becoming uninhabitable without alternative water sources. [Storlazzi, et al., 2018] [Kench & Ford, 2016] [Spennemann, 1996]

As one of the five atoll countries in the world, the Republic of the Marshall Islands is highly exposed to natural hazards. The country exhibits geological and topographical characteristics that result in high exposure. With an average elevation of 2 metres, and high population densities—about 292 persons per square kilometer in average spread across approximately 181 square kilometers of land—large swaths of the population, infrastructure and economy are exposed to hazards and climate impacts. [Barnett & Adger, 2003] [Republic of the Marshall Islands, 2016]

Additionally, the land available for human settlements in the Marshall Islands is also limited. The majority of atolls in the Marshall Islands are less than 200 m wide and 500 m long. Settlements are mostly located along the lagoon side of the atolls, which offers protection from storm surges and typhoons, whereas the ocean shore side of the atolls experience a high degree of wind-driven salt spray. Development and human activities along the coastlines of the atolls have disrupted ecology and coastal processes, contributing to a reduction of natural sediment production and transport. The negative impacts of urbanization, pollution, and mining on the ecosystem is also undermining food and water security for communities. Figure 3 illustrates the distribution of buildings on the major atolls in the Marshall Islands. [Republic of the Marshall Islands, 2014] [Spennemann, 1996].
Coastal reclamation and adaptation projects in the Marshall Islands have seen investment in hard interventions such as seawalls. While data is lacking, a 2006 study estimates that seawalls protect 30% of the coastline in Majuro. A recent study in Ebeye by the World Bank found the main source of hazards to be large swell waves and typhoons, and the most cost effective solution to reduce vulnerability being further construction of revetments to protect the shoreline and communities. The sheer degree to which Marshall Islands is physically exposed to environmental hazards leaves communities vulnerable to disaster and climate impacts, and poses challenges in reducing vulnerability through infrastructure development. [Republic of the Marshall Islands, 2014] [Giardino, Nederhoff, Gawehn, Quataert, & Capel, 2017]

2.5 Cultural Vulnerability

All Marshallese individuals and families are part of a clan (bwij) which owns land under the leadership of the clan head (alap). Multiple bwij and alap will form a unit that is then led by a chief (irooj or lerooj). Within the clan, both matrilineal and patrilineal heirs have land rights. However, the permanent authority is primarily determined and passed down along the maternal line. Some observers have linked the authority of women within this matrilineal system to that of a ‘shadow government’: despite the intangible institutional mechanism, their authority is influential and powerful. While the Marshall Islands is traditionally a matrilineal society in which women have considerable rights to land, women are now less likely to live on their own land, and husbands are less likely to move to join their wives’ families after marriage (UN Women, 2011). An increasing number of women now live away from their own land – where they have respect, power, and protection – and move to their spouses’ land and communities, where they may be isolated from their support systems. The colonial history of the United States in the 20th century has been identified a factor contributing to the move away from customary land practices and weakening of women’s land rights. At a household level, 26% of households were headed by women in 2011 [UN Women, 2011] [Asian Development Bank, 2020] [Stege et al., 2008]

Domestic violence and gender-based violence is a prevailing issue in the country. The strongly rooted perceptions on the women’s role in the society is one of the main reasons for violence against women in RMI. Among ever-partnered women, 48% reported experiencing physical
violence from a partner in their lifetime, with 16% of women reporting this violence in the previous 12 months. About 21% of ever-partnered women reported that they had been sexually abused by a partner during their lifetime, and 6% of women reported experiencing sexual violence from a partner in the previous 12 months. [Republic of the Marshall Islands, 2014]

Women are either absent or grossly under-represented at the highest level of government decision making. Cultural stereotyping of gender roles based on traditional social hierarchy is the primary reason for such underrepresentation. As of February 2022, there were two female Senators in the Parliament of the Marshall Islands, meaning that 6.1% of MPs were women. One female senator was serving as the Minister of Education, meaning that women therefore held one of the 13 (7.7%) of executive branch positions. Dr. Hilda Heine was elected as the first female President of Marshall Islands in 2016, and served in this role until 2019. Dr Heine is the only woman to have served as the political leader in any Micronesian country. Moreover, the percentage of women who held senior management roles was 25% in 2011 [Government of Marshall Islands, 2011] [PacWIP, 2021] [RMI Parliament, 2022] [UN CEDAW, 2018].
3. Progress in Sendai Framework for Disaster Risk Reduction

The following sections shed light on RMI’s process and capacity in disaster risk reduction and climate change adaptation as mandated and guided by the global policy frameworks such as Sustainable Development Goals (SDGs), the Paris Agreement, and Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR), which aims to prevent new and reduce existing disaster risk, increase preparedness for response and recovery, and strengthen resilience. The sections are organized by four priority areas of SFDRR, in which focused actions are required within and across sectors by states at local, national, regional, and global levels.

Priority 1. Understanding Disaster Risk. Disaster risk management policies and practices should be based on an understanding of disaster risk in its components such as vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Due to the wide range of hazards and remoteness of RMI, and its atolls, officials can have a hard time collecting and analyzing comprehensive risk information. The RMI, as with other Pacific countries, has limited resources and capacity to conduct such assessments at the subnational level. [The United Nations Office for Disaster Risk Reduction, 2015]

The “Building Resilience in Pacific Atoll Island Countries Study” (Phase II) elaborated a set of development pathways for Government of RMI to consider in its long-term (100 year+) climate change adaptation planning and provided order-of-magnitude estimates of the costs associated with each development option. This project includes a detailed multi-hazard risk assessment, and viable adaptation options with cost estimates. [Deltares, 2020]

Priority 2. Strengthening Disaster Risk Governance to Manage Disaster Risk. Disaster risk governance at national and regional levels is essential for disaster risk management in all sectors. By ensuring the coherence of national and local legal frameworks, regulations and policies can guide, encourage and incentivize public and private sectors to take action towards reducing disaster risks.

The NDMO Strategic Plan 2020-2023 was prepared to strengthen resilience in the neighboring atolls, organize disaster preparedness, response and recovery and improve coordination at local, national and international levels. Local DRM plans are also in development for specific atolls. At present, eight of these plans have been finalized. Further details on the DRM governance frameworks of the RMI are provided in Section 2.1.

Priority 3. Investing in Disaster Risk Reduction for Resilience. Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are fundamental to enhance resilience of persons, communities and the assets of RMI. These measures have been found to be cost-effective and efficacious at saving lives, preventing and reducing losses and ensuring effective recovery and rehabilitation [The United Nations Office for Disaster Risk Reduction, 2015].

Since 2018, the World Bank has supported the Marshall Islands to boost climate resilience by approving a grant for $2.5 million USD. This is to help strengthen resilience to natural hazards, such as typhoons and droughts, as well as respond quickly when these hazards do occur. The grant is to extend disaster risk insurance for up to five years under the Pacific Catastrophe Risk Assessment and Finance Initiative (PCRAFI) which provides disaster risk modeling and assessment tools as well as immediate funds in the event of a disaster. The grant also supports the building of a seawall to protect Ebeye and funds the improvement of the early warning
Finance has also been provided to strengthen water resilience. The national government has provided $6 million USD and the Green Climate Fund has recently approved a $18.6 million USD grant. The GCF grant is to help the Marshall Islands adapt to drought that constantly impacts the country’s drinking water and aims to provide year round access to freshwater. The project also improves harvesting and storage systems as well as gutters and downpipes in local communities. Moreover, with king tides and storm surges also affecting freshwater, this support will also protect groundwater wells by raising their height and installing coverings and hand pumps [UNDP, 2019].

Lastly, the Marshall Islands Aquaculture Fisheries Project is also focused on achieving disaster risk reduction. This project has received $1.7 million USD by the Pacific-American Climate Fund over a 36 month time period. The objective of the project is to improve Majuro’s economic resilience and food security by manufacturing fish feed, growing fish, and providing training to establish an aquaculture farm [USAID, 2017].

**Priority 4. Enhancing disaster preparedness for effective response to “Build Back Better” in recovery, rehabilitation and reconstruction.** The disaster recovery, rehabilitation, and reconstruction phase are an opportunity to “Build Back Better” through integrating disaster risk reduction measures [The United Nations Office for Disaster Risk Reduction, 2015].

The Pacific Adaptation to Climate Change (PACC) program has worked to increase the availability of potable water. The water that is being collected at Majuro airport and diverted to reservoirs has recently been upgraded through the PACC program. Disaster preparedness has been strengthened though this work, as the freshwater reserves have increased from 3-4 weeks of water availability to 3-4 months of availability. Resilience to droughts in the outer islands has also been strengthened through the provision of solar purifiers to produce freshwater [UNDP, 2013].

The Maritime Investment Project for the Marshall Islands, funded by the World Bank, has also enhanced disaster preparedness. This project has improved the safety of docks and port operations and built resilience to disasters and climate change through strengthened design, rehabilitation and construction. Other components of the project are to strengthen the safety and security of maritime transport and improve the connections between Majuro and the other islands for food, water, and fuel for emergency response services. Finally, the project aims to enhance the capacity of the government to manage maritime assets in a more efficient and climate resilient manner through improved coordination of emergency response systems [World Bank, 2019].

The provision of early warning systems is also key for achieving enhanced disaster preparedness and mitigation of economic losses. The Marshall Islands Weather Service Office is responsible for communicating warnings that are developed by the US National Oceanographic and Atmospheric Administration’s National Weather Service (NOAA NWS) to relevant authorities and communities. The Marshall Islands Weather Service Office receives forecasts, which range from rainfall outlook to drought monitoring information, that are used to better predict disasters and determine likely impacts. The Pacific Resilience Project Phase II (PREP II) also aims at improving emergency communication within the RMI. Under this project, a National Emergency Communication Strategy has been developed and investments are planned to improve the current emergency communication network and increase the number of Marshallese who receive actionable warning messages. [Leenders, Holland, & Taylor, 2017].

Lastly, the Pacific Islands Meteorological Strategy (PIMS) 2017-2026 outlines the regional development priorities of the Pacific Island National Meteorological and Hydrological Services (NMHSs). PIMS sets out the strategic context and direction for strengthening NMHSs, and this provides strategic direct for policy design and reform in the RMI.
4. Coherence with Sustainable Development Goals & The Paris Agreement

4.1 Strategic Coherence

Strategic coherence explores whether disaster risk reduction and climate change adaptation are explicitly addressed jointly or if there is an aim to strengthen the relationship and linkages between the two fields [UNDRR, 2020].

RMI’s policies and frameworks demonstrate linkages between climate change and development. RMI is one of the few countries in the Pacific region to have an integrated approach to manage disaster risk and climate change through the development of a JNAP. The JNAP (2014-2018) includes both climate and disaster risks, and explicitly mentions the link between disaster risk management and climate change adaptation. The JNAP precedes the establishment of the Sustainable Development Goals (SDGs) and the signing of the Paris Agreement, but the framework nevertheless contributes to achieving these international processes. For example, Goal 1 of the JNAP (establish and support an enabling environment for improved coordination of disaster risk management/climate change adaptation) directly corresponds with SDG goal 13 (Climate Action) and SDG goal 16 (Peace, Justice and Strong Institutions). Goal 1 of the JNAP, moreover, looks to strengthen DRM and CCA institutional arrangements as well as increase human resource capacity at the local and national level – this is aligned to several SDG indicators [Republic of the Marshall Islands, 2014]. The JNAP (2014-2018) is now expired and some of its goals and risk reduction strategies are expected to be included in the RMI NAP and RMI National DRM plan that will replace it.

The National Strategic Plan 2020-2030 is the country’s framework to coordinate long-term development goals and objectives of the RMI government. The risks of climate change and natural hazards are addressed jointly under the “Environment and Climate Change and Resilience” pillar. The objective of this pillar is to “enhance resilience of RMI and its environmental assets to the impacts of climate change and natural disasters and its environmental assets through national, regional, and international efforts”.

The actions outlined in the National Environment and Management Strategy (NEMS) (2017-2022), National Gender Mainstreaming Policy (NGMP) (2022), and National Energy Policy and Energy Action Plan (2016) are also aligned to either the SDGs or Paris Agreement. For instance, a strategy included in the NEMS is “establish and support an enabling environment for improved coordination of disaster risk management/climate change adaptation in RMI”. Therefore, RMI’s national policies, plans and frameworks are fully aligned to at least one of the international frameworks shown in Table 2. [Republic of the Marshall Islands, 2016] [Republic of the Marshall Islands, 2017] [Republic of the Marshall Islands, 2020] [Republic of the Marshall Islands, 2022]
<table>
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<tr>
<th>Sectoral Aim</th>
<th>Policies with Linkages to Sendai Framework for Disaster Risk Reduction</th>
<th>Policies with Linkages to Sustainable Development Goals</th>
<th>Policies with Linkages to the Paris Climate Agreement for Environment</th>
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<td>National Environment Management Strategy (2017 - 2022)</td>
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Table 2. Synergies between the national policies, plans and frameworks by sector

4.2 Conceptual Coherence

Conceptual coherence explores how countries link DRR and CCA conceptually, through risk and resilience [UNDRR, 2020].

Building resilience is a key goal of the National Strategic Plan (2020-2030), National Climate Change Policy Framework (2011), and other national plans and policies. Climate change and disaster risks are addressed in many plans and policies in RMI. Socio-economic factors, vulnerabilities and other drivers of climate risk are also a key focus in these plans. Overall, the RMI has demonstrated a strong conceptual coherence between climate change and DRM. [Republic of
the Marshall Islands, 2011] [Republic of the Marshall Islands, 2020]

**4.3 Operational Coherence**

Operational coherence looks at measures and activities that bring together disaster risk reduction and climate change adaptation practices and the extent to which planning is cross-sectoral [UNDRR, 2020].

RMI’s National Strategic Plan (2020-2030) and the JNAP (2014-2018) advocate the adoption of inclusive and participatory process and promotes gender equality and empowerment of women. The National Strategic Plan (2020-2030) includes CCA and DRR related policy objectives under the Environment Climate Change and Resiliency Pillar. The JNAP (2014-2018) and National Climate Change Policy (2011) includes several CCA and DRR measures, however, there are no sector specific measures outlined. The NDC 2020-2025 contains no actions related to disaster risk reduction activities [Republic of the Marshall Islands, 2020] [Republic of the Marshall Islands, 2014]

**4.4 Institutional Coherence**

Institutional coherence assesses whether coordination between DRR and CCA is achieved, and if and how institutional arrangements support coherence [UNDRR, 2020].

The RMI has made considerable efforts to improve the coherence between DRR and CCA at institutional level. RMI has the Climate Change Directorate (CCD), previously known as the Office of Environmental Planning and Policy Co-ordination (OEPPC), which is a dedicated entity for implementing CCA and DRR activities. The establishment of the NDMO and NDC has also increased the capacity of RMI to undertake actions to address the impacts of climate change and disaster risks. Overall, there is a strong coherence at institutional level in the country.

**4.5 Financial Coherence**

Financial coherence explores whether and how funding strategies and investments bring together disaster risk reduction and climate change adaptation [UNDRR, 2020].

The JNAP (2014-2018) included a detailed financial costs and contingency costs for implementing each goal and objective. However, a costing for implementing goals, actions, and objectives of the National Strategic Plan (2020-2030), Updated NDC, and National Climate Change Policy (2011) are not available. [Republic of the Marshall Islands, 2011] [Republic of the Marshall Islands, 2014] [Republic of the Marshall Islands, 2020]
5. Future Challenges and Priorities

5.1 Challenges for Disaster Risk Reduction Implementation

With the Compact of Free Association (COFA) coming to an end in 2023, one of the key future challenges for the RMI is to achieve long-term fiscal sustainability. The fiscal and external balances are expected to be in surplus in the near term, benefiting from higher grants, but to move to deficits from FY2023, assuming expiring Compact grants and stagnant fishing revenues. This will constrain the financing available for achieving DRM objectives, such as development of climate-resilient infrastructure, strengthening of social protection measures, and the implementation of key frameworks such as the NAP. The RMI will need to identify innovative sources of climate change adaptation and disaster risk management finance, which could include budget support, national financing vehicles, and private-sector led initiatives. [IMF, 2021].

The RMI relies heavily on the support of the US government through the COFA. The RMI is also heavily dependent on international partners, including the United States Agency for International Development (USAID), Government of Australia, and International Federation of Red Cross (IFRC), to implement DRM programs and respond to disasters caused by natural hazards. For example, USAID has contributed more than USD $3.5 million in the 2018 fiscal year to the Federated States of Micronesia and the Republic of the Marshall Islands. The funding has gone towards several DRR projects and response programs, such as working with students, educators and community members to establish community disaster preparedness and response committees, developing school emergency management plans and implementing national strategies for DRM. Another USAID funded program is in collaboration with the IFRC to build awareness of disaster response activities and train volunteers for emergency response. This high dependence on external partners results in vulnerabilities, including potential delays in mobilizing humanitarian support and coordinating disaster response assistance.

5.2 Priority Areas of Work

It is recommended that RMI continues to identify sources of post Compact funding, and works with donors to develop a medium-term fiscal strategy to secure DRM funding. This should be consistent with existing plans and frameworks, including the National Strategic Plan (2020 - 2030) and the NAP. There is also a need to continue discussions on the best way to plan for sustainable development at the national, local and community levels and to have strategies tailored to both urban areas and outer islands. [Republic of the Marshall Islands, 2014].

Development of climate-resilient infrastructure is also a high priority for the Marshall Islands. To improve the transportation sector, there are plans to provide marine safety standards for watercrafts, improve access to marine transport through approving the Marshall Islands Shipping Corporation Operations Plan, improve routing and scheduling, and build and repair docks in the outer islands. For water and sanitation infrastructure, the RMI aims to implement the National Water and Sanitation Policy. This will prove a framework for protecting groundwater and water resources sustainability through collection management, and improve services in areas where safe water is unavailable or is of low quality. The RMI also plans to improve water service delivery in Majuro by implementing reforms to the Majuro Water and Sewer Company which will improve asset efficiency, minimize system losses and improve capacity development. Improving solid waste and hazardous waste management infrastructure is also a priority area. To decrease solid waste generation and manage solid waste effectively, the RMI aims to build the capacity of stakeholders to promote effective waste management and to ensure the sustainable financing of waste management facilities [Republic of the Marshall Islands, 2014].
In addition, there is a need to increase early warning system (EWS) coverage across the country. Priority areas for future investment include the development of effective impact-based weather forecasting and warnings, and strengthened partnerships between emergency response authorities, community groups and forecasting agencies to action suitable on-ground responses to reduce flood risks and threats. While the capacity for drought prediction and monitoring has increased, future investment is needed. Priority areas of work are translation of meteorological drought information to water availability forecasts and development of drought management plans which include triggers for communicating early warnings. [WMO, 2015]
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