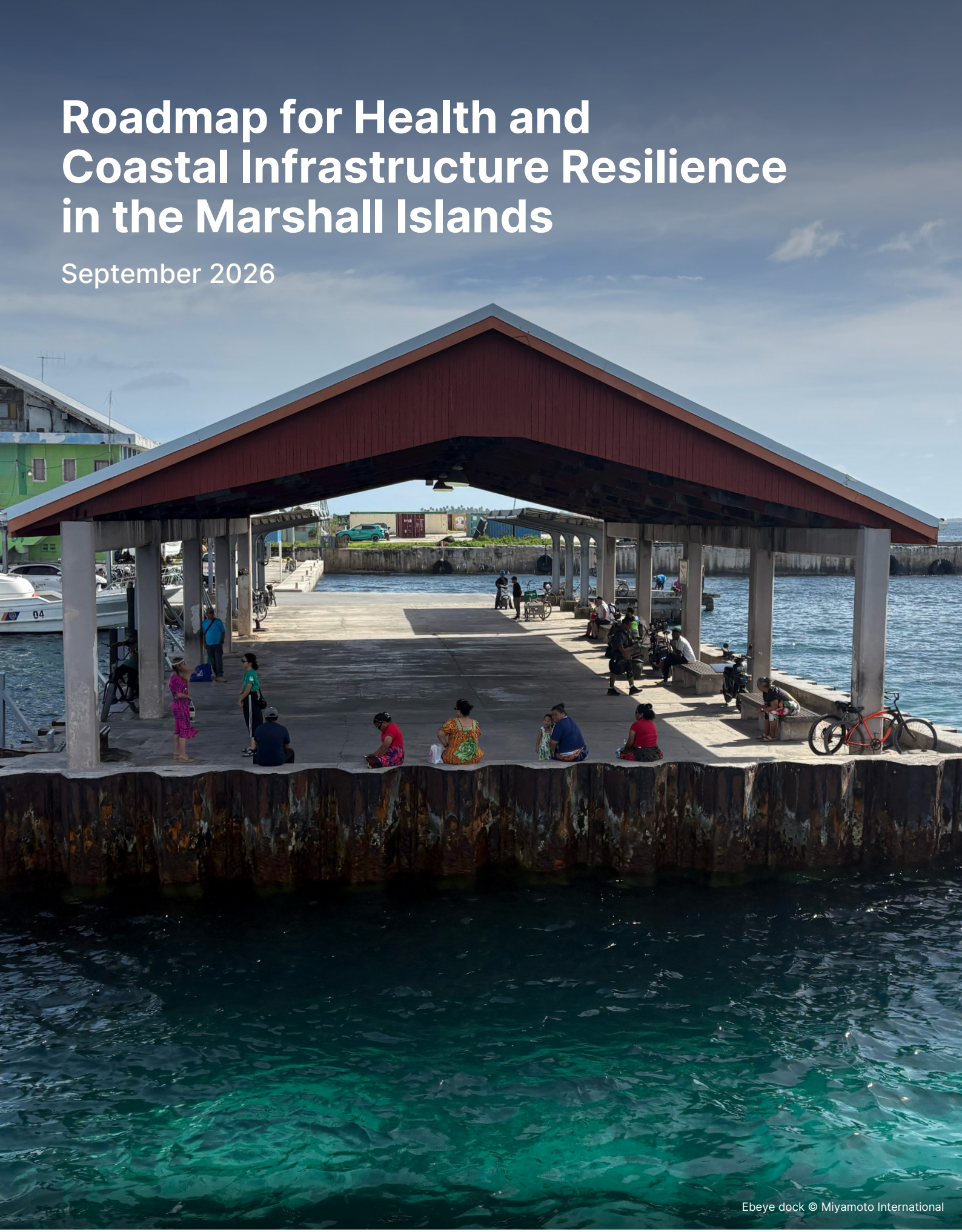
Roadmap for Health and Coastal Infrastructure Resilience in the Marshall Islands

September 2026



Ebeye dock © Miyamoto International

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The Coalition for Disaster Resilient Infrastructure (CDRI) is a global partnership of governments, UN agencies, multilateral banks, the private sector, and academic institutions that promotes resilient, sustainable, and inclusive infrastructure. CDRI emphasizes resilient health infrastructure by strengthening hospitals and facilities to ensure continuous essential services. It promotes risk-informed planning, safer design and climate adaptation, enabling health systems to remain functional and accessible, especially for vulnerable groups.

About UNOPS

UNOPS delivers infrastructure and project management expertise to advance sustainable development. When it comes to health infrastructure, it promotes equitable access to essential services by integrating climate resilience considerations, universal design principles and gender-responsive approaches. UNOPS also strengthens local capacity, governance and maintenance systems, ensuring health facilities are safe, inclusive and sustainable.



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Ocean waves © UNOPS

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Acronyms

CDRI	Coalition for Disaster Resilient Infrastructure
DIDA	Division of International Development Assistance
EPPSO	Economic Policy, Planning and Statistics Office
GCF	Green Climate Fund
GFDRR	Global Facility for Disaster Reduction and Recovery
GEDSI	Gender equality, disability and social inclusion
GIS	Geographic information system
HF	High frequency (radio)
KALGOV	Kwajalein Atoll Local Government
MIMA	Marshall Islands Mayors Association
MoCIA	Ministry of Culture and Internal Affairs
MoHHS	Ministry of Health and Human Services
MPWIU	Ministry of Public Works, Infrastructure and Utilities
NAP	National Adaptation Plan
NDC	Nationally determined contribution
NIIP	National Infrastructure Investment Plan
NSP	National Strategic Plan
PMU	Project Management Unit
NDMO	National Disaster Management Office
RMI	The Republic of the Marshall Islands
SDG	Sustainable Development Goal
TTEC	Tile Til Eo Committee
WHO	World Health Organization

Foreword



Francyne Wase-Jacklick
Secretary, Ministry of Health and Human Services (MoHHS)

The Republic of the Marshall Islands faces climate and infrastructure challenges that directly affect the health and well-being of our people. Sea level rise, flooding, storms and extreme weather do not only affect buildings and infrastructure; they affect our ability to provide essential health services when communities need them most.

When we speak about resilient health infrastructure, ultimately, we are speaking about protecting people: the mother bringing her child to a clinic, the elder who depends on regular medication, the health worker who continues to serve during an emergency, and communities across our neighbouring islands. Our clinics are more than buildings; for many communities, they are lifelines. Keeping those lifelines functioning requires reliable power, safe water, emergency communications, accessible facilities, appropriate maintenance and prepared health workers.

This Roadmap comes at an important time as the Ministry advances its health reforms towards a system that is more accessible, responsive, accountable, sustainable and better prepared for the future. Resilient infrastructure is an essential part of that vision.

Resilience cannot be achieved by one ministry or one sector alone. Health, Public Works, our development partners and our communities all bring essential perspectives and capabilities. I therefore see this Roadmap not as the end of a planning process, but as the beginning of stronger collaboration and coordinated action. The direction is before us; now we must take this journey together.

Francyne Wase-Jacklick



Walter Myazoe
Secretary, Ministry of Public Works, Infrastructure and Utilities (MPWIU)

In the Republic of the Marshall Islands, resilience is not an abstract concept. Almost every infrastructure decision is shaped by where and how we live: on narrow strips of land, in a highly corrosive marine environment, exposed to flooding, erosion, saltwater and high waves, while serving communities spread across many islands and atolls.

For the Ministry of Public Works, Infrastructure and Utilities, this Roadmap comes at a very useful time. It encourages us to look beyond construction and consider how infrastructure is managed throughout its life cycle. A project may take only a few years to build, but Government may need to maintain that asset for decades. This requires greater attention to inspection, maintenance, budgeting, reliable information and eventual replacement.

Infrastructure investment should also leave behind more than a physical asset. It should strengthen local skills and knowledge and, wherever possible, enable our people to inspect, operate, maintain and repair the infrastructure on which our communities depend.

The value of this Roadmap will ultimately be determined by what we do with it. Its success should be reflected in infrastructure that lasts longer, better investment decisions, stronger local capacity and communities that are better protected. The Ministry looks forward to working with our partners to translate these priorities into practical actions, step by step.

Walter Myazoe



Executive summary

Seawall at Majuro Stadium © UNOPS

This roadmap presents the main findings and strategic directions emerging from the project 'Roadmap for the Resilience of Health and Coastal Infrastructure in the Marshall Islands'. It brings together evidence from Output 1 – the Resilient Coastal and Health Infrastructure Gap Assessment, Output 2 – the Health Infrastructure Climate Event Readiness Assessment, and Output 3 – the Enabling Environment Assessment to identify the most pressing resilience needs affecting coastal and health infrastructure in the Republic of the Marshall Islands (RMI). The report is structured to guide readers from context and methodology, through the consolidated findings, to a prioritized set of strategic actions. The following summary outlines the report by chapter so that readers can quickly identify where to find the information most relevant to their needs.

Introduction

In this section, the project context, scope and methodology are illustrated, including how the four outputs of the broader project were developed. The infrastructure systems considered in the assessment are defined, and key limitations of the analysis are clarified.

Chapters 1 and 2: Hazard and climatic profile, and governance and institutional overview

Chapters 1 and 2 set the foundation for the roadmap. They present the broader context of the RMI, including geomorphology, climate and hazard exposure, sea level rise, gender equality, disability and social inclusion (GEDSI) considerations, political and demographic characteristics, and the institutional and policy framework relevant to infrastructure planning and management.

Chapter 3: Consolidated findings on existing gaps and planned investments

Chapter 3 consolidates the main findings from the three technical assessments into a synthesis of outstanding resilience gaps. It is organized into three sections: coastal infrastructure, healthcare infrastructure, and enabling environment components. The chapter focuses on the most critical unresolved needs, excluding projects and investments already planned or underway that substantially address identified gaps.

Key findings have identified, among other issues, fragmented asset and hazard data systems, weak life cycle maintenance practices, limited resilience of neighbouring island clinics, under-utilization of lower-cost coastal protection options and nature-based solutions, significant gaps in emergency shelter readiness and rapid response systems, and insufficient drainage along the corridor between the Marshall Islands International Airport in Majuro and Laura.

Chapter 4: Roadmap for Health and Coastal Infrastructure Resilience in the Marshall Islands

Chapter 4 translates the assessment findings into a practical roadmap structured around three key dimensions (physical infrastructure, digitalization and local capacity). These dimensions were identified as critical and translated in six strategic priorities, ranked in the following order by stakeholders during a validation workshop held in July 2026:

1. Closing the operations, maintenance and end-of-life gap
2. Upgrading and climate proofing neighbouring island clinics
3. Building an integrated geospatial asset and hazard information system
4. Scaling up nature-based and low-cost coastal protection solutions
5. Strengthening emergency shelter readiness and rapid response systems
6. Delivering a phased resilience upgrade of the road corridor between Majuro airport and Laura

For each priority, the chapter outlines the rationale, recommended actions, expected positive impacts, indicative sequencing plan over ten years, cost considerations, institutional ownership, and alignment with the Sustainable Development Goals (SDGs), nationally determined contributions (NDCs), RMI National Strategic Plan (NSP) 2020-2030,[1] and RMI National Infrastructure Investment Plan (NIIP) 2023.[2]

Altogether, the report is intended to serve both as an informed guide for action and a practical decision support tool to help local governments, ministries and communities sequence investments, prioritize high-risk assets, and implement a coherent pathway towards long-term coastal resilience. Strengthening infrastructure resilience in the RMI requires both targeted physical investments and broader institutional improvements, especially in maintenance, data systems, emergency preparedness and long-term planning. Enhanced coordination among government agencies and a focus on local capacity building could also reduce dependency on external technical support and development partners, leading to a more sustainable future for the RMI, including from an operational standpoint. Digitalization can play a critical role in this process, standardizing data collection and storage protocols, and creating an interoperable digital ecosystem able to transform data into knowledge and support transparent and evidence-based decision-making. Readers interested in the underlying evidence and analytical details should also consult the individual assessment reports and supplementary annexes alongside this roadmap.



Introduction

Palms at Majuro © UNOPS

Project context and purpose of the roadmap

This roadmap is the culmination of a two-year project funded by the Coalition for Disaster Resilient Infrastructure (CDRI)-Infrastructure Resilience Accelerator Fund (IRAF) under the Infrastructure Resilience in Small Island Developing States (IRIS) initiative. The overall purpose of the project is to strengthen the resilience of the Republic of the Marshall Islands' (RMI) coastal and health infrastructure systems to climate-related hazards, including flooding (due to sea level rise [SLR] and extreme weather events), strong winds, heatwaves and droughts. Given the high exposure to hazards the RMI faces, and the challenge of building adaptive capacity in remote low-lying atolls, the project adopted a phased and evidence-based approach to identify gaps, assess health infrastructure readiness, evaluate current policies and translate findings into actionable pathways.

The project scope spans four interconnected outputs:

1. Resilient coastal and health infrastructure gap assessment
2. Health infrastructure climate event readiness assessment
3. Enabling environment assessment
4. Roadmap for Health and Coastal Infrastructure Resilience in the Marshall Islands

These outputs are designed to develop a high-level understanding of resilience gaps, including analyses of current policies and facility-level and physical infrastructure, culminating in a prioritized and implementable roadmap, which is presented herein.

Approach for the development of the roadmap

Output 1 – *Resilient Coastal and Health Infrastructure Gap Assessment* established a baseline understanding of vulnerabilities affecting health and coastal infrastructure in the RMI, with a focus on physical assets. Firstly, it included background analyses covering the natural hazards relevant to the scope of the project, climate change trends and projections, and the historical, social, geopolitical, and geomorphological context, as well as cross-cutting considerations related to gender equality, disability and social inclusion (GEDSI), all of which form the basis for the subsequent outputs. Secondly, drawing on desk reviews, stakeholder consultations (Annex B), site visits, international resilience frameworks (including Waterfront Alliance and ARISE-US Coastal Resilience Scorecard),[3] and spatial inundation modelling,[i] the assessment identified several critical gaps despite overall system functionality. Following validation during a workshop held in March 2026, findings were refined to reflect planned and ongoing investments.

Output 2 – *Health Infrastructure Climate Event Readiness Assessment*, on the other hand, assessed the readiness of the main health facilities in the RMI (i.e., Majuro Hospital, Ebeye Hospital and, within the limits of the available information, the network of clinics in neighbouring islands) to withstand and continue operating during climate-related hazards, including flooding, sea level rise, strong winds, drought and heatwaves. Building on the findings of Output 1 and informed by site visits, spatial analysis, the World Health Organization (WHO) Guidance For Climate Resilient and Environmentally Sustainable Health Care Facilities,[4] and stakeholder consultations, the assessment identified facility-specific vulnerabilities and priority actions required to ensure safe and continuous health service delivery. Following validation at the March 2026 workshop, findings were refined to reflect planned and ongoing investments.

Output 3 – *Enabling Environment Assessment* evaluated the RMI's institutional, regulatory, and technical capacity to plan, deliver, and manage resilient infrastructure. Building directly on the gaps identified in Outputs 1 and 2, this assessment combined a desk review of national frameworks with a structured institutional analysis using the UNOPS EnABLE tool (formerly the Capacity Assessment Tool for Infrastructure [CAT-I]). By evaluating indicators across the full infrastructure life cycle and seven enabling domains, it identified the systemic root causes of physical vulnerabilities. Findings were validated by stakeholder interviews, site visits in the atolls of Majuro and Kwajalein, and two workshops held in March 2026 and July 2026, respectively.

Output 4 – *Roadmap for Health and Coastal Infrastructure Resilience in the Marshall Islands* (this document) translates the physical vulnerabilities and institutional gaps from Outputs 1, 2, and 3 into an actionable, long-term strategic pathway. Completed in July 2026, its development utilized the FundABLE tool to map financing mechanisms to implement the strategic priorities identified. The roadmap was refined and validated through stakeholder consultations and a workshop in July 2026, where partners provided feedback to prioritize resilience actions based on urgency and feasibility.

GEDSI considerations were integrated throughout the assessment process rather than being treated as a stand-alone topic. Site observations considered accessibility and usability of health facilities, and the extent to which infrastructure systems can ensure inclusive access during climate-related disruptions. These findings were complemented by a literature review of national policies and census information to identify structural inequalities, data gaps and relevant policy commitments in the context of the RMI.[ii]

Furthermore, all tools used in each assessment include, at variable capacity and based on specialization, questions and instruments to evaluate GEDSI components.

i. A national-scale climate modelling assessment is not currently available. Studies focus on specific atolls (e.g., Majuro, Ebeye) at different times and with different methodologies.

ii. For literature review details, please see the References section.

PROJECT OUTPUTS AND WORKSHOPS – SEQUENTIAL FLOW

FIELD VISIT

On-site coastal and health infrastructure inspections

Stakeholder interviews

Completed in November 2025

OUTPUT 1

Resilient Coastal and Health Infrastructure Gap Assessment

Completed in January 2026

Tools used

Waterfront Alliance and ARISE-US Coastal Resilience Scorecard

OUTPUT 2

Health Infrastructure Climate Event Readiness Assessment

Completed in March 2026

Tools used

WHO Guidance for Climate Resilient and Environmentally Sustainable Health Care Facilities

WORKSHOP 1

March 2026

Presentation of Outputs 1 and 2

Stakeholder consultation and feedback

Outputs 1 and 2 revised and inputs integrated into the future roadmap (Output 4)

OUTPUT 3

Enabling Environment Assessment

Completed in May 2026

Tools used

EnABLE Tool

OUTPUT 4

(Draft) Roadmap for Health and Coastal Infrastructure Resilience in the Marshall Islands

Completed in June 2026

Tools used

FundABLE Tool

WORKSHOP 2

July 2026

Presentation of Outputs 3 and 4

Stakeholder consultation and feedback

Outputs 3 and 4 revised and inputs integrated into the final Output 4

FINAL OUTPUT 4

A prioritized and implementable Roadmap for Health and Coastal Infrastructure Resilience in the Marshall Islands

Completed in September 2026

Critical systems and definitions: Resilient, coastal and health infrastructure

Resilient infrastructure refers to infrastructure systems planned, designed, constructed, operated, and maintained to anticipate, withstand, adapt to, and rapidly recover from disruptions caused by natural hazards, climate-related stresses, and other shocks, while continuing to deliver essential services. Resilient infrastructure integrates robustness, redundancy, resourcefulness, and rapid recovery, adopts a multi-hazard and life cycle-based approach, and accounts for infrastructure interdependencies within a broader *system-of-systems*.[5]

For the purposes of this assessment, key coastal infrastructure, and infrastructure vulnerable to coastal exposure, considered:

- **Seawalls:** rigid structures that protect the atoll, resisting erosion caused by waves and increasing the waves' overtopping height. Typically found in the form of reinforced concrete or sheet piles
- **Coast revetments**: semi-rigid structures that protect the atoll, resisting erosion caused by waves. Typically sloped and made of large rocks. They dissipate the wave energy, as they are permeable, and require a filter layer to contain the sand on the atoll side
- **Roads and causeways**, including water drainage systems
- **Majuro bridge**
- **Majuro airport**
- **Landfills**

Please also see Annexes C and D, which detail the condition of infrastructure across Majuro and Ebeye.



Majuro atoll aerial view © UNOPS

In the RMI, resilient infrastructure must be tailored to the unique conditions of low-lying atoll environments, including extreme exposure to coastal hazards, limited elevation, high groundwater vulnerability, remoteness and geographic dispersion.

Coastal infrastructure refers to infrastructure assets located within or in areas directly influenced by coastal zones. They provide protection, access or connectivity and are exposed to marine and climate-driven hazards. In the RMI, where most land is low-lying and immediately adjacent to the ocean or to lagoons, the boundary between coastal and inland infrastructure is often indistinct. Please refer to Annex A – Glossary for more information.

Health infrastructure refers to the physical facilities, systems and essential supporting networks required to deliver quality, sustainable and inclusive healthcare. In the RMI, health services are organized around two main public hospitals: Leroj Atama Medical Center in Majuro and Leroj Kitlang Health Center in Ebeye. They provide primary and secondary care, with limited tertiary services; patients requiring advanced tertiary treatment are typically referred overseas, often to hospitals in Honolulu or the Philippines.

In addition to these main hospitals, a network of approximately 50 clinics located in the neighbouring islands completes the national healthcare infrastructure. Ten of them are noted by the Outer Island Office based in Majuro Hospital as 'vacated', which indicates that there are no health assistants responsible for providing the clinics' services currently available on the atolls or assigned to these facilities. Therefore, the total number of active clinics in neighbouring islands is 40. Detailed information about the clinics was not available for the development of this report; however, they have been included in this assessment based on the limited information available.

The list of public healthcare facilities considered in this report is as outlined in Table 1. The number of people per clinic in each atoll is provided in parentheses in the table, while uninhabited atolls (Ailinginae, Bikar, Bikini, Bokak, Rongelap, Rongerik and Taka) are excluded from it.

Figure 1. RMI healthcare facilities and population distribution
Based on data from the RMI 2021 census.[6] Developed by Miyamoto International

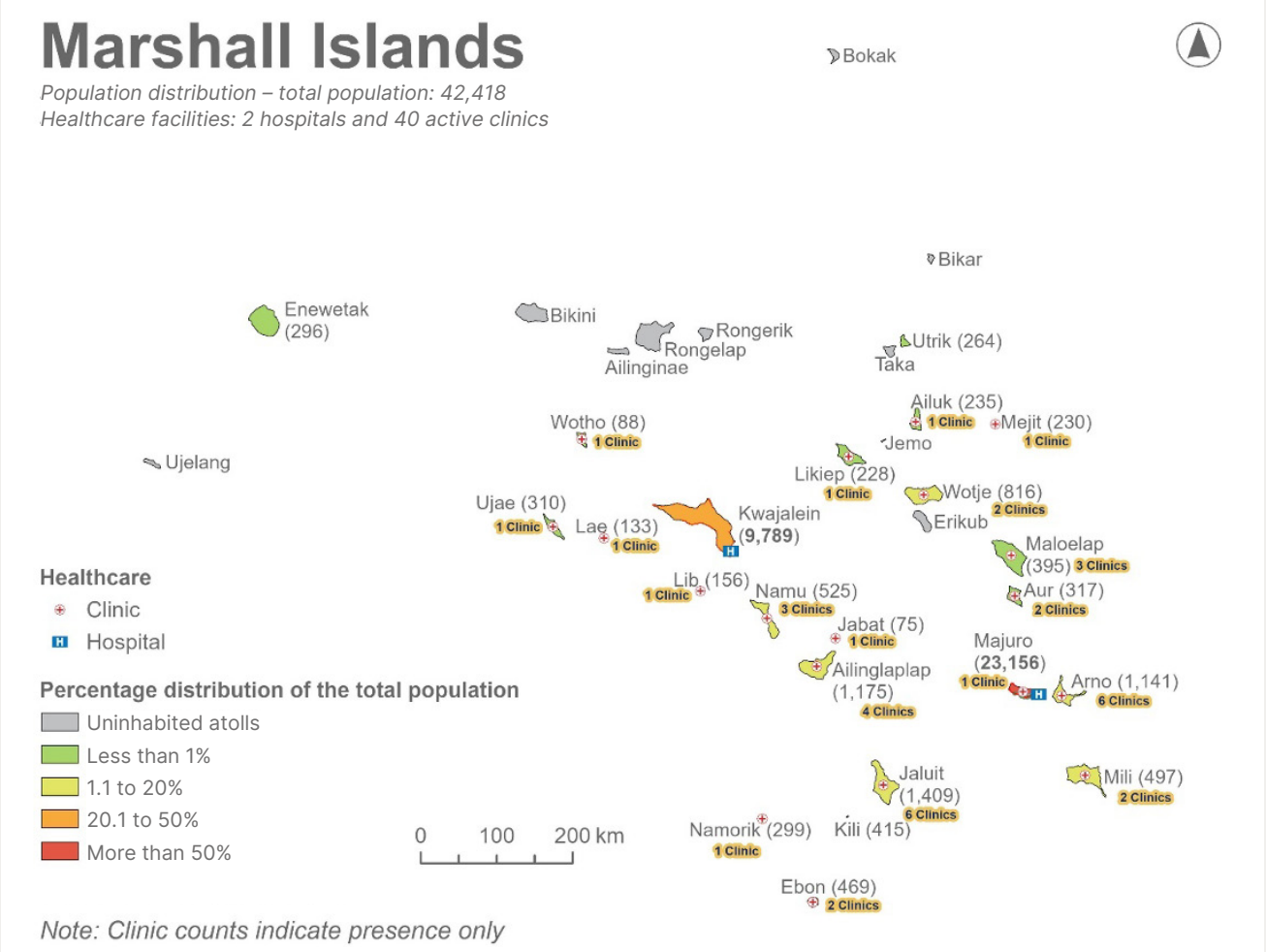


Table 1. Clinics in neighbouring islands
Based on data shared by the Office of Outer Islands (MoHHS) during the field mission to the RMI in November 2025.

Atoll/Island	Population count according to MoHHS data and people per clinic	Facility name
Ailinglaplap	1,175 (294 per clinic)	Aerok, Buoj, Jeh, Woja
Ailuk	235 (235 per clinic)	Ailuk, Enejelar (vacant)
Arno	1,141 (191 per clinic)	Tinak, Kilange, Ine, Arno, Ulien, Bikarej, Tutu (vacant)
Aur	317 (159 per clinic)	Aur, Tobal
Ebon	469 (235 per clinic)	Ebon, Toka, Ene-Ko-Ion (vacant)
Enewetak	296	
Jabat	75 (75 per clinic)	Jabat
Jaluit	1,409 (235 per clinic)	Jaluit, Jabwor, Mejirjok, Jabnodren, Imiej, Imroj
Kwajalein	9,789	Leroj Kitlang Memorial Health Center (Hospital)*
Lae	133 (133 per clinic)	Lae
Lib	156 (156 per clinic)	Lib
Likiep	228 (228 per clinic)	Likiep, Jebal (vacant)
Majuro	23,156	Leroj Atama Zedkaia Medical Center (Hospital)*, Rongrong
Maloelap	395 (99 per clinic)	Jang, Ollet, Kaven, Aerok (vacant), Tarawa (vacant)
Mejit	230 (230 per clinic)	Mejit
Mili	497 (125 per clinic)	Lukonwod, Enejet, Mili (vacant), Nallu (vacant), Tokewa (vacant)
Namdrik	299 (299 per clinic)	Namdrik
Namu	525 (175 per clinic)	Majkin, Namu, Loen, Mae (vacant)
Ujae	310 (310 per clinic)	Ujae
Utirik	264	
Wotho	88 (88 per clinic)	Wotho
Wotje	816 (408 per clinic)	Wotje, Odmej
Ailinginae, Bikar, Bikini, Bokak, Rongelap, Rongerik, Tak	0	Uninhabited atolls



Ebeye Hospital © UNOPS

Limitations

This assessment provides an initial structured diagnostic of resilience gaps in the health and coastal infrastructure in the RMI, based on the best available technical, institutional and operational information at the time of preparation. It draws primarily on document review, site visits, spatial analysis, and interviews and workshops with government stakeholders and service providers. Therefore, it reflects a predominantly sectoral, natural hazard-focused perspective (excluding human-made hazards such as sand and gravel mining).

Some constraints affect the interpretation of the findings. Validation with representatives of women, persons with disabilities, older persons, and remote or marginalized communities was limited to the stakeholders present at the workshops and interviews. In addition, flood modelling results may differ from actual local depths because land infiltration capacity and drainage conditions are not represented. The assessment of clinics in neighbouring islands is also restricted by the unavailability of documentation on standard clinic prototypes, limiting conclusions about design fitness, condition and inclusive access (GEDSI) beyond the facilities observed (i.e., the Majuro and Ebeye hospitals). Hospital site visits were conducted during normal operating hours; as a result, access to some rooms and buildings depended on clinical activity and privacy considerations, and observations were partial in some cases.

The EnABLE institutional assessment relies on qualitative, structured professional judgement and therefore entails some subjectivity in the scoring of effectiveness. The availability of evidence varies by stage and domain, with data often fragmented, project-specific, inconsistently updated or centrally managed, and with limited disaggregated information about participation and benefits; consequently, some aspects of routine implementation and enforcement may be under-represented. Further, infrastructure in the RMI is frequently built through donor-financed projects, which have their individual arrangements based on international standards and external oversight. Once the external support is withdrawn, it becomes more challenging to replicate exemplary project-level performance and apply those same standards to other initiatives.

Overall, the results represent a snapshot in time and should be used as a basis for prioritization and sequencing (alongside ongoing and planned reforms and investments) rather than as a definitive or static evaluation of system performance.

PART 1

Context and needs assessments for infrastructure resilience in the Marshall Islands



Climate and infrastructure resilience context in the RMI

Coastal protection at Majuro
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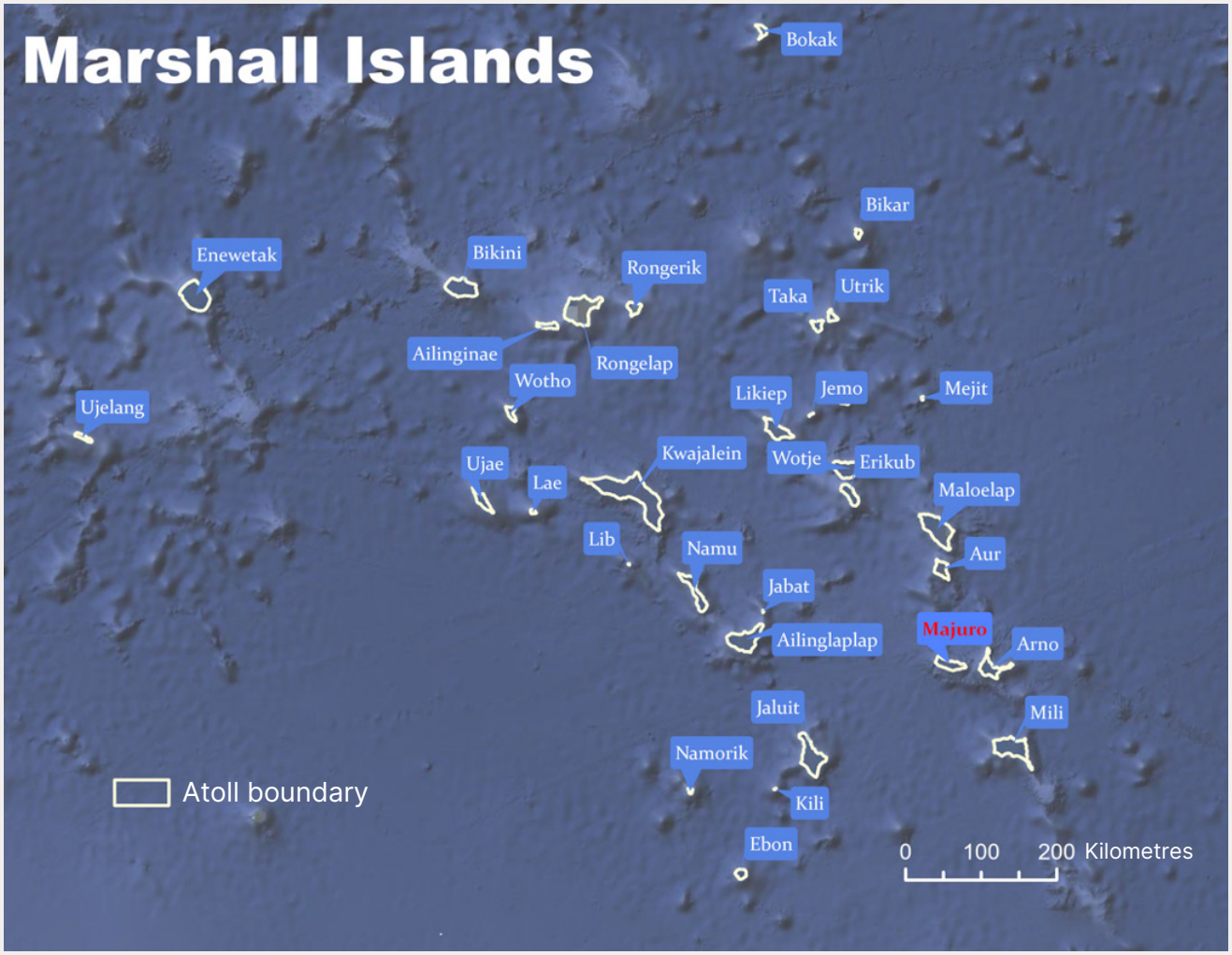
Geography and geomorphology

The RMI lies in the western Pacific Ocean and consists of 29 atolls and 5 low-lying coral islands (see Figure 2). These are grouped into two parallel island chains: the western *Ralik*, meaning 'sunset', and the eastern *Ratak*, meaning 'sunrise'."

The geomorphological profile of the archipelago is defined by its narrow and low-lying nature; individual islands or atolls rarely exceed 200 metres in width, while the majority of the land-mass remains situated at an elevation of less than 2 metres. Atolls are reef-built systems in which the reef, lagoon and narrow land strip work together to shape wave energy, sediment movement and shoreline stability. These conditions are formed by unconsolidated sand and gravel accumulating over thousands of years as waves move and deposit broken coral material onto the reef platform. Windward shores face direct ocean swell, with waves losing energy across the shallow reef before reaching land, while lagoon shores are calmer but typically lower. During storms, even large lagoons like Majuro can generate enough wind-driven waves to cause flooding and erosion.

The reef composition of Majuro and Kwajalein atolls is shown in Figures 3 and 4. Both have narrow reef structures, though Majuro's reef widens on the western side, opposite the more densely inhabited eastern shore. Each reef system has five functional zones: the *fore-reef*, an outer high-energy slope exposed to ocean swell; the *reef flat*, a shallow, near-sea-level platform that dissipates wave energy before it reaches shore; the *lagoon*, a sheltered, low-energy environment where fine sediment and diverse habitats accumulate; *passes*, which are channels that exchange water between lagoon and ocean and generate strong currents; and *lagoon pinnacles*, localized reef structures that act as biodiversity hotspots (see Figure 5). The islands' emergent land – low coral islands and sand cays – depends entirely on this reef system for physical protection.

Figure 2. RMI atolls
Based on data from the National Oceanic and Atmospheric Administration.[7] Developed by Miyamoto International



Wave breaking, illustrated in Figures 6 and 7, occurs when a wave becomes unstable in shallow water and collapses, typically once wave height reaches 0.5 to 1.2 times the water depth, though the exact ratio varies according to seabed slope, wave characteristics and wind. On coral reefs, the steep transition from deep to shallow water at the reef face makes this a fast and energetic process, as well as an important one, as it dissipates a large proportion of the incoming wave energy across the outer reef flat. Greater energy dissipation occurs at low tide when reefs are less submerged.

This reef-and-island system is not static, and its ability to dissipate wave energy and supply sediment to the shoreline depends on reef health – which is itself sensitive to the climate hazards set out in subsection 1.3. Rising sea surface temperature, ocean acidification and sea level rise all directly impact coral growth, and therefore the natural coastal protection the atolls in the RMI depend on.

Figure 3. Majuro reef

Based on data from the National Oceanic and Atmospheric Administration.[8] Developed by Miyamoto International

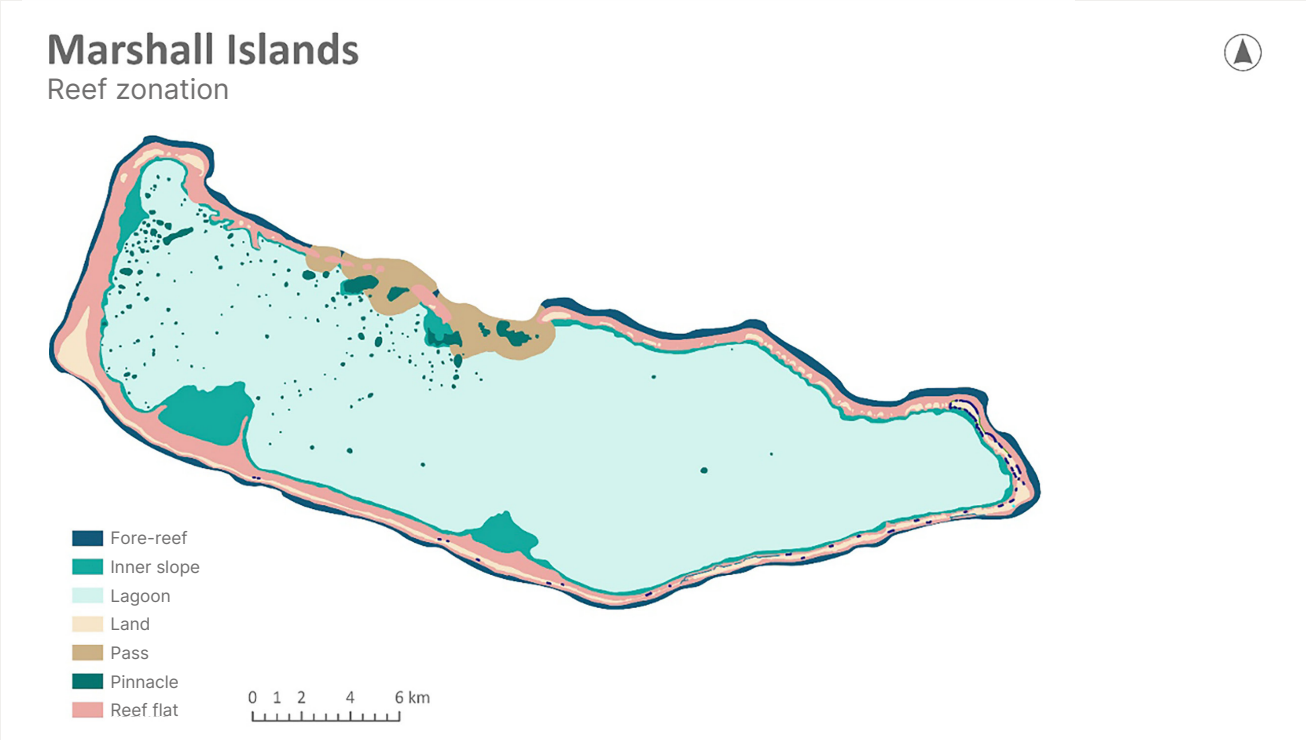


Figure 4. Kwajalein reef

Based on data from the National Oceanic and Atmospheric Administration.[9] Developed by Miyamoto International

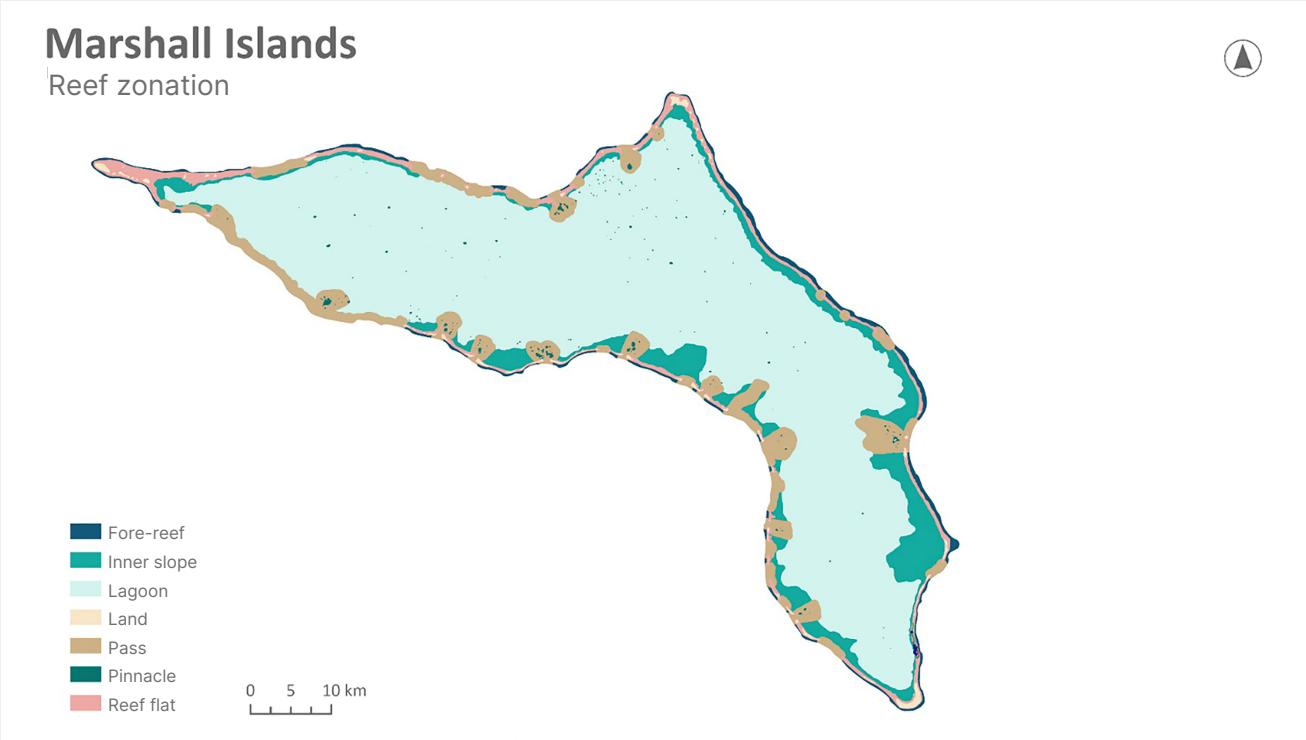


Figure 5. RMI atolls or reef-top islands[10]

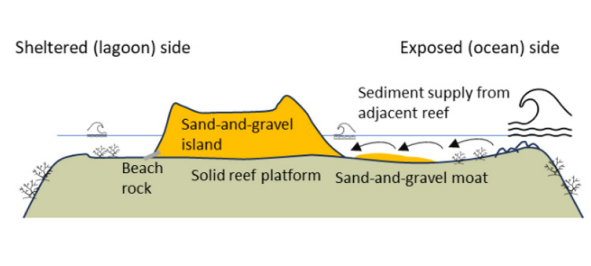


Figure 6. Example of Majuro reef and surrounding waves with annotations[11]



Figure 7. Example of Ebeye reef and surrounding waves with annotations[12]




Majuro coastline © Miyamoto International

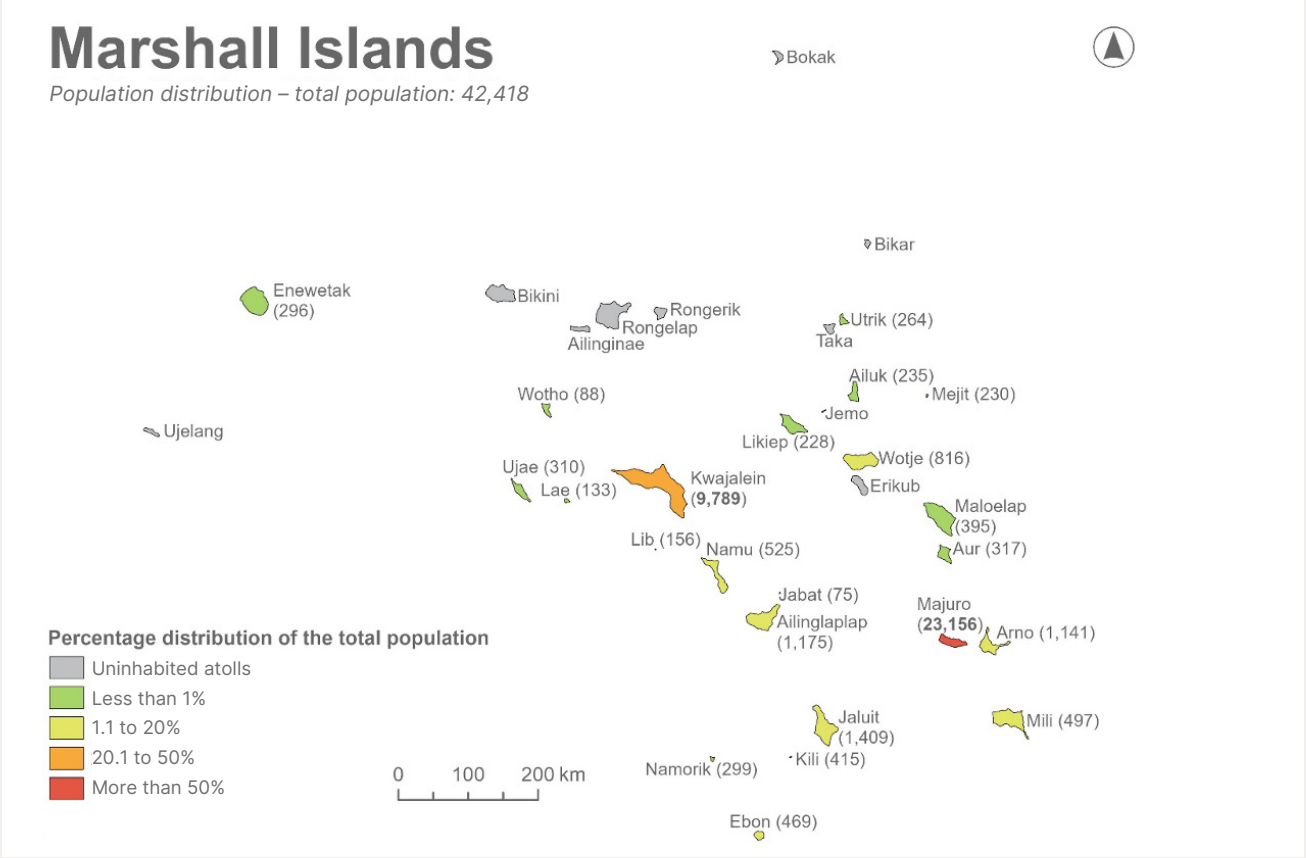
Demography

The Marshall Islands, settled over 3,000 years ago, underwent a claim by the Spanish, German colonial rule, and Japanese occupation before coming under the administration of the United States of America as part of the UN Trusteeship Agreements in 1947. It achieved self-government in 1979 and full sovereignty under the Compact of Free Association with the United States in 1986, with the trusteeship ending in 1990.

According to the 2021 census,[13] the total enumerated population of the RMI is 42,418, which is 10,740 units less than the population registered in the 2011 census, marking a 20 per cent decrease. It is hypothesized that the decrease is due to international migration, as the fertility rate is more than three children per woman. Of the total population, 54.6 per cent lives in Majuro and 23.1 per cent in Kwajalein, making them the most populated atolls. Local key stakeholders clarified that the most densely populated area is Ebeye, as most of the population in Kwajalein is concentrated in that area. The remainder of the population is distributed among the other atolls, with their populations ranging between 0 per cent and 3.3 per cent of the total, showing a significant difference between the two most populated atolls and the others (see Figure 8).

For these reasons, government efforts are mostly focused on Majuro and Kwajalein atolls, and on the communication and transport networks (from the neighbouring islands to Majuro and Ebeye) in the other atolls. In fact, Majuro and Kwajalein act as focal points for the healthcare system, with neighbouring islands referring to the Majuro and Ebeye hospitals when they need assistance.

Figure 8. RMI population
Based on data from the RMI 2021 census.[14] Map developed by Miyamoto International




Laura beach © UNOPS

Climate profile, natural hazards and recent extreme events

The RMI has a tropical oceanic climate characterized by consistently warm temperatures and high humidity, with relatively minimal seasonal temperature variation (27°-28° C mean annual temperature).[15] Rainfall is primarily seasonal, with a main wet season typically extending from May to October and a drier period from December to April when the northeast trade winds are most persistent. Precipitation varies across the archipelago, with southern atolls generally receiving more annual rainfall (approximately 406 cm per year) compared to that in northern atolls (approximately 51 cm per year).[16]

Climate variability is strongly influenced by the El Niño-Southern Oscillation (ENSO), which can amplify extremes and contributes to drought and water scarcity in drier years, and to heavy rainfall events that increase localized flooding risk in wetter periods. These climatic conditions, combined with low elevation and high coastal exposure, result in significant vulnerability to climate-related hazards. Key climate-related hazards affecting the RMI include extreme heat, drought, coastal flooding, tropical cyclones and tsunamis.[17,18]

Figure 9. Key climate-related hazards affecting the RMI, and associated hazard levels[19,20]

High	High	High	Medium	Medium
Coastal flooding	**Cyclones**	**Drought**	**Extreme heat**	**Tsunamis**
Frequent and expected to worsen with climate change impacts on sea level rise	Over 20 per cent chance of damaging winds associated with tropical cyclones in a 10-year period	ENSO-driven, affecting high volume of population with each event	Number of high heat index days rising sharply	The risk of tsunami hazards influenced by regional seismic activity

The RMI: Historical climate-related disasters

Recorded climate-related events in the RMI include droughts, tropical storms, typhoons, king tides and wave-driven coastal flooding. A notable historical event was Typhoon Paka in 1997, which caused an estimated $80 million in damage across the RMI.[21] Over the last decade, the RMI has experienced a pattern of recurring and compounding climate-related disasters dominated by two hazard types: drought and coastal inundation from king tides, storm surges and swell-wave overwash.

The 2015 to 2016 El Niño drought was the most economically damaging single event in the history of the RMI, affecting all 23 inhabited atolls and causing losses equivalent to 3.4 per cent of the 2015 GDP. Coastal flooding events in March 2016 (king tides in Kili and Majuro), November 2019 (wave-driven swell reaching 5 m in Majuro) and January 2024 (a storm surge affecting 19,532 people across 11 atolls, destroying homes, schools and critical infrastructure in Roi-Namur and Arno, assessed by the National Oceanic and Atmospheric Administration as more severe than the major flooding of December 2008) demonstrate both the increasing frequency and severity of marine inundation events.

The 2024 coastal flooding was further compounded by a concurrent drought beginning in late 2023, which stripped communities already affected by the surge of access to their remaining freshwater lens (affecting 5,200 people in 15 atolls and islands) – a direct illustration of how compound hazard events disproportionately affect small island communities with limited redundancy in their critical water and infrastructure systems.[22,23]

Figure 10. Major historical climate-related disasters in the RMI, 1991-2024[24-30]

1991 **Tropical Storm Zelda**
Around 6,000 people affected

1997 **Typhoon Paka**
Peak wind of 296 km/h; $80 million crop damage; 70 per cent of homes hit in Ailinglaplap; Ebeye Hospital water and sewage system damaged

1999 **El Niño drought**
National disaster declared; 8 per cent of normal rainfall over four months

2008 **Storm surge (Majuro)**
Over 300 homes damaged; 10 per cent of population displaced

2014 **King tide**
Around 1,000 displaced; Tinak Clinic (Arno) affected

2015 **Drought (2015-2016)**
State of emergency, February 2016; a total of 27,384 people affected; $4.9 million loss (3.4 per cent of the 2015 GDP); over 50 per cent of population affected across 23 atolls

2016 **King tides (March)**
Majuro roads flooded (around 150 mm depth)

2019 **Drought**
State of emergency; Northern atolls on emergency desalination

Flooding (November)
Airport access temporarily cut, around 200 residents displaced, swell up to 5 m in Majuro

2021 **Drought (2021-2022)**
Over 9,000 people across 17 atolls affected; National Disaster Management Office Emergency Operations Centre activated; Extreme drought persisted in Wotj

2023 **Drought (2023-2024)**
Rainwater shortages increased reliance on freshwater lenses; over 5,200 people affected (12.3% of population) across 15 atolls

2024 **Storm surge (January 2024)**
A total of 19,532 people across 11 atolls affected; Roi-Namur and Arno most severely affected; homes, schools and infrastructure destroyed; NOAA: more severe than 2008 flooding; IFRC emergency relief: CHF 50,024

Household exposure to natural hazards

Approximately 38 per cent of households in the RMI have reported direct climate-related health impacts, primarily in the form of heat stress or personal injury related to extreme weather.[31]

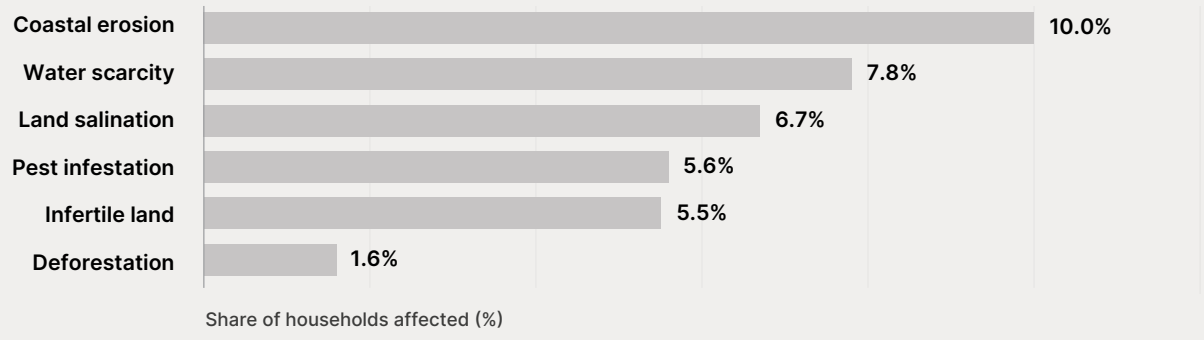
The 2021 census also demonstrates significant household exposure to natural hazards. Over the preceding 10 years, drought or irregular rainfall was the most commonly reported hazard, affecting 23.9 per cent of households, followed by storm surges (12.6 per cent), floods (12.3 per cent), king tides (9.7 per cent), typhoons (8.8 per cent) and tsunamis (3.8 per cent).

The census also highlights the persistent environmental impacts experienced by households. Coastal erosion affected 10.0 per cent of households, followed by water scarcity (7.8 per cent), land salination (6.7 per cent), pest infestation (5.6 per cent), infertile land (5.5 per cent) and deforestation (1.6 per cent).[32]

Coastal flooding remains a significant hazard in the RMI, driven by processes including storm surges, king tides and wave-driven inundation. These impacts are expected to worsen as sea levels rise.[33] Further details on current and projected coastal inundation under different sea level rise scenarios are provided in the section *Climate change impact on mean sea level rise*.


Ebeye Lagoon © UNOPS

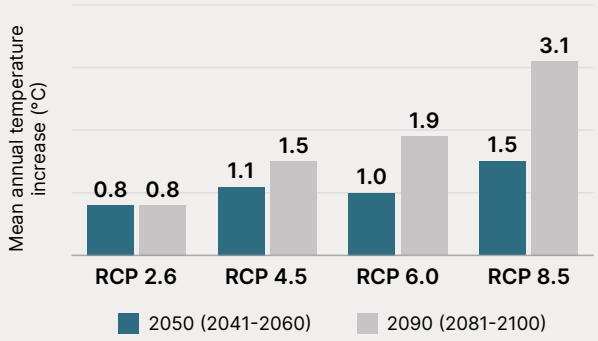
Figure 11. Share of households in the RMI reporting direct impacts from selected natural hazards[34]



Extreme heat and drought

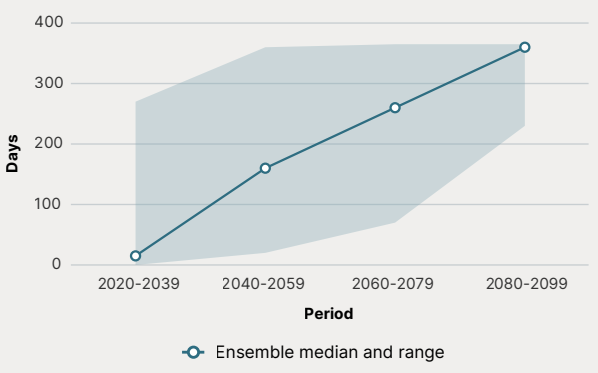
The RMI has already warmed by approximately 0.6° C since 1980, consistent with broader Pacific and global trends.[35] Projected further warming varies widely by emissions pathway and time horizon – from a modest 0.8° C by the 2090s under strong mitigation (Representative Concentration Pathway [RCP] 2.6) to over 3° C under a business-as-usual approach (RCP 8.5) – though model confidence is only medium given the difficulty of simulating climate processes at small-island spatial scales.[36]

Figure 12. Projected mean annual temperature increase for the RMI relative to 1986-2005, by emissions pathway; error bars show the 5th to 95th percentile range[37]



A particularly important measure of heat exposure in the RMI is the heat index, which accounts for both temperature and humidity. Under RCP 8.5, the number of days per year in which the daily mean heat index exceeds 35° C is projected to increase by approximately 357 days by the 2090s relative to the 1986-2005 baseline.[38] This substantial increase in heat exposure has direct implications for the thermal comfort and cooling requirements of health facilities, as well as for outdoor and manual workers.[39]

Figure 13. Projected change in the number of days with a heat index over 35 °C[43]



In the RMI, drought is strongly influenced by ENSO, with El Niño conditions generally associated with increased drought risk and severity, while La Niña conditions tend to bring wetter conditions and reduce drought risk.[40] A major drought occurred in 2015-2016, resulting in widespread water shortages and significant economic and health impacts.[41] Drought conditions again affected RMI in 2019, particularly the northern atolls, requiring the deployment of emergency reverse-osmosis units to communities experiencing water shortages. More recently, drought conditions beginning in late 2023 impacted 15 atolls and islands, and approximately 5,200 people.[42]

The 2015-2016 drought: Economic and health impacts

The 2015-2016 drought in the RMI caused economic losses estimated at $4.9 million (3.4 per cent of the 2015 GDP). Approximately 82 per cent of the economic effects resulted from disruptions to production flows, particularly across agriculture, education and industry, while the remaining 18 per cent was due to higher production costs. No physical damage to health infrastructure was reported, but demand for healthcare increased, with higher incidence of diarrhoeal disease, influenza-like illness, conjunctivitis and scabies, resulting in approximately $137,900 in additional healthcare costs. Women and girls bore a disproportionate burden; about 4,400 hygiene kits were distributed to women and girls of reproductive age to offset the challenges of having inadequate water for bathing and hygiene needs. There was a nearly fivefold increase in hospitalizations due to child malnutrition during the drought period, suggesting a substantial deterioration in overall child nutritional status. Women play a central role in maintaining household health and well-being, particularly for children and older persons, and were therefore disproportionately affected by the compounded impacts of water scarcity and food insecurity.[44]

Rainfall trends are less clear-cut. Observed records show a statistically significant decrease in annual rainfall in Majuro since 1954, with substantial year-to-year variability associated with ENSO. In contrast, climate projections generally indicate an increase in average annual rainfall over the course of the 21st century, although considerable uncertainty remains in future rainfall projections.[45]

Flooding

Flooding in RMI can result from both extreme rainfall and coastal events. Intense rainfall can cause localized or more widespread flooding depending on its duration, while coastal flooding can result from elevated tides, storm surges and wave-driven inundation. Coastal flooding is classified as a high-risk hazard by the Global Facility for Disaster Reduction and Recovery (GFDRR) ThinkHazard! tool[46] and is expected to worsen with sea level rise.

Documented assessments of damage from past flooding events are limited, with available studies focusing primarily on hazard exposure rather than post-event losses. Stakeholder consultations indicate that health facilities have generally not experienced major structural damage from past flooding, although Tinak Clinic in Arno was significantly affected by the 2014 king tide.[47,48]

Tropical cyclones (typhoons)

The World Bank Climate Risk Country Profile for the RMI, drawing on GFDRR hazard information, identifies tropical cyclone hazards as high-risk. The probability of experiencing potentially damaging wind speeds within a 10-year period is over 20 per cent, with a higher frequency of occurrence during El Niño years and significantly lower frequency during La Niña years.

While future changes in cyclone behaviour remain uncertain, climate change is expected to exacerbate impacts through sea level rise, increased storm surges, and potentially higher wind speeds and precipitation intensity. Global climate models suggest a possible decrease in overall cyclone frequency but an increase in the intensity of the most extreme events, although confidence in regional projections remains low. Tropical cyclones have historically affected the RMI (see Table 2).[iii]

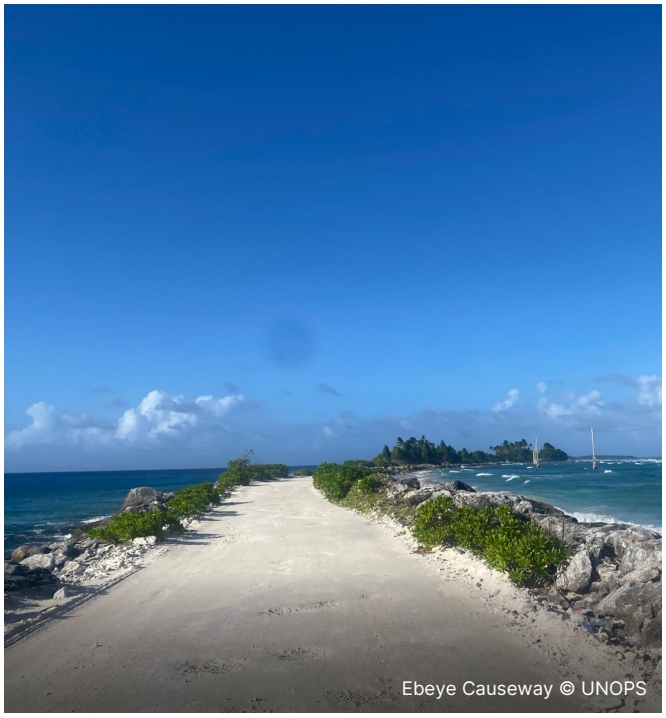
Tsunamis

Although Pacific atolls sit in relatively quiet local seismic zones, they remain vulnerable to trans-oceanic tsunamis generated at distant subduction margins, such as the Kuril Trench.[49,50] The GFDRR ThinkHazard! platform classifies the Marshall Islands as having a medium tsunami hazard risk, meaning that it is possible for potentially damaging tsunamis to occur within the next 50 years. The steep drop-off just beyond the RMI reef crest – unlike a gently

iii. GFDRR ThinkHazard! (2020) reports there is no data for cyclone hazards in the RMI. Given the recognized relevance of tropical cyclones to the RMI, cyclone information is supplemented by the 2011 GFDRR assessment and the World Bank Climate Risk Country Profile for the RMI.

Table 2. History of tropical cyclones in the RMI[51,52,53]

Indicator	Value
Tropical cyclones developing within or crossing the RMI exclusive economic zone, 1977-2011	Average 22 cyclones per decade
Severe tropical cyclones (Category 3 or stronger)	~18%
Tropical cyclone frequency during El Niño years	50 per decade
Average damage per major cyclone (1988-2008)	$63 million
GFDRR cyclone hazard classification for the RMI (2011)	High


Ebeye Causeway © UNOPS

sloping continental shelf – limits wave amplification (shoaling) compared to settings like Japan. The 2011 Tohoku earthquake generated a tsunami that reached the RMI at under 90 cm, below typical storm swell or king tide heights;[54] nonetheless, sea level rise will increase the baseline water level against which any future tsunami arrives.

Legacy nuclear contamination

Between 1946 and 1958, 67 nuclear detonations in Bikini and Enewetak atolls introduced long-lived radionuclides into the local ecosystem, forcing permanent community displacement.[55,56] While external exposure has declined, the risk of internal exposure persists through the food chain. This hazard is excluded from the scope of this assessment, as the affected areas remain uninhabited.

Climate change impact on mean sea level rise

The mean sea level in the RMI is shaped by tides, wave action (including storm surges) and long-term climate change. RMI-specific projections track closely with global Intergovernmental Panel on Climate Change (IPCC) AR5 ranges (2013-2014), with high confidence in the direction of change but lower confidence in the exact magnitude, given the uncertainty in predicting Antarctic ice sheet dynamics.[57,58]

Under RCP 8.5 projections, warming of around 2.8° C is projected by the end of the century,[59] potentially exacerbating droughts and causing a cascading effect on essential services.[iv]

Erosion is already visible today. Coastal vegetation loss and shoreline retreat are underway in Majuro, worsened by dredging and sand mining, notably around the airport area.[60] The Deltares spatial flood modelling for Ebeye (2017)[61] and Majuro (2021)[62] translates these sea level trajectories into projected land inundation under different coastal hazard events – swell waves, locally-generated waves from the lagoon, typhoons or tsunamis – across a range of return periods (RP).

iv. Downscaled climate projections for the RMI are available under IPCC6/AR6 through the National Aeronautics and Space Administration (NASA) Sea Level Change Portal. These AR6 projections show that the sea level rise trajectory in the RMI is broadly consistent with global patterns, with high confidence in continued rise but greater uncertainty in late-century values due to evolving understanding of Antarctic ice sheet dynamics. AR5 data have been provided in this report to maintain consistency with the assessments carried out by Deltares (coastal risk assessments in Ebeye and vulnerability assessments in Majuro), which have been used in the analysis.

Table 3. Sea level rise projections in the RMI[63,64]

Emissions scenario	RMI-specific projection	Global IPCC AR5 range (by 2100)
RCP 4.5 (reduced emissions)	0.35-0.45 m (50 years)	0.53 m (0.36-0.71)
RCP 8.5 (business-as-usual approach)	0.7-1.1 m (100 years)	0.74 m (0.52-0.98)
High-end Antarctic ice-sheet loss	N/A	1.84 m (0.98-2.47)

Ebeye Island

Ebeye is already highly exposed to coastal inundation. According to the Deltares (2017) coastal risk assessment, the principal drivers of inundation are swell waves and typhoons. Swell waves are the dominant cause of flooding for lower return periods (more frequent events), while typhoon conditions become increasingly dominant at higher return periods (rarer and more extreme events).

Deltares modelling shows that under present-day conditions (SLR = 0 m), approximately 30.2 per cent of the island is inundated by more than 20 cm of waves during a 10-year return-period event, increasing to 69.9 per cent for a 30-year event and 90.0 per cent for a 50-year event (see Figure 14).

Deltares modelling shows that sea level rise substantially amplifies this exposure. Under RCP 8.5, by 2100 (SLR = 0.78 m), the modelled inundated area increases to 78.2 per cent for a 10-year event, 91.8 per cent for a 30-year event and 94.1 per cent for a 50-year event. The modelling therefore indicates that, by 2100, even a relatively frequent 10-year event could inundate most of Ebeye (see Figure 15). This increase is directly linked to higher sea levels, which allow waves to reach farther across the low-lying island.[65]

Majuro Atoll

According to the Deltares (2021) coastal flood modelling for Majuro, the atoll is exposed to coastal inundation from several hazards, including swell waves, typhoons and extreme rainfall, with the extent of flooding increasing under sea level rise scenarios.

The assessment models coastal flooding for a range of return periods and sea level rise scenarios, both with and without extreme coastal events. Importantly, sea level rise alone is projected to result in permanent inundation of parts of Majuro. Modelled flood maps show that with 1 m of sea level rise, large areas along the lagoon coast – including Delap-Uliga-Djarrit – become permanently flooded; at 2 m, most low-lying areas of the atoll are submerged, including significant portions of the corridor between the Majuro airport and Laura.[66]

Figure 14. Maximum inundation modelled for a 10-year return period for combined coastal hazards under present-day conditions, sea level rise scenario (SLR = 0)[67]

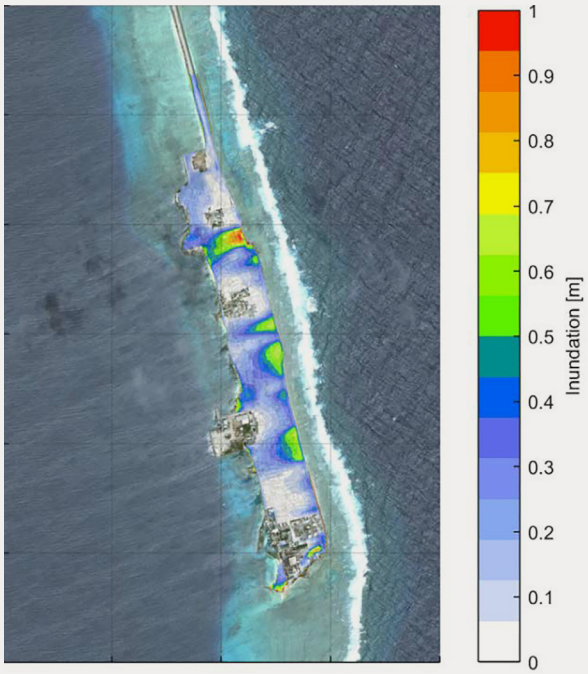
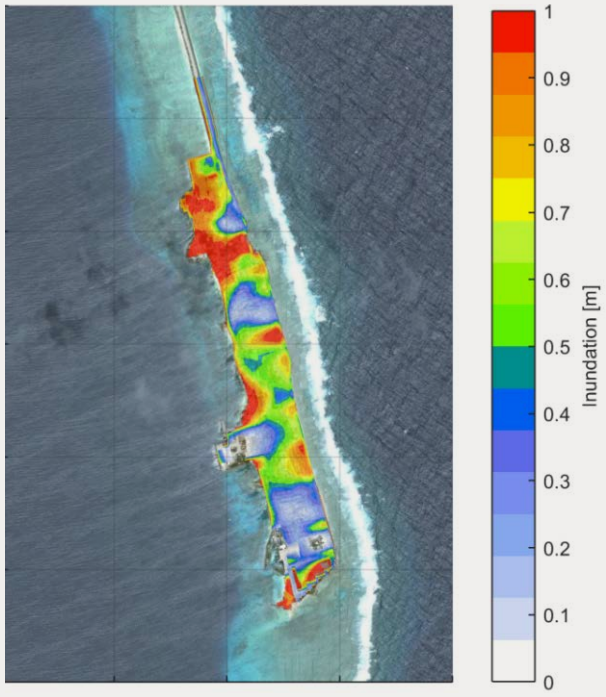


Figure 15. Maximum inundation modelled for a 10-year return period for combined coastal hazards, sea level rise scenario RCP 8.5, 2100 (SLR = 0.78 m)[68]



Swell waves are the main driver of coastal inundation in Majuro, particularly those arriving from the northeast. Typhoon events, in contrast, predominantly drive flooding from the south and can combine waves, storm surges and intense rainfall. Table 4 presents the percentage of Majuro's land area inundated under 10-year and 50-year return period swell and typhoon events, combined with different sea level rise scenarios. The results demonstrate the strong influence of sea level rise on future flood exposure (see Figure 16). Under present-day sea levels, a 10-year event inundates approximately 31-35 per cent of the land area, increasing to 85-91 per cent under 1 m of SLR. With 2 m of SLR, almost the entire land area is inundated even during a relatively frequent 10-year event.[70]

Table 4. Majuro Atoll projected inundation under various scenarios[71]

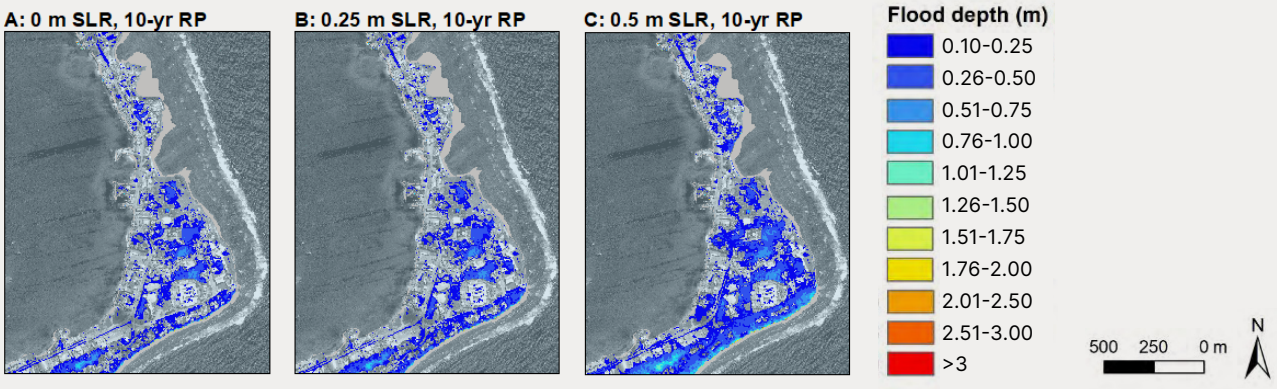
Scenario	10-year RP swell waves	50-year RP swell waves	10-year RP typhoon	50-year RP typhoon
Present (SLR 0 m)	35%	56%	31%	58%
SLR +0.25 m	52%	70%	44%	70%
SLR +0.5 m	66%	83%	58%	83%
SLR +1 m	91%	96%	85%	96%
SLR +2 m	100%	100%	99%	100%

Implications for the development of the roadmap

Two aspects of the RMI climate profile have directly shaped the roadmap's strategic approach. First, the direction of risk is well established even where exact magnitudes are uncertain – the risk of heat, drought, cyclone and inundation exposure is rising, which encourages no-regret investment now rather than waiting for more exact model ranges.

Second, several hazards interact with physical assets that support health and coastal infrastructure. High heat index days raise cooling load requirements for health facilities, and both erosion and SLR-driven inundation converge on the same low-lying coastal corridors already identified as priority sites (corridor between Majuro airport and Laura, Ebeye). This reinforces the need for a phased, adaptive investment sequence over a single fixed design standard, given how widely projected exposure diverges across emissions pathways.

Figure 16. Maximum flood depth in the southern Delap-Uliga-Djarrit area for typhoon conditions, with 0, 0.25, and 0.5 m of sea level rise for the 10 return period storm[69]





Governance and institutional context

Majuro coastline © UNOPS

Governance aspects

The RMI operates under a mixed parliamentary-presidential system, with a Presidential Cabinet managing 10 portfolios. Geographic isolation and a limited resource base constrain economic diversification, leaving the public sector as the largest employer (engaging roughly a third of the workforce) and the national income and development financing largely reliant on international assistance.

Within this government structure, responsibilities for infrastructure planning, investment, delivery, operation and resilience are distributed across line ministries and central government bodies. For the coastal and health infrastructure considered in this Roadmap, the Ministry of Public Works, Infrastructure and Utilities (MPWIU) and the Ministry of Health and Human Services (MoHHS) are the principal sector institutions.

Beyond the sector ministries, several cross-government institutions and coordination bodies support national planning, development financing, disaster risk management and climate policy. Their respective roles are summarisedin Table 5.

Core project counterparts

Ministry of Public Works, Infrastructure and Utilities (MPWIU)

The MPWIU is the lead agency responsible for the planning, development, construction and maintenance of public infrastructure. Its mandate covers core assets that underpin national connectivity, resilience and service delivery, including roads, docks, airport runways, public buildings, and coastal protection infrastructure across urban centres and outer islands.

Through its Project Management Unit (PMU), the ministry oversees design review, construction supervision, quality assurance, and enforces compliance with the national building code[72] for major government projects. In addition to handling infrastructure delivery, MPWIU acts as a key focal point between sector ministries, state-owned enterprises and development partners. As manager of the national infrastructure portfolio, it coordinates the government's broader objectives under the National Strategic Plan, National Adaptation Plan and National Infrastructure Investment Plan.

Ministry of Health and Human Services (MoHHS)

The MoHHS is the national authority responsible for the planning, management and operation of health infrastructure in the RMI. Under its statutory mandate, MoHHS supervises all government-owned health facilities, including Majuro Hospital, Ebeye Hospital, and the nationwide network of neighbouring island clinics.

Within the National Infrastructure Investment Plan framework, MoHHS acts as the sector asset owner for health infrastructure. The ministry is responsible for identifying priority investments, defining operational requirements, and articulating sector-specific needs. These responsibilities require considering functionality, service continuity, staffing, utilities and basic maintenance, including in remote island contexts. The ministry also plays an important role in strengthening health infrastructure resilience to climate-related hazards through facility upgrades and emergency preparedness.

Inter-agency coordination

MoHHS works closely with MPWIU on the delivery of capital investments for health facilities. While MPWIU leads project implementation, procurement and construction oversight, MoHHS provides technical and operational input to inform design requirements, resilience standards and health service functionality.

Table 5. Key cross-government institutions in the RMI supporting national planning, financing, climate action and disaster risk management

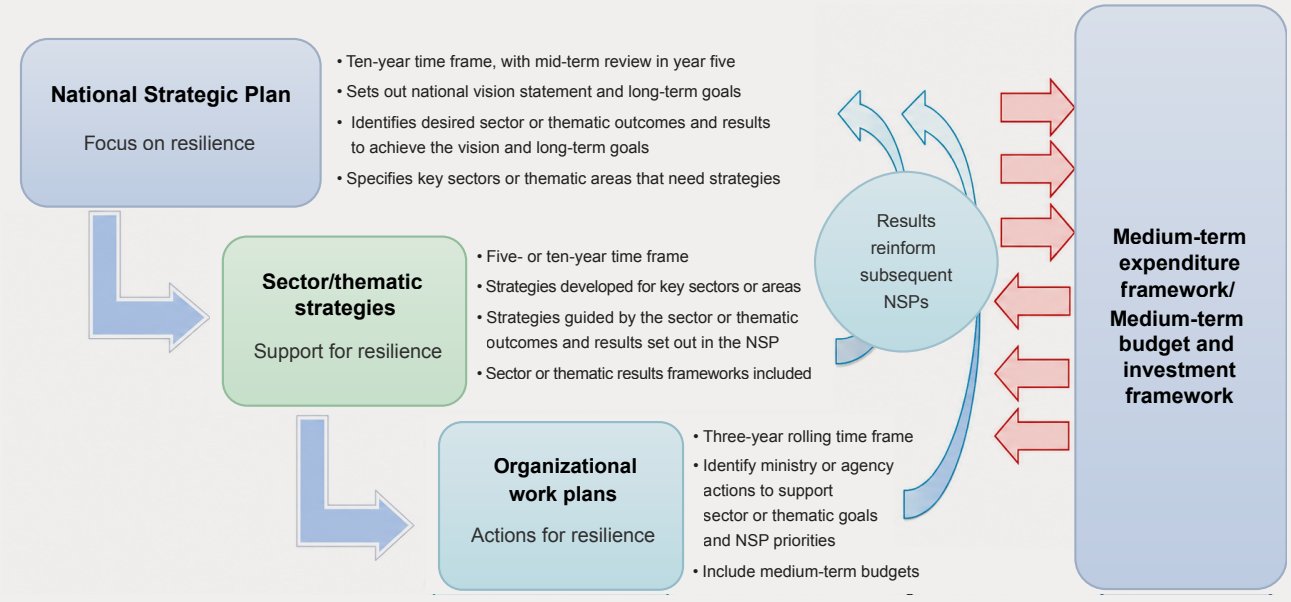
Body	Mandate	Key role
Economic Policy, Planning and Statistics Office (EPPSO)	National strategic planning, policy coordination, monitoring	Oversees the RMI National Strategic Plan; aligns sector strategies with climate and development goals
Ministry of Finance, Banking and Postal Services (MoFBPS)	Budget allocation, fiscal oversight, financial control	Links infrastructure planning to medium-term and annual budgeting
Division of International Development Assistance (DIDA) (falls under MoFBPS)	External financing and donor engagements	Ensures alignment with national priorities via the National Infrastructure Investment Plan
National Disaster Management Office (NDMO)	Disaster risk management, emergency preparedness, recovery	Implements the Disaster Risk Management Act (2023); leads national response and resilience efforts
Tile Til Eo Committee (TTEC)	Cross-cutting climate policy coordination	Ensures interministerial coordination across climate change action, disaster risk resilience, and green energy initiatives

Current framework of infrastructure policies

Figure 17 illustrates the institutional and policy architecture governing infrastructure planning, financing and delivery in the RMI. The National Strategic Plan (NSP)[73] and the National Adaptation Plan (NAP)[74] sit at the apex of the framework, providing the overarching strategic direction for sector performance and resilience objectives.

The NSP builds on a long-term evolution of development planning in the RMI, drawing on successive national frameworks, from the First Five-Year Economic Development Plan (1986-1991) to Vision 2018 (2003-2018) and the National Strategic Plan 2015-2017. In May 2019, the Cabinet adopted the National Planning Framework, reaffirming the NSP as the fundamental planning instrument guiding all public, private and externally funded development. The NSP 2020-2030 sets a 10-year national vision, defines sector goals and policy objectives across key strategic pillars – including social services and cultural identity, economic development, infrastructure, environmental stewardship, climate change, and governance – and guides resource allocation through medium-term and annual budgeting.

Figure 17. Planning flow diagram as outlined in the National Strategic Plan (2020-2030)[75]

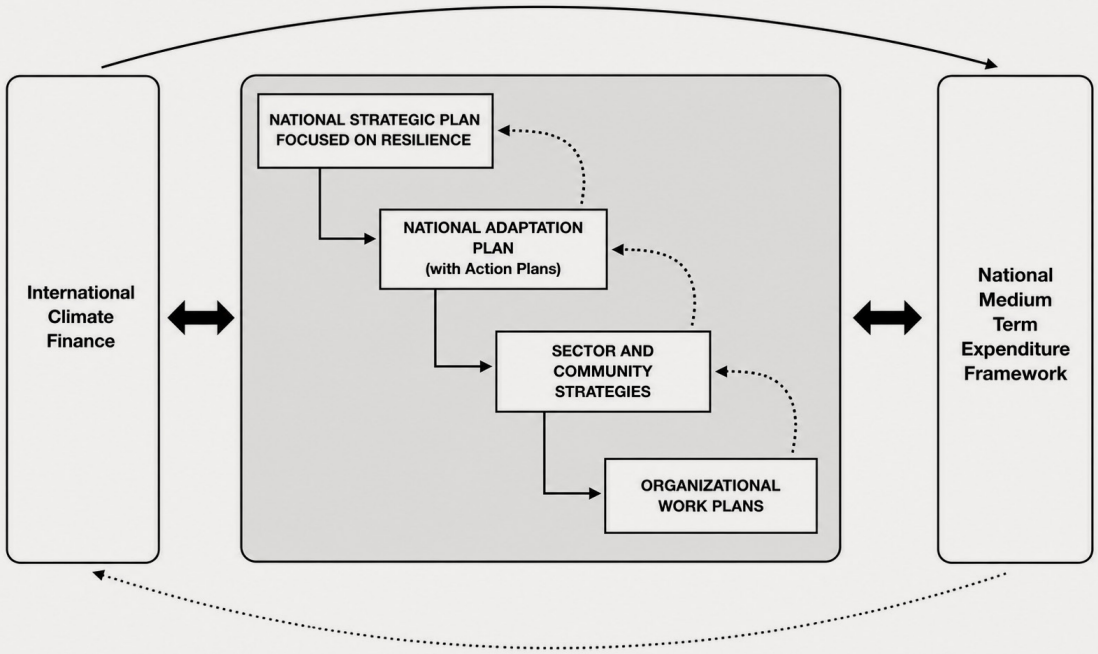


Within this framework, the NAP, which is also referred to as the Climate Adaptation Survival Plan, functions as the key national planning and implementation instrument for climate change adaptation and resilience. Fully integrated within the NSP, the NAP operationalizes the Environment, Climate Change and Resiliency pillar and translates national climate ambitions into actionable interventions. As a result, implementation of NAP actions directly contributes to the achievement of NSP climate objectives, while also advancing progress across other NSP pillars, particularly infrastructure development and economic resilience, reflecting the cross-cutting nature of climate adaptation.

The NAP provides government agencies with a structured roadmap to mainstream climate adaptation into planning, policy-making, and service delivery across sectors and governance levels. It is designed as the primary coordinating framework for climate adaptation and resilience, aligning allied policy instruments (such as sea level rise and disaster risk reduction policies), sector-specific strategies (including health- and infrastructure-related climate strategies), and government and donor-funded initiatives. Coordination and strategic oversight of NAP implementation are supported through the Tile Til Eo Committee (TTEC), which also serves as the primary authority for the endorsement and coordination of Green Climate Fund (GCF) projects and strategies, strengthening alignment between national priorities and international climate finance.

The NAP further promotes inclusive engagement with civil society, the private sector, and local communities, facilitating participatory and locally informed adaptation planning. Importantly, the first NAP adopts a 10-year planning horizon, addressing immediate and medium-term adaptation needs while establishing the foundation for longer-term, resource-intensive adaptation actions to be carried out over a time frame of 10 to over 50 years. Through this structured approach, the NAP strengthens access to climate finance, enhances implementation readiness and supports a resilient development trajectory for the RMI.

Figure 18. Strategic national policies and processes as per the National Adaptation Plan (2023)[76]

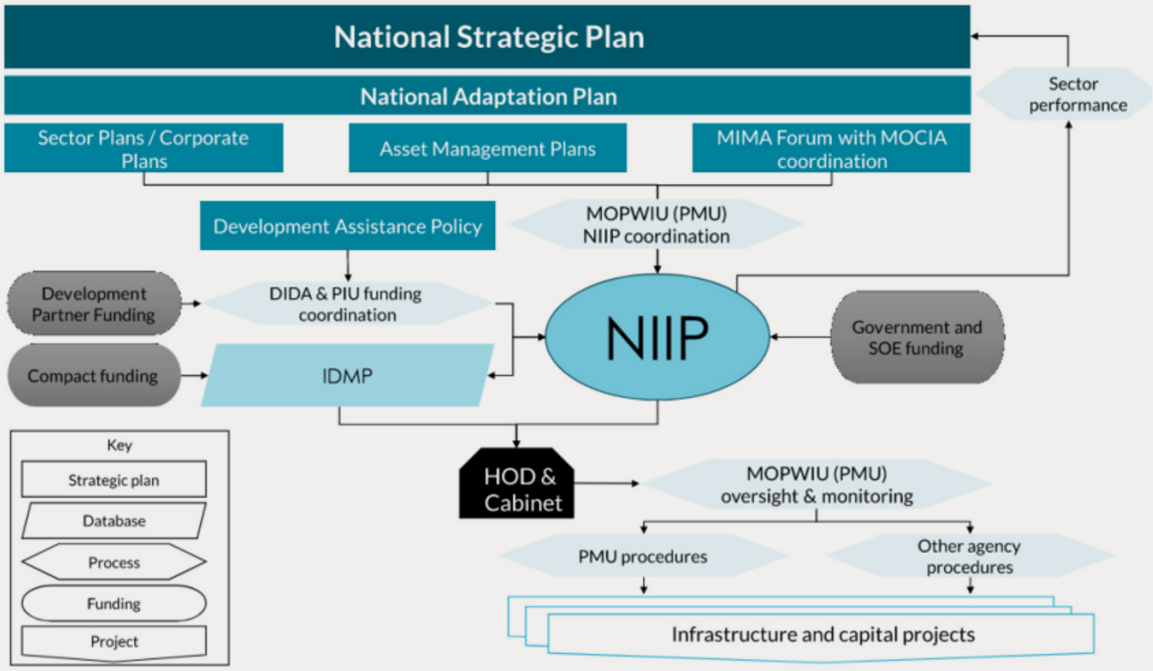


Operational investment framework

NSP and NAP are translated into sector and corporate plans, asset management plans and coordination mechanisms with local governments through platforms such as the Marshall Islands Mayors Association (MIMA) forum and the Ministry of Culture and Internal Affairs (MoCIA). The National Infrastructure Investment Plan (NIIP)[77] functions as the central operational instrument, consolidating priority infrastructure investments and aligning them with available funding sources. Coordination of the NIIP is led by MPWIU through its PMU, with inputs from sector ministries and agencies (including MoHHS, which can request funds for projects related to hospitals and clinics).

The role of financing and project-based mechanisms in infrastructure delivery is central. Development partner funding, compact funding, and government and state-owned enterprise financing flow into the NIIP through coordinated processes involving the Division of International Development Assistance (DIDA), Project Implementation Units, and the Infrastructure Development and Maintenance Plan. Projects approved through the NIIP are subject to oversight by Heads of Departments and the Cabinet, and are implemented through PMU procedures or other agency-specific processes. While the framework demonstrates clear strategic alignment and defined institutional roles, it also illustrates the system's excessive reliance on project-based delivery and external financing, with limited feedback from operation and maintenance performance into planning. This reflects the assessment's finding that, although planning and coordination structures are well established, long-term asset management and life cycle funding remain key areas that require strengthening.

Figure 19. RMI plans and processes as per the National Infrastructure Investment Plan 2023[78]



DIDA = Division of International Development Assistance; HODs = heads of departments; IDMP = infrastructure development and maintenance plan; MIMA = Marshall Islands Mayors Association; MOCIA = Ministry of Culture and Internal Affairs; MPWIU = Ministry of Public Works, Infrastructure and Utilities; NIIP = National Infrastructure Investment Plan, PIU = Project Implementation Unit; PMU = Project Management Unit (under the MPWIU); SOE = state-owned enterprise.


Construction works Majuro Airport road © UNOPS

To illustrate the scale and distribution of these investments, the current portfolio metrics and sectoral breakdowns from the NIIP 2023 database are aggregated in Table 6.

Table 6. Metrics from the National Infrastructure Investment Plan database[79]

Investment metric (NIIP 2023 database)	Pipeline status and sector allocations
Total project pipeline	155 projects
Total estimated portfolio value	$1.17 billion
Funded portfolio (ongoing or commencing)	45 projects (35% of pipeline/$409 million)
Unfunded portfolio (planned or appraised)	110 projects (65% of pipeline/$758 million)
Primary sectoral shares	Energy (21.5%), education (16.2%), aviation (11.8%), water and sanitation (11.0%), information and communications technology (9.5%), environment (7.4%), maritime (7.2%), buildings (5.2%), other (10.3% – including roads, waste management, health, finance, fisheries and agriculture)
MoHHS health project allocation	3.7% of total portfolio value ($14 million)

Gender equality and disability and social inclusion

Women constitute 43 per cent of the public service workforce in the RMI but hold only 38 per cent of the management positions within public service, reflecting persistent gender disparities in leadership and decision-making.[80] Women held approximately 12.1 per cent of parliamentary seats in 2024, indicating continued under-representation in political decision-making. Early marriage is prevalent, with 26.3 per cent of women aged 20-24 having married before the age of 18. Gender-based violence is also a concern, with 19.3 per cent of girls and women aged 15-49 having reported physical or sexual violence in 2018.[81] These indicators reflect structural gender inequalities that influence access to resources, decision-making power, and resilience capacities across the Marshall Islands. Reproductive health indicators further highlight gender-related vulnerabilities. According to data from the World Bank, the adolescent birth rate in the RMI remains high at approximately 71 births per 1,000 girls aged 15-19, indicating continued challenges in accessing reproductive health services and education, and in preventing early marriages.[82]

These modern inequities represent a profound shift from traditional social structures. Historically, Marshallese culture emphasized clear gender roles under a matrilineal land tenure system that granted women significant decision-making power, alongside their active contributions to fishing, canoe building and navigation. However, historical missionary activities, colonization and nuclear testing have driven major changes in these traditional gender norms. Today, the impact of climate change on women is especially pronounced in the outer atolls, exposing them to heightened economic hardship, unemployment, restricted access to justice, and intensified poverty or marginalization.[83]

Social dynamics of climate risk

Risks related to natural hazards are generally not gender-neutral. In the RMI, as across the Pacific, climate risks interact with existing inequalities related to gender, disability, age, geographic location (urban Majuro/Ebeye vs. neighbouring islands), and socio-economic status, shaping who is exposed, who can access services, and who can recover after shocks.[84]

Environmental threats often disproportionately affect women, who frequently bear the primary responsibility for maintaining family health and community well-being. They also often carry disproportionate unpaid care responsibilities, including water collection, caregiving, and household management, which intensify during climate stress and service disruptions. These factors constrain their participation in decision-making, planning processes and economic activities.[85]

Consistent with international guidance on inclusive and resilient development,[86,87] this roadmap highlights that climate-resilient infrastructure presents an opportunity to not only reduce disaster risks, but also to address long-standing social inequalities. Investments in health facilities, coastal protection systems, transportation networks, emergency shelters, water supply systems, and digital connectivity can significantly improve quality of life, safety, accessibility, and economic opportunities for vulnerable groups if designed and implemented using approaches responsive to gender equality, disability and social inclusion (GEDSI) issues.

Embedding GEDSI considerations throughout the infrastructure life cycle, from planning and design to operation, maintenance, emergency preparedness, and investment prioritization, will help ensure that investments in resilience deliver equitable benefits and improve quality of life for all Marshallese communities.

Geographic inequality

The geographic dispersion of the RMI, comprising 29 atolls and 5 low-lying islands spread across approximately 1.9 million km² of ocean, creates significant disparities in access to infrastructure, public services and economic opportunities.

Through stakeholder consultations and a review of national policies and literature undertaken during this assessment, the geographic dispersion of the Marshall Islands atolls, combined with increasing climate-related hazards, was consistently identified as one of the principal barriers to equitable access to healthcare, transportation, emergency services, water, sanitation, and resilient infrastructure.[88] Residents of remote atolls have to deal with longer travel times and reduced access to specialized healthcare, emergency services, and infrastructure investments.

Geographic isolation also increases the cost and complexity of delivering and maintaining infrastructure by limiting the availability of construction materials, equipment and skilled personnel. These challenges are further exacerbated by climate-related hazards, including king tides, coastal flooding, droughts, storm surges and coastal erosion, which can disrupt transport and supply chains, delay emergency response, and prolong interruptions to essential services in remote communities. As a result, communities in the neighbouring islands are more vulnerable to prolonged service disruptions and slower recovery following disasters, with disproportionate impacts on households with limited financial resources or mobility, including on women, older persons and persons with disabilities.

Children and youth

Children and adolescents are particularly exposed to climate change impacts because of their reliance on continuous access to education, healthcare, water supply and sanitation services for their health, development and well-being. In the RMI, where children aged 0-17 account for approximately 46 per cent of the country's population,[89] climate-related disruptions to schools, health facilities and essential public services directly affect



Kwajalein coastline © UNOPS

Strengthening GEDSI-responsive data collection for infrastructure resilience

While this assessment has drawn on the best available evidence, the limited availability of disaster impact data disaggregated by atoll and population group impeded a more comprehensive analysis of differential impacts from a GEDSI perspective. Based on the findings of this assessment, it is concluded that strengthening the collection and availability of disaggregated disaster and infrastructure performance data is essential to better understand the needs, capacities and vulnerabilities of different population groups and to support more inclusive, evidence-based planning, investment prioritization and resilience decision-making.

children's health, nutrition, learning outcomes and psychosocial well-being, with long-term implications for human capital development.[90]

In 2024, drought-related school disruptions affected approximately 1,000 students (5 per cent of all children) in the RMI.[91] These cumulative vulnerabilities are reflected in the RMI having a Human Capital Index (a measurement developed by the World Bank) of 0.42, indicating that a child born in the Marshall Islands today is expected to achieve only 42 per cent of their potential productivity by adulthood under current education and health conditions, which are increasingly threatened by climate change.[92]

The government also recognizes that climate shocks contribute to interrupted education, food insecurity and the increasing migration of young people to Majuro or Ebeye, or overseas, in search of economic opportunities. Consequently, the third nationally determined contributions (NDC 3.0) developed by the RMI identify early childhood development as a national priority and commit to strengthening climate-resilient homes, schools and community environments to protect children's development and future opportunities.[93]

Implications for development of the roadmap

Two features of the institutional context shape the roadmap's approach. First, responsibility for planning, financing, delivering and maintaining resilient infrastructure is distributed across several ministries, agencies and state-owned enterprises, requiring sustained coordination throughout the infrastructure life cycle. Therefore, the roadmap must prioritize the strengthening of institutional arrangements for asset management, implementation, and operations and maintenance (O&M) capacity across all responsible agencies, in addition to proposing critical infrastructure investments.

Second, the RMI has already established a comprehensive policy framework for climate adaptation, disaster risk reduction and inclusive development. The priority for this roadmap is therefore not the development of additional policies, but the practical implementation of existing commitments and identified priorities through targeted investments, improved coordination and strengthened institutional systems. This includes recognizing that resilient infrastructure should also support equitable access to essential services, encourage community participation and meet the needs of different users, consistent with the principles set out in the national policy framework.



Consolidated findings revealing resilience needs

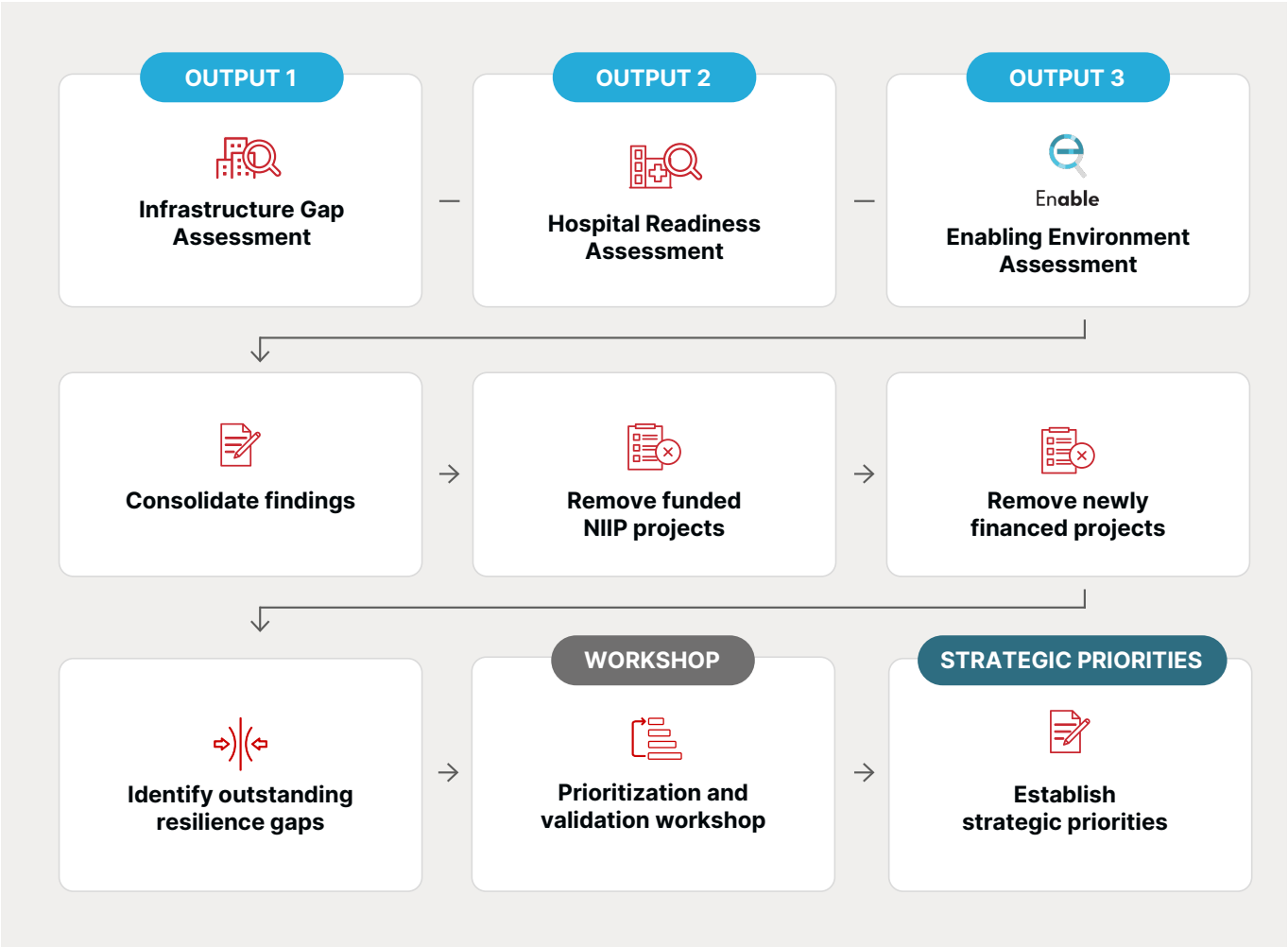
Majuro Hospital © UNOPS

This chapter brings together the summary findings from Output 1 – the Resilient Coastal and Health Infrastructure Gap Assessment, Output 2 – the Health Infrastructure Climate Event Readiness Assessment, and Output 3 – the Enabling Environment Assessment into a single consolidated overview. The analysis is organized by infrastructure type to highlight the most critical resilience gaps across coastal and healthcare infrastructure, and then elaborates on the findings related to the enabling environment. Findings with specific implications for gender equality, disability inclusion or vulnerable population groups are highlighted with the ⚥ icon.

To ensure that this roadmap serves as a practical pipeline for future investments and avoids duplicating ongoing initiatives, the assessment findings were systematically reviewed against existing and planned investments. Projects or interventions already funded or programmed under the NIIP 2023 were excluded. Following the March 2026 validation workshop, a second review with representatives from MPWIU, MoHHS, NDMO and WHO identified additional projects that had secured funding since the NIIP was published. Consequently, the priorities presented in this chapter represent resilience gaps for which no funded project, confirmed investment or implementation pathway had yet been identified.

This approach is illustrated by the assessment of the Majuro and Ebeye hospitals. Field missions documented significant structural, mechanical and operational deficiencies (see Annex D). These issues remain valid but are no longer included among the priority investment gaps because substantial investments are already underway. Approximately $125 million has been allocated through the United States Compact for the redevelopment of Majuro Hospital, while emergency stabilization works and planning for a new $300 million hospital in Ebeye are progressing with initial support from the Asian Development Bank (ADB).

This chapter should therefore be read as a synthesis of outstanding priorities that inform the strategic actions presented in Part 2.





Majuro Hospital © UNOPS



Seawall in Majuro © Miyamoto International

Coastal infrastructure

The coastal infrastructure assessment examined the condition, climate exposure and performance of key infrastructure assets across Majuro, Ebeye and selected outer islands using methodologies set out in the Waterfront Alliance and ARISE-US Coastal Resilience Scorecard. While individual assets differ in their level of exposure and condition, the assessment identified several recurring resilience gaps affecting coastal protection, transport, utilities and emergency preparedness. Table 7 summarizes the outstanding priorities after excluding projects that have already been financed or are under implementation at the time of writing.

Table 7. Synthesis of coastal infrastructure gaps

Current status and associated gap	Desired target	Strategic priority identified as part of the roadmap (see Part 2)
Infrastructure in the RMI has to operate in a highly corrosive marine environment. During November 2025 site visits, the project team observed significantly corroded sheet piles at Ebeye dock and exposed corroded rebars in Majuro's reinforced concrete seawalls. This points to poor maintenance in an aggressive marine environment, with corrosion of sheet piles in docks being a recurring issue.	Coastal protection assets should be well maintained and able to structurally perform for their entire life cycle, which is typically 50 years minimum.[94]	See **Strategic Priority #1** (Close the operations, maintenance and end-of-life gap) and **#3** (Build an integrated geospatial asset and hazard information system)
New coastal infrastructure design and construction typically consists of reinforced concrete walls and rock revetments. Large engineered seawalls are costly, technically demanding to construct, and slow to deliver, which limits the number of coastlines that can be protected through conventional hard engineered solutions alone. They require significant financial effort and have long approval times (e.g. the recently built seawall in Ebeye cost approximately $35,000 per metre), which limits implementation compared to the needs.	Exposed areas that require protection should be addressed with more cost-effective, valid, local alternatives if the most traditional methods are not affordable in the short to medium term.	See **Strategic Priority #4** (Scale up nature-based and low-cost coastal protection solutions)
The corridor between Majuro Airport and Laura, approximately 30 km in distance, is a nationally critical transport asset and the only road connecting around 2,700 residents in Laura and Ajeltake to Majuro, including to the international airport, Majuro Hospital and other essential services. Insufficient road drainage causes water ponding, reduced passability and pavement deterioration in certain sections of the road during extreme weather events and wave runup.[v] Disruptions to transportation affects access to healthcare services, emergency response, supply chains, and airport access, thereby directly affecting community safety, maternal and reproductive health, childcare, and overall family well-being. Certain sections (e.g., near the airport, and those close to the coast) are more vulnerable to coastal overtopping and are therefore more exposed to risks, which can temporarily disrupt access from Laura and Ajeltake to Majuro during extreme events.	Water run-off, ponding, wave overtopping and localized flooding should be effectively managed. The corridor should remain passable during extreme weather events through a phased combination of drainage upgrades, targeted road rehabilitation and routine maintenance based on climate-informed design assumptions.	See **Strategic Priority #6** (Deliver a phased resilience upgrade of the road corridor between Majuro airport and Laura)

v. The intensity of hazard impacts differs between road sections, with the most exposed segments facing the greatest levels of stress and operational interruption.

Current status and associated gap	Desired target	Strategic priority identified as part of the roadmap (see Part 2)
Schools, churches or community buildings used for other purposes are often used as emergency shelters instead of buildings that are specifically designed or fit for the purpose. Buildings constructed prior to the adoption of the 2021 RMI National Building Code most likely will not be compliant with the latest standards, especially regarding roof detailing in case of extreme winds. Critical shelter functions such as backup power, water supply, communications, thermal comfort and accessible sanitation may be missing or unreliable in existing buildings being used as shelters. There is no comprehensive readiness assessment covering structural safety, services, habitability and inclusive access.	Emergency shelters should be adequate enough to host a population affected by an extreme event until people can return home. From structural and operational standpoints, they should be able to withstand extreme events. Their structure should be able to endure strong winds and rain loads; sites should not be prone to flooding or rainwater leaks and should be properly maintained; and they should be equipped with functioning photovoltaic panels, batteries or power backup systems, water harvesting systems with tanks and pumps, robust window frames, and protected glass.	See **Strategic Priority #5** (Strengthen emergency shelter readiness and rapid response systems)
Emergency shelters often lack features compatible with GEDSI best practices (ensuring adequate privacy, universal accessibility, safety, lighting, separate sanitation facilities, safety for girls and women). An assessment from the emergency response perspective to ensure they adequately meet requirements has also not been carried out (please refer to Output 3 – Enabling Environment Assessment for more information).	Emergency shelters should be fully compliant with GEDSI standards and assessed for operational readiness during a crisis.	See **Strategic Priority #5** (Strengthen emergency shelter readiness and rapid response systems)

Healthcare infrastructure

The health assessment combined infrastructure observations with the framework provided by the WHO guidance for climate-resilient and environmentally sustainable healthcare facilities to evaluate the capacity of hospitals and clinics to maintain essential services under future climate conditions. Although several structural deficiencies identified at the Majuro and Ebeye hospitals are now expected to be addressed through ongoing redevelopment programmes, the assessment revealed common system-wide vulnerabilities affecting health infrastructure across the country. Table 8 focuses on the outstanding gaps that remain relevant for future investments at the time of writing.

Table 8. Synthesis of healthcare infrastructure gaps

Current status	Desired target	Strategic priority identified as part of the roadmap (see Part 2)
Many neighbouring island clinics lack the minimum necessary resilient infrastructure, including reliable solar power and batteries, safe rainwater harvesting and storage, functional high frequency (HF) radio communications, thermal protection, and accessible design features. The public power grid in neighbouring islands is not always available and reliable, and items such as water pumps and radios rely on electricity. Gutters, tanks and pumps are damaged or not well connected, and they are not able to properly and safely store rainwater. Walls and roof insulation are frequently not installed, and air conditioning units are often missing. Phone networks are not consistently reliable, and Starlink is not an affordable option. HF radios function inconsistently across all the clinics.[vi] A significant share of clinic construction predates the adoption of the 2021 RMI National Building Code, and current information on structural condition, utility performance and code compliance is incomplete.	Neighbouring island clinics should meet a minimum resilient service standard that ensures continuity of care during routine operations and climate-related emergencies. This includes having reliable solar power and battery backup, safe rainwater catchment and storage, functioning HF communications, and adequate thermal protection, as well as ensuring progressive compliance with the 2021 RMI National Building Code.	See **Strategic Priority #2** (Upgrade and climate-proof neighbouring island clinics)
Neighbouring island clinics often lack features compatible with GEDSI best practices (e.g., the provision of ramps, accessible toilets, adequate internal spaces).	Neighbouring island clinic infrastructure should meet baseline GEDSI accessibility and spatial standards.	See **Strategic Priority #2** (Upgrade and climate-proof neighbouring island clinics)
The Majuro Hospital facility manager says that the average external air conditioning unit's life is limited to one to two years due to the aggressive external environment.	Health facilities should maintain reliable thermal control and air quality for patient safety. Heating, ventilation and air conditioning systems should be specifically engineered to withstand highly corrosive marine environments (e.g., utilizing anti-corrosive coatings) to ensure a standard operational lifespan.	See **Strategic Priority #1** (Close the operations, maintenance and end-of-life gap)
The administrator of Ebeye Hospital has never seen the elevators functioning; the supplier (KONE) does not provide technical assistance in the RMI due to its remoteness.	Healthcare facilities should provide continuous vertical mobility to safely transport patients on stretchers and ensure accessible, inclusive access in line with GEDSI principles.	See **Strategic Priority #1** (Close the operations, maintenance and end-of-life gap)
Performance standards for critical infrastructure operations during emergencies (e.g., a water supply and continuous power backup capable of lasting 72 hours) are not formally established for hospitals, clinics and shelters.	Minimum performance standards ensure a consistent level of service provision and adequate preparedness in case of emergency (extreme weather events).	See **Strategic Priority #2** (Upgrade and climate-proof neighbouring island clinics)

vi. A high frequency radio network has been implemented in all atolls (not necessarily where clinics are located). It has recently been successfully used to relay a tsunami warning to all atolls.

Enabling environment

The Enabling Environment Assessment combined stakeholder interviews with the EnABLE tool to examine the institutional capacity required to plan, deliver and sustain resilient infrastructure throughout its life cycle. Rather than focusing on individual projects, the assessment evaluated the effectiveness of the existing policies, regulations, plans, codes and standards, and human and financial resources that guide infrastructure development from strategic planning through to spatial planning, design, procurement, construction, operation, maintenance, and eventual decommissioning.

As illustrated in the infrastructure life cycle performance graph (Figure 20), while planning performs relatively strongly, there is a pronounced drop in performance during execution and long-term management. The spatial planning, procurement, operation and maintenance, and end-of-life stages emerge as the weakest areas across the life cycle. Table 9 summarizes the principal assessment findings, grouped by infrastructure life cycle stage, to inform the enabling actions proposed in Part 2. Some enabling environment challenges, however, relate to domains that cut across multiple stages of the infrastructure life cycle – such as data management. To avoid repeating these findings under multiple stages, these cross-cutting gaps are presented separately at the bottom of the table, with the relevant life cycle stages identified.

Figure 20. Infrastructure life cycle performance chart as per EnABLE assessment

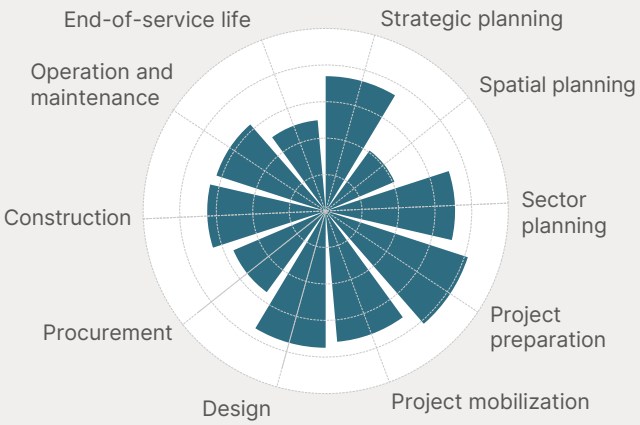
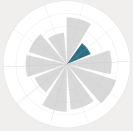
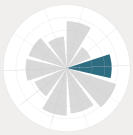
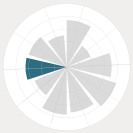


Table 9. Enabling environment gap analysis

Life cycle stage	Current status and associated gap	Desired target	Strategic priority identified as part of the roadmap (see Part 2)
Spatial planning 	Hazard and geospatial data are fragmented and not routinely embedded in siting and permitting decisions. Ongoing data initiatives – such as the NDMO Hazard and Risk Assessment Platform supported by the International Organization for Migration – risk becoming isolated if not integrated into a unified system. The absence of a centralized geo-referenced asset and land dataset, the limited geographic information system (GIS) capacity, and the complexity of land information management (e.g., constrained cadastre or land registration context due to customary tenure) restrict routine use of spatial data in infrastructure planning.	Centralized hazard and geospatial data can support siting, permitting, investment prioritization and infrastructure management decisions. There should be an interoperable asset and hazard information system, supported by clear institutional ownership, standardized datasets and local GIS capacity, which can act as a critical decision support tool for long-term resilience building.	See **Strategic Priority #3** (Build an integrated geospatial asset and hazard information system)

Life cycle stage	Current status and associated gap	Desired target	Strategic priority identified as part of the roadmap (see Part 2)
Sector planning 	Institutional arrangements are not uniform across the neighbouring islands. The Kwajalein Atoll Development Authority (KADA) has already developed its own master plan with identified infrastructure priorities for Ebeye and Kwajalein, and in that jurisdiction, maintenance funding and responsibility run through the local government rather than the national MPWIU.	Infrastructure projects and upgrades must align with existing local government master plans.	See **Strategic Priority #2** (Upgrade and climate-proof neighbouring island clinics)
Project mobilization 	The decision to carry out assessments during an emergency is made on a case-by-case basis. There is no emergency response team that can rapidly deploy dedicated personnel trained in the specifics.	Clear response procedures should be in place, including trained teams and survey tools that can be quickly deployed to assess damage, support decision-making and initiate urgent interventions.	See **Strategic Priority #5** (Strengthen emergency shelter readiness and rapid response systems)
Design 	Financing for innovation, research and development, and locally appropriate resilient design solutions is limited, while end-of-life and circularity considerations are rarely integrated systematically into design. Although relevant hazard, material and performance data are available for many projects, the selection remains incomplete, partly outdated and not consistently used to support fully data-driven design choices across the broader infrastructure portfolio.	Design decisions should systematically integrate available hazard, asset, material and performance data, alongside life cycle, end-of-life and circularity considerations. Locally appropriate resilient design solutions should be supported through research, innovation and knowledge development.	See **Strategic Priority #3** (Build an integrated geospatial asset and hazard information system)
Procurement 	Remoteness increases lead times for the procurement of materials, reduces availability of spare parts and limits access to specialized maintenance services. There is no mechanism in place to rapidly procure urgent supplies in case of an emergency. All purchases require tendering, and there is no approved list of contractors or vendors, nor a framework to procure emergency items at an established price (e.g., food baskets, tents, or other necessary items).	Emergency response arrangements should enable rapid procurement, mobilization and technical assessment immediately after a hazard event. This requires the compilation of a list of pre-approved suppliers and contractors, and appropriate arrangements for the rapid procurement of essential emergency goods and services.	See **Strategic Priority #5** (Strengthen emergency shelter readiness and rapid response systems)
Construction 	Dependence on the import of construction materials and the limited availability of local aggregate increase costs, particularly in the context of neighbouring islands with lower populations. Construction equipment: There is no dredging equipment available in the country for sand and aggregate mining or dredging.	Construction approaches should account for the limited availability and high cost of materials and equipment, while prioritizing locally appropriate and resilient options (e.g., nature-based solutions [NBS]) and improved O&M of existing infrastructure to extend asset lifespan in the face of harsh environmental conditions and exposure to climate hazards.	See **Strategic Priority #1** (Close the operations, maintenance and end-of-life gap), **#3** (Build an integrated geospatial asset and hazard information system) and **#4** (Scale up nature-based and low-cost coastal protection solutions)

Life cycle stage	Current status and associated gap	Desired target	Strategic priority identified as part of the roadmap (see Part 2)
O&M 	A centralized O&M policy framework establishing O&M requirements and budgets does not exist. Maintenance responsibilities are fragmented, life cycle costs are not consistently considered during project preparation, and long-term maintenance financing remains insufficient despite substantial projected O&M liabilities. Maintenance remains predominantly reactive, and current funding levels (approximately $750,000 annually for education and health) are insufficient. Without intervention, the maintenance deficit for currently funded projects alone will result in a cumulative shortfall of $77 million over the next 10 years.[95] Preventive maintenance, condition monitoring and centralized digital asset management systems are inconsistent, particularly for coastal infrastructure and neighbouring island facilities. Maintenance staffing, technical capacity and operational resources are also insufficient to sustain reliable infrastructure services, particularly in the neighbouring islands. For health infrastructure, the maintenance team consists of three people, plus the facility engineer for all the hospitals and clinics in the country.	Infrastructure assets are managed under a national O&M framework that defines responsibilities, integrates life-cycle costing into project preparation, and provides sustainable financing for routine maintenance. Preventive, life cycle-based asset management is supported by condition monitoring, digital asset registers, routine inspections, coordinated maintenance planning across sectors, and sufficient staffing and technical capacity. This preventive maintenance sustains reliable operations, and reduces emergency repairs, service disruptions and premature asset failure.	See **Strategic Priority #1** (Close the operations, maintenance and end-of-life gap)
	Central government funding to MoHHS for outer island clinics has remained static for 20 years. A new localized funding pilot ($3,000 upfront and $1,000 quarterly for completed renovations) is testing community ownership, but long-term funding is not secured, and resources to monitor the quality of works are limited.	Sustainable O&M funding mechanisms and localized maintenance capacity must be secured for remote clinics, empowering local communities to manage minor upkeep while ensuring quality control.	See **Strategic Priority #1** (Close the operations, maintenance and end-of-life gap) and **#2** (Upgrade and climate-proof neighbouring island clinics)
	There is no centralized, consistently updated asset management system for healthcare and coastal infrastructure; data on maintenance and repair works are fragmented and not reliably backed up. Majuro Hospital has a system in place that includes digital tracking of maintenance tasks, though stakeholder interviews revealed that implementation remains a challenge.	Healthcare infrastructure should be managed through a preventive, life cycle-based maintenance approach supported by centralized and regularly updated asset information, including condition, monitoring, maintenance and records of repairs.	See **Strategic Priority #1** (Close the operations, maintenance and end-of-life gap) and **#3** (Build an integrated geospatial asset and hazard information system)
	There is no comprehensive mapping of coastal protection infrastructure. Existing information about physical characteristics (e.g., seawall length and height) and conditions (e.g., exposed rebars, corroded sheet piles, cracked concrete), design and construction (e.g., technical drawings, maintenance records), hazard exposure, and geospatial details is limited and fragmented among the RMI agencies, limiting integrated planning and informed decision-making for investment prioritization.	Existing coastal protection infrastructure should be mapped, including information about age, geometric dimensions, technical specifications and drawings, design or assessment reports, expected remaining life span, past repair interventions, and planned maintenance.	See **Strategic Priority #3** (Build an integrated geospatial asset and hazard information system)

Life cycle stage	Current status and associated gap	Desired target	Strategic priority identified as part of the roadmap (see Part 2)
End-of-service life 	End-of-service life planning and decommissioning are not embedded upstream. Recycling and reuse pathways for decommissioned infrastructure are severely limited, and both the Majuro and Ebeye landfills are currently at maximum capacity, creating environmental and safety hazards.	End-of-life planning, decommissioning budgets and circular economy principles must be embedded into initial project design, procurement and environmental permitting.	See **Strategic Priority #1** (Close the operations, maintenance and end-of-life gap)
Cross-cutting: strategic planning/ sector planning/ design/O&M 	Data often remain confined in reports rather than being organized and analyzed in databases. Furthermore, design and assessment reports are often outsourced to external consultants, which means new knowledge and information are not easily accessible to governmental agencies.	Relevant data on infrastructure that could influence future projects and internal processes should be readily available for the internal or external agencies that can legitimately have access to such data to make better decisions. A centralized infrastructure knowledge repository should be established and managed internally, with clear institutional ownership (e.g., a digital platform for healthcare buildings under MoHHS and a coastal protection infrastructure digital platform under MPWIU).	See **Strategic Priority #3** (Build an integrated geospatial asset and hazard information system) and **#5** (Strengthen emergency shelter readiness and rapid response systems)
	Assessments do not systematically collect disaggregated data, such as on service delivery needs or the differentiated impacts of disasters on women and vulnerable groups. Nor are these data stored in databases for future research and evidence-based decision-making.	Disaggregated data should be systematically collected, stored and utilized for universal, risk-informed governance.	See **Strategic Priority #3** (Build an integrated geospatial asset and hazard information system)
Cross-cutting: spatial planning/ design/ construction/ O&M 	Academic institutions in the RMI do not currently offer courses in NBS, spatial analysis, GIS or other specialized disciplines required for the planning and management of resilient infrastructure.	Academic institutions in the RMI can help fill the technical gap by training skilled personnel in the most innovative methodologies and building local capacity for the planning and management of resilient infrastructure.	See **Strategic Priority #3** (Build an integrated geospatial asset and hazard information system) and **#4** (Scale up nature-based and low-cost coastal protection solutions)
Cross-cutting: project preparation/ design/ construction/ O&M 	An engineering professional body has not currently been established.	A recognized engineering professional body is required to support professional standards. This will allow the continuation of technical development and oversight, the implementation of ethical practices, and the mobilization of qualified personnel for infrastructure assessment, maintenance, and emergency response. Over time, the engineering body should contribute to strengthening local technical capacity and institutionalizing professional support mechanisms across the sector.	See **Strategic Priority #5** (Strengthen emergency shelter readiness and rapid response systems)

PART 2

Roadmap for Health and Coastal Infrastructure Resilience in the Marshall Islands



Roadmap for Resilient Health and Coastal Infrastructure in the Marshall Islands

Ebeye dock © Miyamoto International

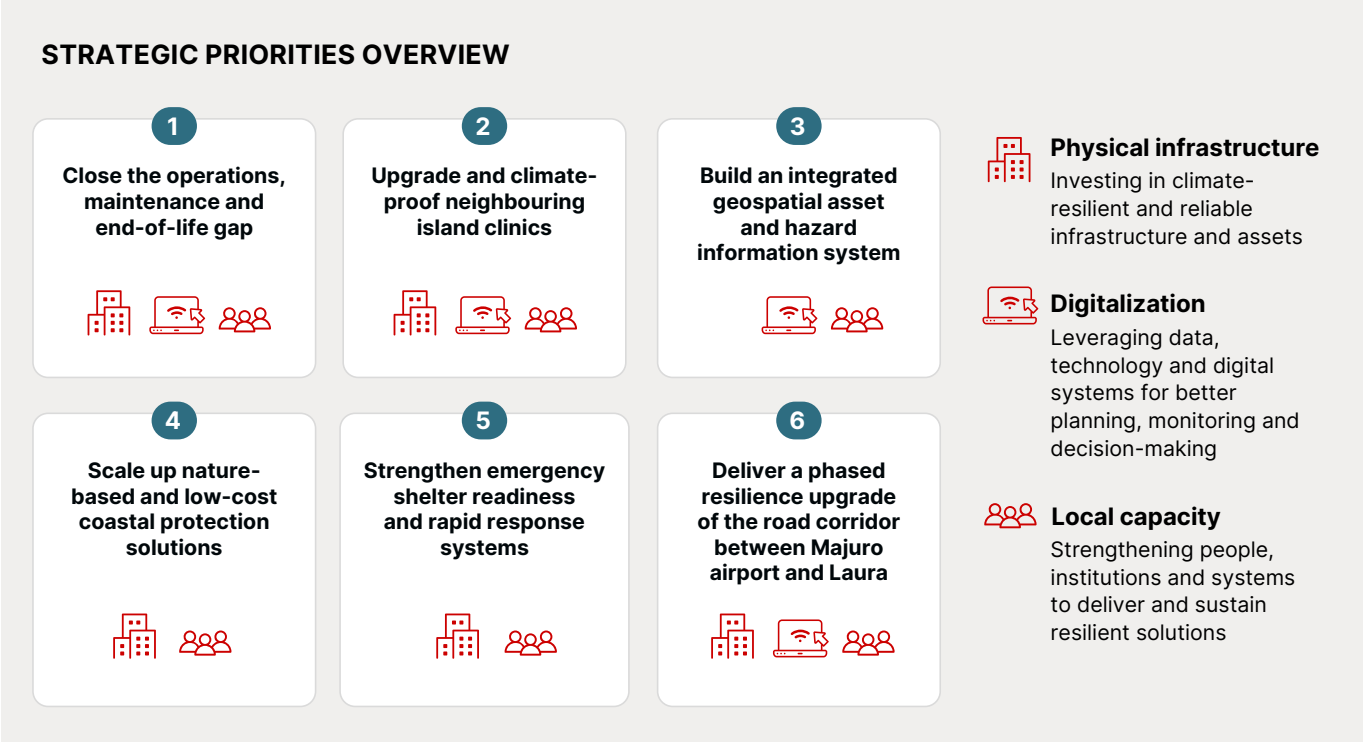
The previous chapter identified the principal gaps and systemic challenges affecting the resilience of health and coastal infrastructure in the Marshall Islands. Building on those findings, this section presents a practical roadmap to guide future investments, institutional strengthening and resilience-building actions.

The roadmap is structured around six strategic priorities that together provide an integrated framework to strengthen infrastructure resilience over the short, medium and long term. Rather than presenting a list of independent projects, it identifies coordinated areas of intervention that address the underlying institutional, technical and operational factors influencing infrastructure performance throughout its life cycle.

For each strategic priority, the roadmap outlines the rationale for its selection, the resilience outcomes it seeks to achieve, and a series of recommended sub-interventions that can be implemented in a phased manner. This approach ensures that progress under a given priority is achieved through multiple phased investments and institutional measures, rather than through a single stand-alone project. Where relevant, links are also identified with existing national strategies, planned investments and ongoing initiatives to maximize coordination, avoid duplication and support the government of the Marshall Islands in progressing towards a more resilient, climate adaptive and inclusive infrastructure system.

The implementation timelines and associated costs presented throughout this section are indicative estimates, based on the information and assumptions available during the development of the Roadmap. They may be refined as implementation progresses and further information becomes available.

Strategic priorities based on findings



Strategic Priority 1 – Close the operations, maintenance and end-of-life gap responds to the recurring gaps identified across both coastal and health infrastructure, related to reactive maintenance, inconsistent condition monitoring, insufficient technical staffing, limited maintenance funding, fragmented asset records and the absence of systematic end-of-life planning. Rated a top priority by stakeholders, it addresses constraints that affect the performance and durability of multiple infrastructure categories and increase the risk that existing and future investments will deteriorate prematurely. It aligns with the NIIP 2023, which estimates a $77 million maintenance gap over 10 years for funded projects and highlights the Public Facilities National Maintenance Fund Development, currently unfunded, as a priority.

Strategic Priority 2 – Upgrade and climate-proof neighbouring island clinics responds to the gaps identified in resilient infrastructure, accessible and GEDSI-aligned design, compliance with the 2021 RMI National Building Code (particularly for older buildings), and local capacity for preventative maintenance. Long-term climate resilience requires that outer island clinics are able to operate reliably under increasingly frequent and severe shocks, including flooding, storms, heatwaves and prolonged service disruptions. In this context, the assessment undertaken in November 2025 and the upgrades already underway for neighbouring island clinics are important steps forward. For a broader and more systematic approach, the roadmap frames this as a strategic priority because the development of resilient clinics depends on coordinated improvements in infrastructure , the development of redundant systems that allow essential operations to continue during periods of shock and building routine O&M capacity , rather than on ad hoc measures or short-term functionality alone. Currently, no unfunded NIIP project covers a nationwide neighbouring island clinic resilience upgrade programme.

Strategic Priority 3 – Build an integrated geospatial asset and hazard information system responds to the cross-cutting gaps related to fragmented asset data, limited hazard information integration and weak geospatial decision support. It is prioritized as a foundational enabler for planning, maintenance, investment prioritization, siting and emergency response.This aligns with unfunded NIIP 2023 projects, including the procurement of geodetic infrastructure equipment ($500,000), master plan updates for the Majuro and Ebeye ports ($1 million) and Majuro airport ($1 million), and facility and asset management for the RMI Shipping Corporation ($669,000).

Strategic Priority 4 – Scale up nature-based and low-cost coastal protection solutions responds to the coastal protection gaps associated with the high cost, long delivery timelines and limited scalability of conventional engineered solutions, as well as the limited use of lower-cost and nature-based alternatives. It is prioritized because many exposed shorelines are unlikely to be protected in the near term through large seawall investments alone, particularly in settings with lower populations and constrained resources. It aligns with NIIP 2023 coastal projects that could incorporate nature-based solutions, such as the Majuro seawall project phases 3 to 6 ($5.5 million), and the Ebeye causeway protection project ($1.5 million).

Strategic Priority 5 – Strengthen emergency shelter readiness and rapid response systems responds to the combined gaps related to emergency shelter readiness, universal emergency accommodation as per GEDSI best practices, rapid procurement arrangements and the absence of trained teams that can be quickly deployed after extreme weather events. It is prioritized to ensure effective disaster response through coordinated infrastructure and procedural improvements. It shares its scope with several locations that often serve as shelters and are the focus of unfunded NIIP 2023 projects, including the Majuro Emergency Operations Center ($7.4 million), outer island community centres ($1.5 million), the Ebeye Community Center ($4.6 million), the Kwajalein local government building ($3.3 million), and 23 education buildings ($14.9 million).

Strategic Priority 6 – Deliver a phased resilience upgrade of the road corridor between Majuro airport and Laura responds to the lack of appropriate drainage and the resulting flood-related disruption along this critical 3lifeline. It is prioritized because reduced passability affects mobility, emergency access, supply chains and day-to-day connectivity for a large share of Majuro Atoll's population. Particular stretches in close proximity to the coast face high exposure. The section close to Majuro airport is particularly low-lying and could be significantly affected by sea level rise in the short term. Some sections in this area are already temporarily affected by one-year RP typhoons and spring tides. Rather than isolated maintenance efforts, it requires a coordinated, phased upgrade prioritizing high-risk sections and local capacity building, directly supporting an unfunded NIIP 2023 project valued at $29 million.

Strategic Priority 1

Close the operations, maintenance and end-of-life gap

Impact: From reactive maintenance to life cycle-managed infrastructure that strengthens safety and climate resilience across communities

Longer asset life, fewer service interruptions, and lower life cycle costs strengthen the reliability of hospitals, clinics, roads, and coastal protection during normal operations and post-hazard recovery.

Location
Nationwide

Type of infrastructure
Healthcare and coastal infrastructure

Natural hazard addressed
Storms, flooding, heatwaves, droughts and tsunamis

Assessment basis

- Infrastructure in the RMI has to operate in a highly corrosive marine environment, while remoteness increases lead times for the procurement of materials, reduces the availability of spare parts, and limits access to specialized maintenance services.
- Maintenance staffing, technical capacity and operational resources are insufficient to sustain reliable infrastructure services, particularly in neighbouring islands.
- Maintenance remains predominantly reactive, and current funding levels (approximately $750,000 annually for education and health) are insufficient.
- Without intervention, the maintenance deficit for currently funded projects alone will result in a cumulative shortfall of $77 million over the next 10 years.[96]
- O&M and infrastructure life cycle planning are based on a weak institutional framework.

Implementation Pathway for Priority 1

1.1 National O&M framework
A government framework supported by dedicated departmental staffing, multi-year budgets, and baseline preventive standards, resulting in fully operational teams in MPWIU and MoHHS, as well as trained personnel in remote communities.

1.2 Digital maintenance system for public assets
A centralized digital platform for health and coastal infrastructure to track inspections, work orders, and recurring defects, operated and sustained by trained personnel.

1.3 Procurement framework mandating local knowledge transfer
Updated procurement processes for contracts worth over $10,000, supported by partnerships between foreign and local entities to build domestic capacity.

1.4 Life cycle and end-of-life planning requirements
Revised capital project preparation, procurement, and environmental permitting processes that mandate life-cycle costing, the development of maintenance manuals, and the use of sustainable decommissioning plans.

GEDSI impact

Strengthened maintenance systems ensure more reliable access to essential services, reducing safety risks and improving the well-being of groups disproportionately affected by service interruptions, including persons with disabilities, older persons, pregnant women, caregivers and remote communities.

Project synergies (NIIP 2023 and others)

FIN-OCS-2: Public Facilities National Maintenance Fund Development, value not quantified and flagged as priority.

Urban Resilience Project (Components 1 and 3: Risk-Informed Adaptation and Resilient Facilities): $2 million to $8 million allocated specifically for resilience planning and facility asset security.

Potential SDG targets influenced

SDG 9.1; SDG 11.b; SDG 13.1

Alignment with NDCs

Adaptation: climate-resilient infrastructure

Mitigation: waste management

Capital upfront cost

High cost in short-term staffing, backlog maintenance and systems development (between $1 million and $2 million).[vii]

Operational cost

Moderate cost over the long term, (between $200,000 and $1 million for staffing costs and platform maintenance).

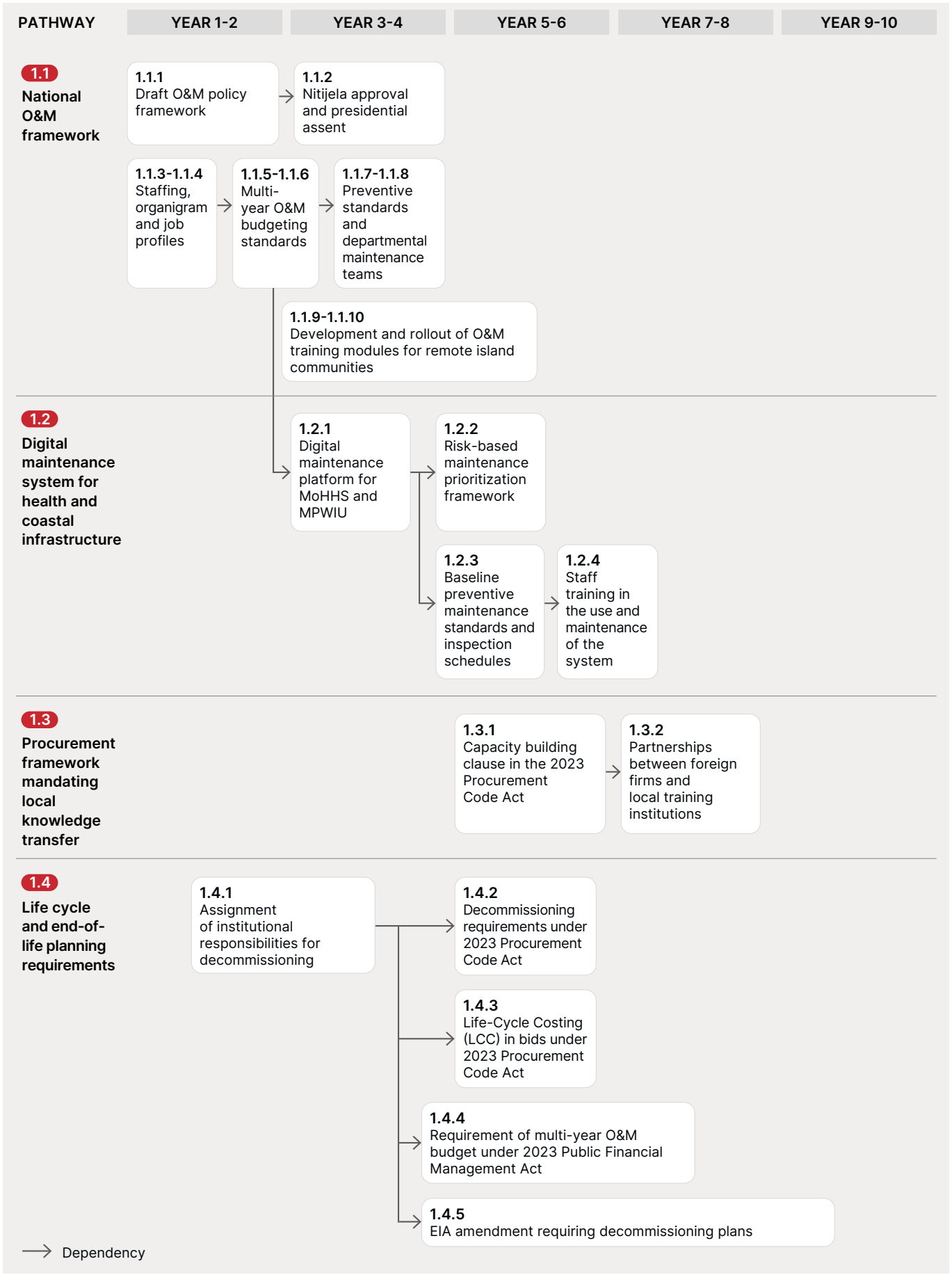
Regional precedents

Kiribati Health Systems Strengthening Project (P176306). Component 3: Project Management and Health Information System Enhancement ($1.90 million).[97]

Fiji, civil service infrastructure capacity reforms and ministry IT system integration. Approximately $150,000 to $200,000 (within wider sector management grants).

vii. Cost thresholds: minor: Under $200,000; moderate: $200,000-$1,000,000; high : Over $1,000,000.

TIMELIME


PATHWAY
YEAR 1-2
YEAR 3-4
YEAR 5-6
YEAR 7-8
YEAR 9-10
1.1
National O&M framework
1.1.1 Draft O&M policy framework
1.1.2 Nitijela approval and presidential assent
1.1.3-1.1.4 Staffing, organigram and job profiles
1.1.5-1.1.6 Multi-year O&M budgeting standards
1.1.7-1.1.8 Preventive standards and departmental maintenance teams
1.1.9-1.1.10 Development and rollout of O&M training modules for remote island communities
1.2
Digital maintenance system for health and coastal infrastructure
1.2.1 Digital maintenance platform for MoHHS and MPWIU
1.2.2 Risk-based maintenance prioritization framework
1.2.3 Baseline preventive maintenance standards and inspection schedules
1.2.4 Staff training in the use and maintenance of the system
1.3
Procurement framework mandating local knowledge transfer
1.3.1 Capacity building clause in the 2023 Procurement Code Act
1.3.2 Partnerships between foreign firms and local training institutions
1.4
Life cycle and end-of-life planning requirements
1.4.1 Assignment of institutional responsibilities for decommissioning
1.4.2 Decommissioning requirements under 2023 Procurement Code Act
1.4.3 Life-Cycle Costing (LCC) in bids under 2023 Procurement Code Act
1.4.4 Requirement of multi-year O&M budget under 2023 Public Financial Management Act
1.4.5 EIA amendment requiring decommissioning plans
Dependency

1.1

National O&M framework

A government framework supported by dedicated departmental staffing, multi-year budgets, and baseline preventive standards, resulting in fully operational teams in MPWIU and MoHHS, as well as trained personnel in remote communities.


Kwajalein Atoll Development Authority © UNOPS

Current challenges

- → Limited technical capacity (e.g., MoHHS maintenance team consists of three people plus the facility engineer).
- → No institutional mechanism to estimate or allocate O&M and asset management budgets in departmental planning; maintenance remains reactive and assets deteriorate faster, increasing life cycle costs and reducing long-term sustainability.
- → No regular maintenance contractors operating in the outer islands due to transportation constraints and geographic context. Multi-year O&M contracts are currently not being utilized to fill gaps.
- → Projected additional maintenance costs: +$12 million/year through FY2033 for currently funded projects alone.[98]

Enabling environment recommended actions

National level:

1.1.1 Develop a national O&M policy framework bill setting clear standards for maintenance planning, preventive schedules, roles, documentation, and reporting, and establish a practical approval pathway for legislative and policy updates – aligned with the Cabinet's submission and consultation requirements.

1.1.2 Secure approval of bill by Nitijela and receipt of presidential assent.

Ministry level:

1.1.3 Define staffing needs for MoHHS and MPWIU, including an updated organigram with clear roles and responsibilities.

1.1.4 Identify missing roles and prepare job descriptions and required skill profiles.

1.1.5 Develop a full maintenance budget covering human resources, interventions, spare parts and equipment.

1.1.6 Establish standard methods for estimating annual and multi-year maintenance budgets, including routine maintenance, spare parts, inspections, service contracts, training, and replacement of short-life components.

1.1.7 Set baseline preventive maintenance standards and inspection frequencies for key asset classes (e.g., clinical equipment, drainage systems).

1.1.8 Establish departmental maintenance teams with approved budgets.

Community level:

1.1.9 Develop basic maintenance training modules specifically targeted towards local communities on remote islands.

1.1.10 Implement training modules to empower locals to carry out essential, immediate preventive actions such as routine cleaning and protective painting to extend asset lifespans without waiting for offshore or urban contractors.

Target assets

Health and coastal infrastructure

Impacts of hazard on asset and services

Without adequate O&M, infrastructure life span can be considerably shortened in the face of ongoing exposure to climate hazards.

Lead institutions

MPWIU takes the lead in cross-sector asset management systems, and MoHHS takes the lead in health asset operations.

Secondary

Specific maintenance teams, local administrators supporting asset management reform and digital systems (e.g., Majuro Atoll Waste Company, Kwajalein Atoll Local Government).

Implementation timeline

0 10 years

Three to five years

Capital/upfront costs

High in the short term – new staff

Operational costs/annual ongoing costs

Moderate – staff compensation

Potential financing sources

Government financing (via Nitijela), policy-based grants, budget support and recurrent departmental budget allocations, technical cooperation, advisory grants

Expected impact

A government-wide O&M policy framework strengthens the sustainability of assets' life cycles by linking maintenance planning, budgeting, and accountability. This enables predictable recurrent funding and the employment of fully resourced maintenance teams, including local teams in outer islands, that reduce deferred maintenance and protect infrastructure value.

GEDSI considerations

Job descriptions, maintenance budgets and the O&M framework should explicitly state who is responsible for monitoring and maintaining inclusive accessibility features and service-critical systems that affect vulnerable users, including clinics, accessible routes, water systems, emergency shelters, and facilities used by women, children, older persons, and persons with disabilities.

By enabling women to participate in local maintenance training, communities enhance women's economic opportunities and ensure more equitable, resilient livelihoods.

Linkages with other priorities

Priorities 2, 4, 5 and 6: The framework will ensure that upgraded clinics, coastal protection works, road drainage and emergency shelters have dedicated maintenance personnel and budget provisions.

1.2

Digital maintenance system for public assets

A centralized digital platform for health and coastal infrastructure to track inspections, work orders, and recurring defects, operated and sustained by trained personnel.



Majuro Hospital © UNOPS

Current challenges

- → Information about assets is fragmented and incomplete, making it difficult to track routine maintenance and recurring defects.
- → The new digital pilot in Majuro Hospital is a positive step, but implementation is a challenge.
- → No centralized, standardized platform or system exists to support the government's goal of conducting a comprehensive assessment of all public assets (e.g., schools).

Enabling environment recommended actions

1.2.1 Create a digital maintenance platform or system for MoHHS and MPWIU, with separate databases to log requests and track interventions (e.g., monitoring inspections, work orders, spare parts and recurring defects).

1.2.2 Develop a risk-based prioritization framework ranking assets by criticality, condition, hazard exposure, service impact, replacement difficulty and GEDSI factors.

1.2.3 Define baseline preventive maintenance standards and inspection frequencies, and incorporate them into the system.

1.2.4 Train MoHHS and MPWIU staff to use and maintain the digital platform or system.

Expected impact

Improved asset management accountability and long-term sustainable infrastructure performance through standardized departmental O&M planning and data-driven, condition-based decisions supported by an integrated digital asset management system.

GEDSI considerations

The system can track GEDSI-compliant features (ramps, lighting, etc.)

Linkages with other priorities

Priorities 2, 4, 5 and 6: The maintenance system helps track defects and repairs for physical infrastructure upgrades.

Priority 3: It can be made interoperable with the proposed asset and hazard information platforms (Platforms A and B).

Target assets

Health and coastal infrastructure

Impacts of hazard on asset and services

Without reliable tracking of defects and maintenance, service continuity and access to critical infrastructure are compromised.

Lead institutions

MPWIU takes the lead in cross-sector asset management systems, and MoHHS takes the lead in health asset operations.

The Ministry of Finance, Banking and Postal Services (MoFBPS) will assume full long-term ownership of the system once the national asset register is finalized and rolled out.

Implementation timeline

0 10 years

Four years to complete the platform with all relevant data and train staff

Capital/upfront costs

Moderate in the short term – platform establishment

Operational costs/annual ongoing costs

Moderate – staff compensation, platform hosting and maintenance

Potential financing sources

Government financing, policy-based grants, technical cooperation

1.3

Procurement framework mandating local knowledge transfer

Updated procurement processes for contracts worth over $10,000, supported by partnerships between foreign and local entities to build domestic capacity.



Construction meeting © UNOPS

Current challenges

- → Maintenance is predominantly reactive; preventive maintenance has not yet been institutionalized.
- → Maintenance of existing assets (e.g., seawalls) is becoming more critical than the construction of new assets.
- → There is limited local technical capacity to operate, maintain and repair procured assets.
- → Procurement processes do not link construction to long-term maintenance needs.[viii]

Enabling environment recommended actions

1.3.1 Add a capacity building clause to the 2023 Procurement Code Act, requiring contracts above a set threshold (e.g., over $50,000) to include a certified knowledge transfer and local training plan, plus a defined O&M period for hands-on training.

1.3.2 Encourage foreign firms to partner with local institutions (e.g., the College of the Marshall Islands) to support training of trainers and build long-term domestic capability.

Expected impact

Local technicians gain the skills to independently operate, maintain and repair public infrastructure through structured training and contractor partnerships.

GEDSI considerations

Potential for employment of local women (e.g., in outer islands) as trained technicians

Linkage to other priorities

Priorities 2, 4, 5 and 6: The framework helps train local technicians to conduct regular operations and maintenance for newly constructed or upgraded infrastructure.

Target assets

Health and coastal infrastructure

Impacts of hazards on assets and services

Weak local maintenance capacity impacts infrastructure service continuity and lifespan.

Lead institutions

MoFBPS takes the lead in making amendments to the 2023 Procurement Code Act with support from MPWIU and MoHHS.

The College of the Marshall Islands and the University of the South Pacific will take the lead in the training development component.

Implementation timeline

0 10 years

Four years

Capital/upfront costs

Minor in the short term – staffing and consultant costs

Operational costs/annual ongoing costs

N/A

Potential financing sources

Government financing, O&M and knowledge transfer financing subsumed in infrastructure contracts, technical cooperation, advisory grants

viii. The Kwajalein Atoll Development Authority has noted that infrastructure contracts in its jurisdiction typically include only one year of maintenance support before responsibility transfers to the client.

1.4

Life cycle and end-of-life planning requirements

Revised capital project preparation, procurement, and environmental permitting processes that mandate life-cycle costing, the development of maintenance manuals, and the use of sustainable decommissioning plans.


Ebeye seawall © UNOPS

Current challenges

→ There is a lack of end-of-life planning, policies and circular economy integration in construction.

→ Decommissioning planning is not embedded upstream nor systematically tracked, leading to safety and environmental risks.

→ Recycling and reuse pathways are limited; Majuro and Ebeye landfills are at maximum capacity.

Enabling environment recommended actions

1.4.1 Assign institutional responsibility for decommissioning, site restoration and debris management for each infrastructure type (through national O&M planning framework).

1.4.2 Define minimum decommissioning requirements for public assets and track decommissioning metrics, such as materials recovered and disposed of, costs, and environmental compliance, to inform future policy and planning.

1.4.3 Under the 2023 Procurement Code Act, give preference to life-cycle costing evaluation. Unlike selection based on the lowest bid, this requires bidders to provide a mandatory maintenance manual, an estimated 10- to 20-year operational budget, and an end-of-life disposal plan as part of their technical bid package. A clause could also be added to reward bids that incorporate circular economy principles in construction with higher technical scores.[ix]

1.4.4 Add a clause to the 2023 Public Financial Management Act (PFMA) requiring that any ministry submitting a request for a new asset also attach a multi-year O&M budget.

1.4.5 Amend the Environmental Impact Assessment Regulations to require developers to submit a decommissioning and sustainable disposal plan before any major capital project can receive an environmental permit. In addition, importers could be required to pay an environmental bond.

Expected impact

Legislation embedding life cycle planning upstream strengthens long-term infrastructure performance by reducing environmental risks, and ensuring assets are managed safely and efficiently throughout their life cycle.

GEDSI considerations

Safely decommissioned infrastructure contributes to wider community safety

Linkage to other priorities

Priorities 2, 4, 5 and 6: The requirements embed life-cycle costing and safe end-of-life disposal planning into the delivery of clinics, coastal infrastructure, shelter and road upgrades.

ix. Linkage to Sub-project 1.3 (Amendment to 2023 Procurement Code Act).

Target assets

Health and coastal infrastructure

Impacts of hazards on assets and services

Infrastructure not decommissioned at the end of its life can pose additional physical hazards.

Lead institutions

MPWIU takes the lead in cross-sector infrastructure, and MoHHS takes the lead in health asset infrastructure.

The Republic of the Marshall Islands Environmental Protection Authority undertakes decommissioning and end-of-life planning in consultation with MPWIU and MoHHS.

MoFBPs works on Procurement Code Act and PFMA amendments in consultation with MPWIU and MoHHS.

Implementation timeline

0 10 years

Eight years

Capital/upfront costs

Moderate in the short term – consulting inputs

Operational costs/annual ongoing costs

Minor – staffing costs to provide support throughout the policy amendment process

Potential financing sources

Government financing, technical cooperation, advisory grants

Strategic Priority 2

Upgrade and climate-proof neighbouring island clinics

Impact: More robust, safer clinics for healthier and more resilient communities

Upgrading and climate-proofing neighbouring island clinics ensures communities have reliable, accessible and continuous health services in the face of escalating climate-related hazards.

Location
All neighbouring island clinics with assigned health personnel, with a phased approach based on risk and service criticality

Type of infrastructure
Healthcare: neighbouring island clinics

Natural hazard addressed
Storms, flooding, heatwaves, droughts and tsunamis

Assessment basis

- Many neighbouring island clinics lack the minimum necessary resilient infrastructure, including reliable solar power and batteries, safe rainwater harvesting and storage, functional high frequency (HF) radio communications, thermal protection and accessible design features.
- A significant share of clinic construction predates the adoption of the 2021 RMI National Building Code, and current information about structural condition, utility performance and code compliance is incomplete.
- Neighbouring island clinics often lack features compatible with GEDSI best practices (e.g., the provision of ramps, accessible toilets, adequate internal spaces).
- A recurring operational constraint is the shortage of local personnel available for preventive maintenance.

Implementation Pathway for Priority 2

2.1 Standardized, climate-resilient clinic design package
An updated architectural and engineering package for outer island clinics that integrates defined minimum resilience requirements.[x]

2.2 Baseline digital clinic database
A digital, centralized inventory of existing records with systematic identification of data gaps across all clinics.

2.3 Fully populated digital clinic database
A comprehensive inventory updated with real-time field assessment data, hazard-exposure analyses and stakeholder feedback to inform the prioritization of upgrades.

2.4 Phased climate-resilient upgrades to clinics
Physical upgrades of neighbouring island clinics guided by risk-based prioritization, and supported by strengthened maintenance systems and enhanced local maintenance capacity.

GEDSI impact

Upgrading outer island clinics – often the only healthcare facilities available to their communities – significantly strengthens maternal and reproductive health outcomes, improves childcare and family well-being, and ensures dignified, accessible care for women, older persons, persons with disabilities, and caregivers. Enhanced safety, reliability, and comfort in these clinics also create safer working conditions for health staff, delivering lasting improvements in community health and resilience.

Potential SDG targets influenced

SDG 3.d; SDG 5.6; SDG 6.1; SDG 7.1; SDG 10.2

Capital upfront cost

High in the short to medium term for assessment, digital database development, design and upgrading of clinics (more than $2 million)

Alignment with NDCs

Adaptation: resilient health facilities in remote communities

Mitigation: renewable energy

Operational cost

Minor over the long term if maintenance and local capacity are built into implementation from the outset (up to $200,000 per year)

Project synergies

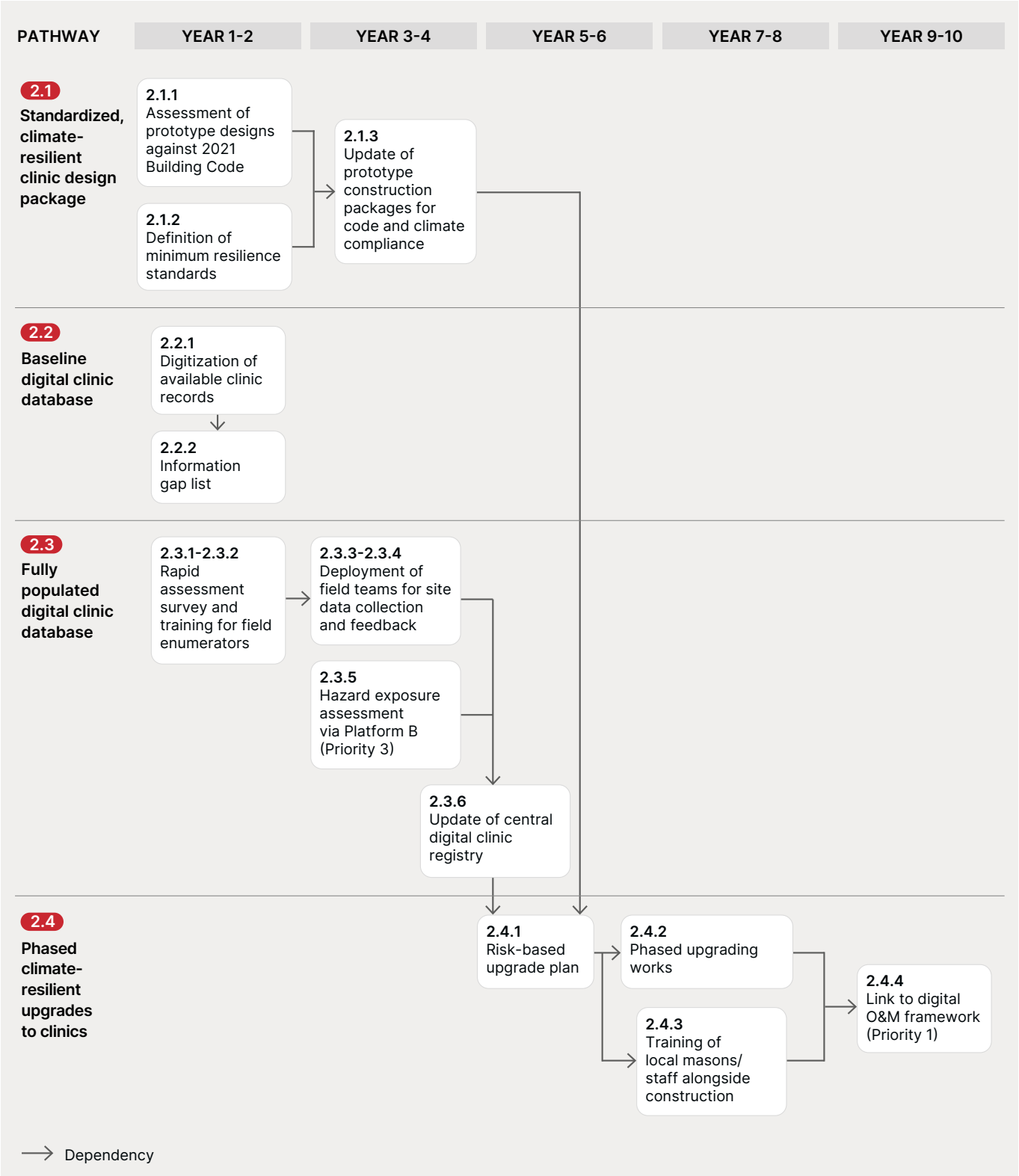
No direct unfunded NIIP project currently addresses a nationwide neighbouring island clinic resilience upgrade programme.

Regional precedents

Building Resilience of Health Systems in Pacific Island LDCs to Climate Change. Output 3 includes costed Climate-Resilient Clinic Upgrade Plans for Tuvalu and Vanuatu, and completion of core upgrades (total project cost $78.6 million).

x. Community and cultural leader buy-in is a precondition for durable outcomes: prior infrastructure works undertaken without sufficient local alignment have faced resistance, while the UN Children's Fund water, sanitation and hygiene project in Arno, which delivered accessible, gender-segregated toilets, is a useful GEDSI reference point for clinic upgrade packages.

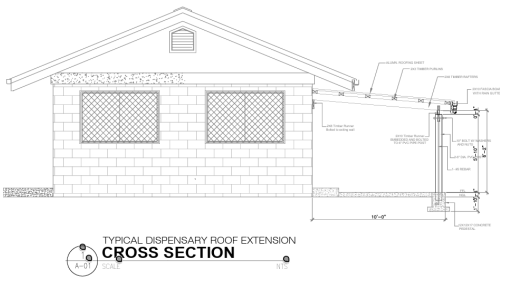
TIMELIME


PATHWAY
YEAR 1-2
YEAR 3-4
YEAR 5-6
YEAR 7-8
YEAR 9-10
2.1
Standardized, climate-resilient clinic design package
2.1.1 Assessment of prototype designs against 2021 Building Code
2.1.2 Definition of minimum resilience standards
2.1.3 Update of prototype construction packages for code and climate compliance
2.2
Baseline digital clinic database
2.2.1 Digitization of available clinic records
2.2.2 Information gap list
2.3
Fully populated digital clinic database
2.3.1-2.3.2 Rapid assessment survey and training for field enumerators
2.3.3-2.3.4 Deployment of field teams for site data collection and feedback
2.3.5 Hazard exposure assessment via Platform B (Priority 3)
2.3.6 Update of central digital clinic registry
2.4
Phased climate-resilient upgrades to clinics
2.4.1 Risk-based upgrade plan
2.4.2 Phased upgrading works
2.4.3 Training of local masons/ staff alongside construction
2.4.4 Link to digital O&M framework (Priority 1)
Dependency

2.1

Standardized, climate-resilient clinic design package

An updated architectural and engineering package for outer island clinics that integrates defined minimum resilience requirements.



Neighbouring Islands Clinic Prototype © UNOPS

Current challenges

→ The government's clinic design prototypes predate the 2021 RMI National Building Code.

→ Minimum standards for RMI clinics on GEDSI, energy efficiency, service redundancies, communication and climate resilience have not been established yet.

Enabling environment recommended actions

2.1.1 Assess the government's two standardized clinic prototype designs against the 2021 RMI National Building Code.

2.1.2 Define the minimum standards for the long-term climate resilience of neighbouring island clinics, addressing: rainwater collection (e.g., roof gutters, tank and pump), power systems and energy autonomy (photovoltaic panels and battery), communication systems (HF radio, Starlink), thermal comfort and habitability (insulation, shading, cross-ventilation), GEDSI (the provision of ramps, toilets, internal spaces), staff accommodation (housing or dormitory space for doctors and health assistants posted from other islands), corrosion-resistant construction materials (stainless steel and aluminium for exterior components, given the coastal environment), infection control provisions (medical waste handling and wound management spaces), and additional options for climate adaptation and risk mitigation (trenches to channel water, sandbags, structure elevation, relocation).

2.1.3 Update the two prototypes' construction package to include minimum standards and ensure compliance with the 2021 RMI National Building Code.

Expected impact

A standardized clinic package for all new construction and upgrades improves service reliability and strengthens the climate resilience of healthcare delivery across neighbouring outer islands.

GEDSI considerations

Minimum resilience standards should integrate GEDSI considerations, e.g., universal design principles, safe water, reliable power, communications, and thermal comfort, which can reduce barriers to access for women, persons with disabilities, older persons, and caregivers while also supporting safer working conditions for health staff.

Linkage to other priorities

Priority 3: The clinic design package uses hazard and climate data (e.g., flood levels, temperatures) to inform its minimum resilience standards.

Target assets

Health infrastructure

Impacts of hazards on assets and services

Water shortages during drought, power shortages in case of disconnection from the public grid, structural damage due to strong winds, flooding due to heavy rainfall, spring tides and storm surges

Lead institutions

MoHHS, with implementation support from MPWIU for design and code compliance.

Outer Island Office support on local implementation.

Implementation timeline

0 10 years

Three years

Capital/upfront costs

Minor – design development for revised package

Operational costs/annual ongoing costs

Minor – periodic updates to the package will be needed to factor in evolving climate risks

Potential financing sources

Adaptation financing, GEDSI financing, capital expenditure grants, concessional loans, disaster risk reduction financing channels

2.2

Baseline digital clinic database

A digital, centralized inventory of existing records with systematic identification of data gaps across all clinics.


Ebeye Hospital © UNOPS

Current challenges

Stakeholder inputs (Outer Island Office site visits in November 2025) indicate that power, water, communications and habitability constraints directly affect continuity of service and the ability to retain health staff in remote locations. However, data need to be stored and standardized for consistent analysis of this issue.

Enabling environment recommended actions

2.2.1 Digitize information already available, following a consistent protocol, thereby creating a baseline digital clinic database (GPS coordinates, photographs, available drawings, architectural layouts, structural detailing, utility connection status, maintenance history, risk information like distance from sea and trees etc.).

2.2.2 Compile a list of missing information for each clinic.

Expected impact

A digital clinic database improves planning and coordination by enabling accurate mapping of facilities and real-time tracking of infrastructure interventions.

GEDSI considerations

The database will help identify and fill GEDSI gaps in current clinics.

Linkage to other priorities

Priority 1: The database can be interoperable with the digital O&M system to track clinic condition and baseline maintenance needs.

Target assets

Health infrastructure

Impacts of hazards on assets and services

Not knowing the location and baseline conditions of clinics makes it impossible to plan for long-term resilience to climate hazards and to identify community vulnerabilities.

Lead institutions

MoHHS; support from the Outer Island Office in providing existing information.

Implementation timeline

0 10 years

Two years

Capital/upfront costs

Minor – digital database creation

Operational costs/annual ongoing costs

Minor – updates to the database over time

Potential financing sources

Policy-based financing, government financing

2.3

Fully populated digital clinic database

A comprehensive inventory updated with real-time field assessment data, hazard-exposure analyses and stakeholder feedback to inform the prioritization of upgrades.


Database work © Unsplash

Current challenges

Stakeholder inputs (Outer Island Office site visits in November 2025) indicate that power, water, communications and habitability constraints directly affect continuity of service and the ability to retain health staff in remote locations. However, data need to be stored and standardized for consistent analysis of this issue.

Enabling environment recommended actions

2.3.1 Produce a rapid assessment survey to evaluate clinics' structural and operational vulnerabilities.[xi]

2.3.2 Train enumerators to apply the survey consistently.

2.3.3 Deploy the assessment team to collect baseline information and populate the digital database.

2.3.4 Collect feedback from local stakeholders on needs and expected outcomes.

2.3.5 Assess hazard exposure for each clinic site (using Platform B – Priority 3).

2.3.6 Update clinic database (Priority 2.2) by populating it with the new information.

Expected impact

A comprehensive evidence base on outer island clinic conditions is established, enabling targeted, climate-resilient and inclusive upgrades that strengthen the reliability and resilience of healthcare facilities.

GEDSI considerations

GEDSI aspects are included in the assessment (e.g., the provision of toilets, ramps, internal spaces).

→ Opportunities to train and be deployed as part of assessment teams should be available to women.

→ Community vulnerabilities should be considered when assessing hazard exposure of clinic sites.

Linkage to other priorities

Priority 1: The database can be interoperable with the digital O&M system.

Priority 3: The database uses multi-hazard exposure data (Platform B) to inform risk assessments of clinics.

Target assets

Health infrastructure

Impacts of hazards on assets and services

Long-term safety of clinics is at risk.

Lead institutions

MoHHS, with implementation support from the Outer Island Office on local existing information.

Implementation timeline

0 10 years

Five years

Capital/upfront costs

Moderate to high – site visits to 40 neighbouring island clinics (travel cost and enumerator wages)

Operational costs/annual ongoing costs

N/A

Potential financing sources

Policy-based financing, government financing, capital expenditure grants, concessional loans

xi. Refer to Annex E: Healthcare building survey questionnaire.

2.4

Phased climate-resilient upgrades to clinics

Physical upgrades of neighbouring island clinics guided by risk-based prioritization, and supported by strengthened maintenance systems and enhanced local maintenance capacity.


Neighbouring island clinic © UNOPS

Current challenges

Stakeholder inputs (Outer Island Office site visits in November 2025) indicate that power, water, communications and habitability constraints directly affect continuity of service and the ability to retain health staff in remote locations. However, data need to be stored and standardized for consistent analysis of this issue.

Adaptation investment recommendations

2.4.2 Implement phased upgrade works in partnership with local communities, securing the endorsement of cultural and community leaders before works begin, with robust quality assurance and control activities. Include relocation plans for clinics facing high exposure upon additional consultation with local stakeholders.

Enabling environment recommended actions

2.4.1 Prioritize urgent interventions for the clinics facing the highest risk using hazard and exposure data from Platform B (Priority 3), based on pressing maintenance requirements, and make a plan for phased upgrades to other clinics.

2.4.3 Combine training of local masons, technicians and clinic staff in maintenance with upgrade works.

2.4.4 Tie to digital maintenance system for health infrastructure (Priority 1.2).

Expected impacts

Climate-resilient, inclusive clinic upgrades supported by stronger maintenance systems improve the reliability and resilience of healthcare infrastructure across outer island communities.

Co-benefits

Increased possibility of retaining health assistance by providing a more comfortable and functional working space.

More telemedicine cases and fewer referrals to Majuro and Ebeye hospitals.

GEDSI considerations

Upgrades prioritize key GEDSI requirements.

Training should be made available to women wishing to strengthen their capacity.

Linkage to other priorities

Priority 1: Clinic upgrades are informed by the digital maintenance platform, and upgrades embed life cycle decommissioning responsibilities.

Priority 3: Hazard data (Platform B) can be used to prioritize interventions, and updated asset data can be fed back into Platform A.

Target assets

Health infrastructure

Impacts of hazards on assets and services

Flooding, extreme heat (thermal discomfort), service disruption, lack of structural safety, service disruption during emergencies, prolonged droughts.

Lead institutions

MoHHS, with implementation support from MPWIU for capital works and code compliance.

Outer Island Office support to identify existing information.

Where a local government body is already established, align with its planned interventions rather than duplicating them. For example, take into account the infrastructure priorities identified by the Kwajalein Atoll Development Authority and Ebeye local government in their master plans.

Implementation timeline

0 10 years

Four to five years

Capital/upfront costs

High – hazard assessment and phased upgrade construction costs

Operational costs/annual ongoing costs

Moderate – maintenance of clinics. As a reference point, dedicated in-house maintenance staff members per health centre have estimated annual wages of $25,000 to $30,000, against which the cost of contracting external teams for routine repairs can be compared.

Potential financing sources

Adaptation financing, disaster risk reduction financing, capital expenditure grants, concessional loans

Strategic Priority 3

Build an integrated geospatial asset and hazard information system

Impact: Strengthened data systems enable risk-informed, evidence-based infrastructure decisions that enhance the safety and resilience of communities facing climate hazards

Integrated digital platforms that consolidate asset and hazard data enable more informed planning and management, resulting in safer, more reliable and climate-resilient infrastructure for communities in the RMI.

Location
Nationwide, beginning with Majuro and Ebeye

Type of infrastructure
Primarily coastal infrastructure, with wider applicability across public infrastructure systems

Natural hazard addressed
Storms, flooding, droughts, heatwaves and tsunamis

Assessment basis

- Information about assets, physical characteristics (e.g., seawall length and height) and conditions (e.g., exposed rebars, corroded sheet piles, cracked concrete), design and construction, hazard exposure, geospatial details, and existing maintenance records is limited and fragmented among RMI agencies, limiting integrated planning and informed decision-making for investment prioritization.
- Limited geographic information system (GIS) capacity and systems (no centralized georeferenced asset or land dataset), and the complexity of land information management (e.g., constrained cadastre or land registration context due to customary tenure) further constrain routine use of spatial data in infrastructure planning.
- Assessments do not systematically collect disaggregated data, such as on service delivery needs or the differentiated impacts of disasters on women and vulnerable groups. Nor are these data stored in databases for future research and evidence-based decision-making.

Implementation Pathway for Priority 3

3.1 Baseline coastal infrastructure database (Platform A)
A consolidated, standards-based GIS inventory under MPWIU that maps existing coastal asset records, establishes dataset requirements, and identifies baseline information gaps.

3.2 Expanded cross-sector asset database (Platform A)
A comprehensive digital infrastructure database updated with structural and condition data from field assessments, and incrementally expanded beyond coastal assets to include other public infrastructure (e.g., schools, docks, landfills).

3.3 Digital multi-hazard exposure and risk analysis database for infrastructure (Platform B)
A unified database compiling climate hazard GIS layers under NDMO, establishing standardized data collection protocols and identifying data gaps.

3.4 Interoperable and expandable climate risk decision support system
An integrated GIS-based infrastructure management system linking Platforms A and B, sustained by formal data-sharing arrangements, cross-departmental governance and strengthened local GIS capacity.

GEDSI impact

Better geospatial and asset data can support more equitable decision-making if datasets capture who is served, where service gaps are concentrated and which communities face the worst access constraints. To maximize GEDSI value, the system should progressively include data relevant to accessibility, remoteness, service dependency and exposure of vulnerable groups, while remaining realistic about data availability.

Potential SDG targets influenced

SDG 9.1; SDG 11.b; SDG 13.2; SDG 16.6

Alignment with NDCs

Adaptation: climate risk preparedness

Capital upfront cost

Moderate in the short to medium term for data collection, platform set-up, and training (between $500,000 and $1 million).

Project synergies (NIIP 2023)

ENV-MPWIU-1, RMI geodetic infrastructure, $500,000 est. equipment value.

MAR-MTCIT-4, Asset management for Marshall Islands Shipping Corporation, $669,000 est. project value.

MAR-RMIPA-2, Majuro and Ebeye ports master plan update, and AVI-RMIPA-3, AKIA master plan update, $1 million est, project value each.

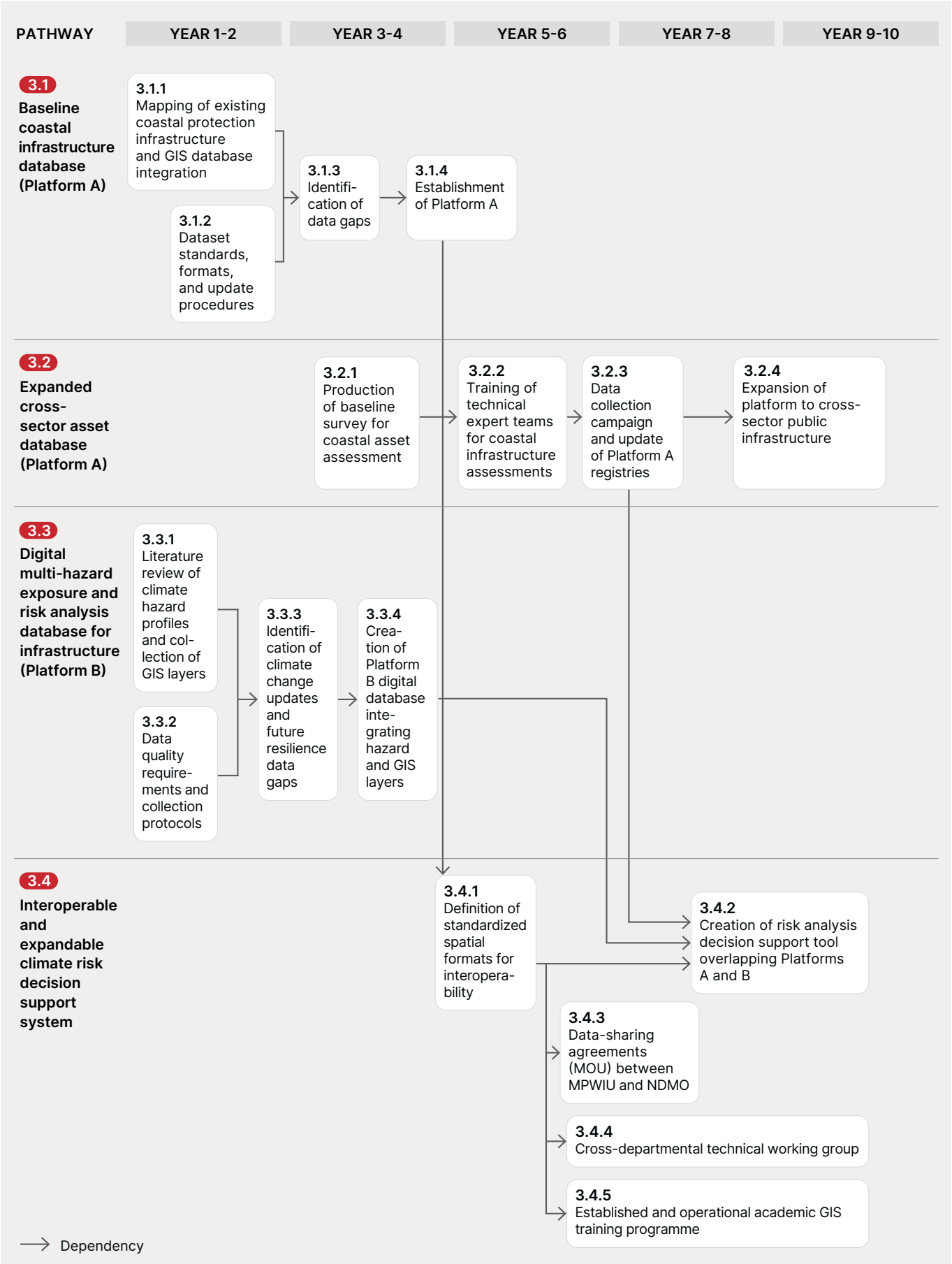
Regional precedents

Federated States of Micronesia, Prioritized Road Investment and Management Enhancements Project (P172225). Component 1: Spatial and Sector Planning Tools ($1.5 million), World Bank Group (investment project financing)

Operational cost

Relatively low over the long term for platform hosting, software licensing, and routine data updates, provided maintenance is assigned institutionally (up to $200,000 per year).

TIMELIME


PATHWAY
YEAR 1-2
YEAR 3-4
YEAR 5-6
YEAR 7-8
YEAR 9-10
3.1
Baseline coastal infrastructure database (Platform A)
3.1.1 Mapping of existing coastal protection infrastructure and GIS database integration
3.1.2 Dataset standards, formats, and update procedures
3.1.3 Identifi-cation of data gaps
3.1.4 Establishment of Platform A
3.2
Expanded cross-sector asset database (Platform A)
3.2.1 Production of baseline survey for coastal asset assessment
3.2.2 Training of technical expert teams for coastal infrastructure assessments
3.2.3 Data collection campaign and update of Platform A registries
3.2.4 Expansion of platform to cross-sector public infrastructure
3.3
Digital multi-hazard exposure and risk analysis database for infrastructure (Platform B)
3.3.1 Literature review of climate hazard profiles and col-lection of GIS layers
3.3.2 Data quality require-ments and collection protocols
3.3.3 Identifi-cation of climate change updates and future resilience data gaps
3.3.4 Crea-tion of Platform B digital database inte-grating hazard and GIS layers
3.4
Interoperable and expandable climate risk decision support system
3.4.1 Definition of standardized spatial formats for interopera-bility
3.4.2 Creation of risk analysis decision support tool overlapping Platforms A and B
3.4.3 Data-sharing agreements (MOU) between MPWIU and NDMO
3.4.4 Cross-departmental technical working group
3.4.5 Established and operational academic GIS training programme
Dependency

3.1

Baseline coastal infrastructure database (Platform A)

A consolidated, standards-based GIS inventory under MPWIU that maps existing coastal asset records, establishes dataset requirements and identifies baseline information gaps.


Wharf in Ebeye © UNOPS

Current challenges

Data on coastal protection assets is fragmented across various agencies, consultant reports and isolated projects. There is currently a lack of standardized spatial data formats, minimum data requirements, and update procedures, making it impossible to consolidate existing records into a reliable baseline inventory that can be used for planning and investment prioritization purposes.

Enabling environment recommended actions

3.1.1 Map existing coastal protection infrastructure and store the data in a digital GIS-based database.

3.1.2 Define minimum standards for datasets, including formats and update procedures.

3.1.3 Identify gaps and missing information about infrastructure assets.

3.1.4 Establish a baseline system for Platform A by populating this data.

Expected impact

A standards-based GIS inventory of coastal protection infrastructure, with gaps identified, strengthens the institutional capacity to develop a comprehensive infrastructure platform for investment prioritization and asset management.

GEDSI considerations

High GEDSI relevance of assets is flagged in the database (e.g., seawall protecting hospital maternity wing).

Linkage to other priorities

Priority 1: The database feeds baseline asset data into the digital maintenance platform to enable routine tracking and highlight critical issues.

Target assets

Coastal infrastructure (e.g., seawalls, sheet piles, docks, bridges, causeways)

Impacts of hazards on assets and services

Not knowing the current status and resilience of assets and not upgrading them will jeopardize the safety of communities.

Lead institutions

MPWIU

Implementation timeline

0 10 years

Five years

Capital/upfront costs

Moderate – platform creation

Operational costs/annual ongoing costs

Minor – platform maintenance

Potential financing sources

Government financing, policy-based grants, project preparation and technical grants

3.2

Expanded cross-sector asset database (Platform A)

A comprehensive digital infrastructure database updated with structural and condition data from field assessments, and incrementally expanded beyond coastal assets to include other public infrastructure (e.g., schools, docks, landfills).


Ebeye seawall © UNOPS

Current challenges

Beyond the fragmentation of existing records, there are significant physical data gaps regarding the current structural condition and maintenance needs of coastal assets. Furthermore, asset data is heavily siloed by sector, preventing a holistic, cross-agency view of related public infrastructure (e.g., schools, clinics, landfills and docks) within a single platform.

Enabling environment recommended actions

3.2.1 Produce a baseline survey[xii] for the assessment of coastal assets (including infrastructure asset data, condition assessments, maintenance requirements).

3.2.2 Train a team of technical experts to assess existing coastal infrastructure assets.

3.2.3 Implement a data collection campaign, compiling data gaps identified when carrying out action 3.1.3 together with GIS layers into the platform, and update Platform A.

3.2.4 Expand this platform to integrate other governmental infrastructure managed by other ministries (e.g., schools, docks, landfills) to create a broader public infrastructure information platform.

Expected impact

A comprehensive digital platform for coastal infrastructure strengthens institutional capacity for investment prioritization and asset management to ensure infrastructure remains safe and reliable over time.

GEDSI considerations

GEDSI considerations need to be embedded in the assessment surveys.

Linkage to other priorities

Priority 1: The database connects to the digital maintenance platform to support long-term life cycle tracking.

Priorities 2, 4, 5 and 6: The database provides cross-sector asset data (Platform A) to support the planning and delivery of physical infrastructure upgrades.

Target assets

Coastal infrastructure (e.g., seawalls, sheet piles, docks, bridges, causeways)

Impacts of hazards on assets and services

Not knowing the current status and resilience of assets and not upgrading them will jeopardize the safety of communities.

Lead institutions

MPWIU, with the support from associated ministries and government departments for platform expansion.

Implementation timeline

0 10 years

Five years (excluding action 3.2.4 – expanding the platform across sectors)

Capital/upfront costs

Moderate – assessment campaign

Operational costs/annual ongoing costs

N/A

Potential financing sources

Policy-based grants, government financing, technical grants

xii. See sample coastal infrastructure survey outline (Annex F).

3.3

Digital multi-hazard exposure and risk analysis database for infrastructure (Platform B)

A unified database compiling climate hazard GIS layers under NDMO, establishing standardized data collection protocols and identifying data gaps.


Database work © Unsplash

Current challenges

There is no single government-owned platform that combines asset information, condition data, hazard layers and exposure data in a form that supports investment prioritization, maintenance planning, and permitting.[xiii]

Enabling environment recommended actions

3.3.1 Review academic and grey literature to identify historical and future climate hazard profiles and collect GIS layers for hazard data.

3.3.2 Establish minimum data quality and quantity requirements, standardize data collection protocols and collect data by assigning responsibility for data collection, input and management.

3.3.3 When identifying gaps, keep in mind updates that might have to be made due to climate change (for future upgrades).

3.3.4 Create the Platform B digital database system by integrating available hazard and GIS data.

Expected impact

The development of a hazards, exposure and risk analysis platform (B) strengthens institutional capacity to develop and manage climate-resilient infrastructure in the RMI.

GEDSI considerations

The platform can support more equitable prioritization by overlaying hazard exposure data with information about service access, remoteness and vulnerability. This can help identify areas in which women, children, older persons, persons with disabilities, and outer island communities may face higher risks or greater barriers in accessing clinics, shelters, roads and emergency services.

Linkage to other priorities

Priorities 2, 4, 5 and 6: The database provides the multi-hazard risk evidence base (Platform B) needed to identify exposed assets, determine design resilience levels, and sequence physical investments.

Target assets

Coastal infrastructure (e.g., seawalls, sheet piles, docks, bridges, causeways), and health and education infrastructure

Impacts of hazards on assets and services

Physical damage, loss of service reliability.

Lead institutions

NDMO; support from GIS and survey specialists, University of the South Pacific – Majuro Campus and academic researchers.

Implementation timeline

0 10 years

Four years

Capital/upfront costs

Moderate – platform creation

Operational costs/annual ongoing costs

Minor – platform maintenance

Potential financing sources

Government budget, project preparation and technical grants

xiii. NDMO, with support from the International Organization for Migration, has already begun to develop a Hazard and Risk Assessment Platform. This sub-project should align with and build on that initiative rather than starting a parallel system.

3.4

Interoperable and expandable climate risk decision support system

An integrated GIS-based infrastructure management system linking Platforms A and B, sustained by formal data sharing arrangements, cross-departmental governance and strengthened local GIS capacity.


Pier in Majuro © Miyamoto

Current challenges

Existing asset data and hazard data are separated in silos, preventing holistic risk analysis and investment prioritization. A critical shortage of local GIS capacity prevents the routine use of spatial data as a unified decision support tool.

Enabling environment recommended actions

3.4.1 Define and enforce standardized spatial data formats to ensure technical interoperability between Platforms A and B.

3.4.2 Create a decision support tool for risk analysis by overlapping Platforms A and B.

3.4.3 Establish formal data sharing agreements (e.g., a memorandum of understanding) between MPWIU and NDMO to mandate regular, secure data exchanges between the two platforms.

3.4.4 Establish a cross-departmental technical working group to govern the overlapping decision support tool, managing user access, frequency of updates, and quality control.

3.4.5 Initiate a collaboration with academic institutions in the RMI to create a spatial analysis and GIS course and build local capacity to manage and update the platforms.

Expected impact

Interoperable data platforms, functioning as decision support tools, improve institutional capacity to assess risks, monitor asset condition, and make timely, evidence-based planning and maintenance decisions – building a stronger evidence base for funding requests, design decisions, permitting, and long-term infrastructure resilience.

Strengthened local technical GIS capacity, built through partnerships with academic institutions, further improves the government's ability to independently manage and update these platforms over time.

GEDSI considerations

Enhancing infrastructure resilience supports community safety and ensures better access to services for vulnerable groups.

Linkage to other priorities

Priorities 1, 2, 4, 5 and 6: The unified decision support tool enables risk-informed infrastructure prioritization and improved O&M planning.

Target assets

Coastal infrastructure (e.g., seawalls, sheet piles, docks, bridges, causeways)

Impacts of hazards on assets and services

Lack of decision support tools prevents the most vulnerable infrastructure from being prioritized.

Lead institutions

NDMO and MPWIU.

Support from GIS and survey specialists, University of the South Pacific – Majuro Campus and academic researchers.

Implementation timeline

0 10 years

Five years

Capital/upfront costs

Moderate – creation of risk framework and presentation of results

Operational costs/annual ongoing costs

Minor – updates

Potential financing sources

Government budget, climate resilience financing, project preparation and technical grants

Strategic Priority 4

Scale up nature-based solutions

Impact: Nature-based coastal protection becomes an institutionalized, locally led practice strengthening long-term resilience to coastal hazards in the RMI

Stronger local capacity to implement NBS and the development of evidence-based coastal protection pilots translate into safer, more resilient communities facing fewer climate-related disruptions.

Location
Nationwide, with particular relevance for exposed outer island shorelines

Type of infrastructure
Coastal infrastructure

Natural hazard addressed
Flooding

Assessment basis

- New coastal infrastructure design and construction typically entail building reinforced concrete walls and rock revetments. Large engineered seawalls are costly, technically demanding to construct and slow to deliver, which limits the number of coastlines that can be protected through conventional hard engineered solutions alone. They require significant financial effort and have long approval times. The new seawall built in Ebeye cost approximately $35,000 per metre, as testing and design were carried out on the basis of a 50-year life span for the asset and a 100-year flood return period.). A combination of textile containers and nature-based solutions is estimated to be around 80 per cent cheaper than concrete seawalls, which would help protect more communities despite funding constraints. For some exposed stretches, lower-cost and more adaptable nature-based solutions may provide an appropriate interim or complementary solution when matched carefully with site conditions.
- Dependence on the import of construction materials and the limited availability of local aggregate further increase costs, particularly in the context of neighbouring islands with lower populations.
- There is no dredging equipment available in the country for sand and aggregate mining or dredging.[xiv]

Implementation Pathway for Priority 4

4.1 Nature-based coastal protection solutions
Cost-effective hybrid and nature-based coastal protection projects implemented at prioritized sites, informed by hazard risk data integration, feasibility studies, and post-construction performance monitoring, including stakeholder feedback.

4.2 Knowledge and learning ecosystem for nature-based solutions
New NBS curricula integrated into academic institutions in the RMI, and local research applied to inform future coastal adaptation.

xiv. The Pacific Community has already conducted a study in Majuro and Ebeye on the environmental requirements for offshore sand and aggregate mining or dredging.

GEDSI impact

Nature-based and lower-cost coastal protection approaches help safeguard settlements and community assets, reducing long waits for major infrastructure investments and strengthening long-term safety and resilience for all community members, including women, older persons, persons with disabilities, and neighbouring island populations.

Potential SDG targets influenced

SDG 11.b; SDG 13.1; SDG 14.2; SDG 15.1

Alignment with NDCs

Adaptation: Adaptation: nature-based solutions

Mitigation: low-carbon coastal protection materials

Capital upfront cost

Moderate in the short term to establish academic programmes, site assessments, and the piloting of nature-based solutions, with future costs dependent on the scale and type of solutions adopted (up to $500,000).

Operational cost

Relatively low over the long term for regular nature-based solution infrastructure maintenance and repairs (up to $200,000 per year) and the ongoing delivery of academic courses (up to $200,000 per year).

Project synergies

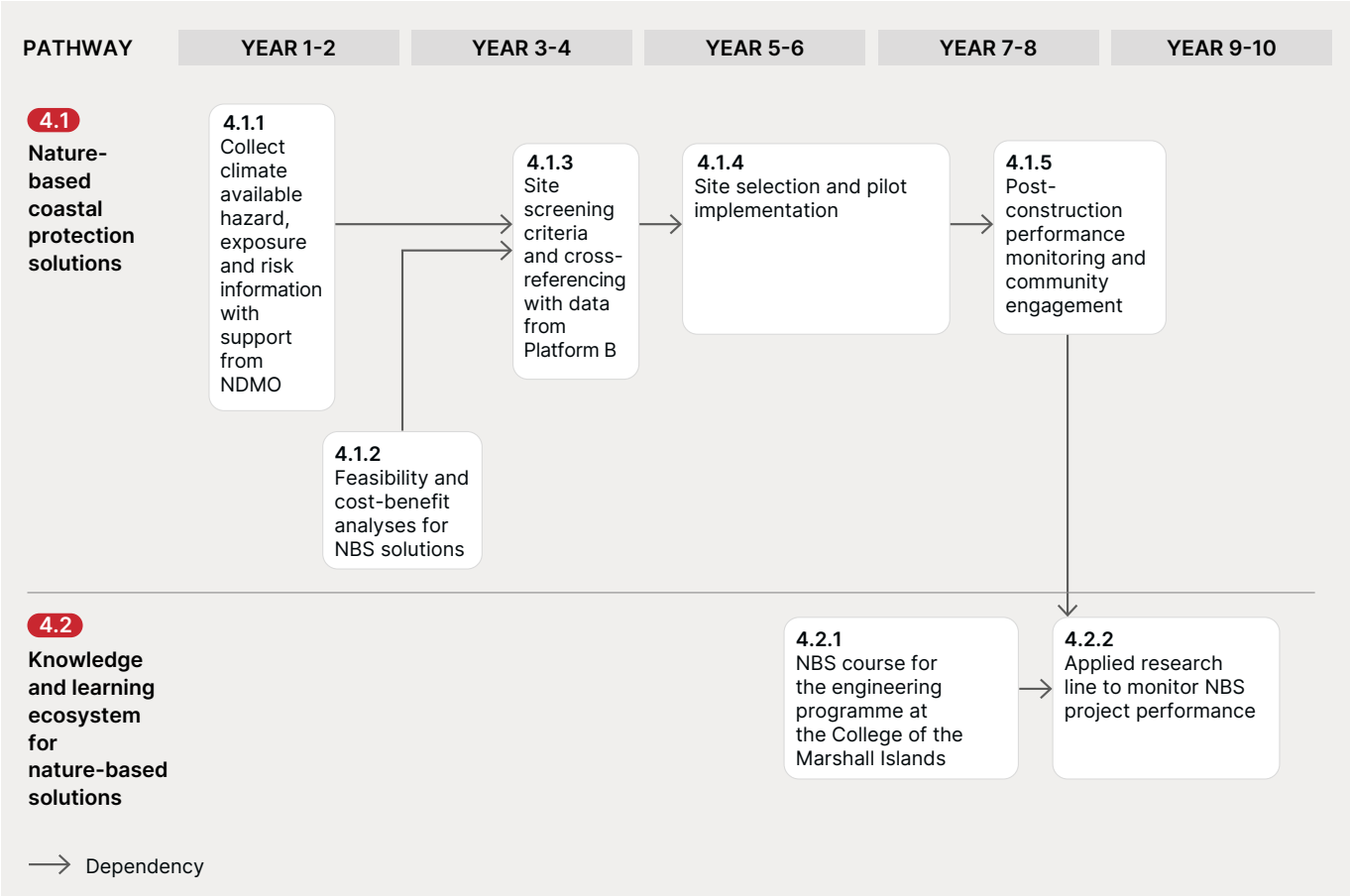
ENV-MPWIU-11, Majuro seawall project (phases 3-6), $5.5 million estimated value of project.

ENV-KADA-3, Ebeye causeway, lagoon side of an embankment, $1.5 million estimated value of project.

Regional precedents

Kiribati, Kiribati Australia Climate Security Initiative (KACSI), geotextile sand containers (soft infrastructure) from $700 to $2,300 per metre, mangrove/ocean-edge plant rehabilitation, $85,000 per hectare.

TIMELIME


PATHWAY
YEAR 1-2
YEAR 3-4
YEAR 5-6
YEAR 7-8
YEAR 9-10
4.1
Nature-based coastal protection solutions
4.1.1 Collect climate available hazard, exposure and risk information with support from NDMO
4.1.2 Feasibility and cost-benefit analyses for NBS solutions
4.1.3 Site screening criteria and cross-referencing with data from Platform B
4.1.4 Site selection and pilot implementation
4.1.5 Post-construction performance monitoring and community engagement
4.2
Knowledge and learning ecosystem for nature-based solutions
4.2.1 NBS course for the engineering programme at the College of the Marshall Islands
4.2.2 Applied research line to monitor NBS project performance
Dependency

4.1

Nature-based coastal protection solutions

Cost-effective hybrid and nature-based coastal protection projects implemented at prioritized sites, informed by hazard risk data integration, feasibility studies, and post-construction performance monitoring, taking into account stakeholder feedback.


Majuro Coastal NbS © Miyamoto International

Current challenges

Engineered coastal structures demand intensive ongoing maintenance that exceeds the RMI's current capacity, accelerating premature asset deterioration. This reinforces the need for lower-maintenance, nature-based solutions that can be deployed at scale and sustained through local interventions.

Adaptation investment recommendations

4.1.4 Identify candidate sites and pilot coastal protection projects implementing NBS.

Enabling environment recommended actions

4.1.1 Collect climate hazard, exposure, and risk information from NDMO.

4.1.2 Produce feasibility studies focusing on neighbouring islands for NBS options like vegetation restoration and geotextile sand containers.

4.1.3 Determine site screening criteria to identify where NBS can provide interim, complementary, or hybrid protection, cross-referencing Deltares flood mapping and coastal vulnerability assessment data from Platform B (Priority 3) for critical infrastructure (e.g., hospitals, causeways).

4.1.5 Monitor post-construction performance and engage communities to build an evidence base for future NBS projects.

Expected impact

Piloted NBS interventions reduce coastal erosion and flood risk, providing affordable shoreline protection that enhances ecosystems. Performance monitoring and community engagement build ownership and strengthen institutional capacity to scale future NBS projects.

GEDSI considerations

NBS offers universal benefits by rapidly protecting settlements that might otherwise wait years for major investments. Site selection and engagement must meaningfully include women, older persons, persons with disabilities, and remote communities in planning and stewardship.

Linkage to other priorities

Priority 3: Uses hazard exposure data (Platform B) to prioritize pilot sites and feeds the newly built NBS asset data back into the digital mapping platforms.

Target assets

Coastal infrastructure

Impacts of hazards on assets and services

Physical damage, loss of community assets, loss of life.

Lead institutions

MPWIU; support from NDMO on hazard, exposure, and risk information data extraction from Platform B.

Implementation timeline

0 10 years

Eight and a half years

Capital/upfront costs

High

Operational costs/annual ongoing costs

Minor – maintenance and upkeep[xv]

Potential financing sources

NBS financing, climate adaptation grants, small grants programme

xv. Future NBS contracts should require contractors to maintain vegetation and infrastructure post-installation, and MPWIU should work with non-governmental organizations and local communities to establish operations and maintenance committees to prevent project abandonment.

4.2

Knowledge and learning ecosystem for nature-based solutions

New NBS curricula integrated into academic institutions in the RMI, and local research applied to inform future coastal adaptation.


Workshop in Majuro © UNOPS

Current challenges

Engineering programmes currently have no formal NBS curriculum or applied research stream, creating a gap in the skills and evidence needed to design, monitor, and improve nature-based solutions.

Enabling environment recommended actions

4.2.1 Develop a course on NBS for the engineering programme at the College of the Marshall Islands.

4.2.2 Introduce a new line of research to monitor the performance of projects implemented, share conclusions with academic and field communities, and foster improvements for future implementations.[xvi]

Expected impact

A dedicated academic programme and research line at the College of the Marshall Islands builds long-term local capacity in NBS design and performance monitoring, strengthening the line-up of trained professionals and evidence available to inform future coastal resilience projects.

GEDSI considerations

Capacity building in NBS can support inclusive local employment, strengthen community ownership, and increase the participation of women, youth, persons with disabilities, and neighbouring island communities in coastal resilience planning, implementation, and maintenance.

Linkage to other priorities

Priorities 3 and 5: Aligns with academic partnerships established for GIS and emergency assessment training to build local capacity-building.

Target assets

Coastal infrastructure

Impacts of hazards on assets and services

Loss of functionality, structural damage.

Lead institutions

MPWIU and the College of the Marshall Islands.

Support from vocational institutions, and the Climate Change Directorate's planned Centre of Excellence.

Implementation timeline

0 10 years

Four and a half years

Capital/upfront costs

Minor – consulting inputs, course development

Operational costs/annual ongoing costs

Minor

Potential financing sources

Climate adaptation grants, small grants programme

xvi. This can provide a stronger evidence base for hybrid coastal protection strategies tailored to atoll environments.

Strategic Priority 5

Strengthen emergency shelter readiness and rapid response systems

Impact: Improved emergency response and shelter systems reduce disaster impacts on at-risk communities by ensuring safer, more dignified, and reliably coordinated support during crises

Upgraded, well-equipped emergency shelters and strengthened rapid response capacity translate into communities that can prepare for, respond to, and recover from disasters quickly and safely.

Location
Nationwide

Type of infrastructure
Coastal infrastructure (emergency shelters and response support systems)

Natural hazard addressed
Storms, flooding, heatwaves, droughts and tsunamis

Assessment basis

- Schools, churches or community buildings used for other purposes are often used as emergency shelters instead of buildings that are specifically designed or fit for the purpose. Buildings built prior to the adoption of the 2021 RMI Building Code most likely will not be compliant with the latest standards, especially regarding roof detailing in case of extreme winds. There is no comprehensive readiness assessment covering structural safety, services, habitability and inclusive access.
- Critical shelter functions such as backup power, water supply, communications, thermal comfort and accessible sanitation may be missing or unreliable in existing buildings being used as shelters.
- Emergency shelters often lack features compatible with GEDSI best practices (for example, ensuring adequate privacy, universal accessibility, the provision of lighting and separate sanitation facilities, and safety, including for girls and women). An assessment conducted from an emergency response perspective, to ensure they can adequately meet requirements is also missing.
- There is no mechanism in place to rapidly procure urgent supplies in case of an emergency. All purchases require tendering, and there is no approved list of contractors or vendors, nor a framework to procure emergency items at an established price (e.g., food baskets, tents or other necessary items).
- The decision to carry out assessments during an emergency is made on a case-by-case basis. There are no established emergency response protocols or procedures, and no emergency response team that can rapidly deploy trained personnel.

Implementation Pathway for Priority 5

5.1 Baseline georeferenced national emergency shelter database
A centralized inventory under NDMO with digitized records of existing buildings, standardized data, and systematic identification of structural and GEDSI information gaps.

5.2 Comprehensive shelter database and minimum standards framework
A shelter readiness inventory updated via field assessments against newly established minimum standards.

5.3 Phased upgrades of shelters for climate resilience
Targeted physical interventions that retrofit shelters designated as high-risk, supported by local maintenance capacity.

5.4 Deployment-ready rapid response and assessment teams
A trained roster of personnel supported by a newly established engineering professional body and targeted academic training.

5.5. Emergency procurement and response protocols
Pre-approved supplier contracts and standardized rapid response procedures for instant mobilization of post-disaster resources.

GEDSI impact

Upgraded emergency shelters provide safe, dignified, and equitably accessible protection during crises, ensuring that women, girls, children, persons with disabilities, older persons, caregivers, and other at-risk community members can evacuate, move, rest, and receive support without barriers. Inclusive design features – such as adequate space for circulation, gender-segregated toilets and areas, lighting, privacy, caregiving arrangements, and communication – enable all vulnerable and at-risk individuals to remain safe, comfortable and supported throughout an emergency.

Potential SDG targets influenced

SDG 3.d; SDG 5.2; SDG 11.5; SDG 11.b; SDG 13.1

Capital upfront cost

High in the short term for assessment, systems set-up and targeted upgrades (more than $2 million).

Alignment with NDCs

Adaptation: emergency preparedness, shelter safety and continuity of response systems

Mitigation: renewable backup power and efficient systems in shelter upgrades

Operational cost

Moderate over the long term for routine shelter maintenance, systems servicing and ongoing response preparedness drills (between $200,000 and $1 million per year).

Project synergies (NIIP 2023)

ENV-OCS-1 Emergency Operations Center in Majuro, $7.4 million estimated value of project, flagged as priority.

OTH-MPWIU-13 Outer island community centres, $1.5 million estimated value of project, flagged as priority.

OTH-KALGOV-3 Kwajalein Atoll Local Government building, $3.3 million estimated value of project, flagged as priority.

OTH-KADA-1 Renovation of Ebeye Community Center, $757,000 estimated value of project.

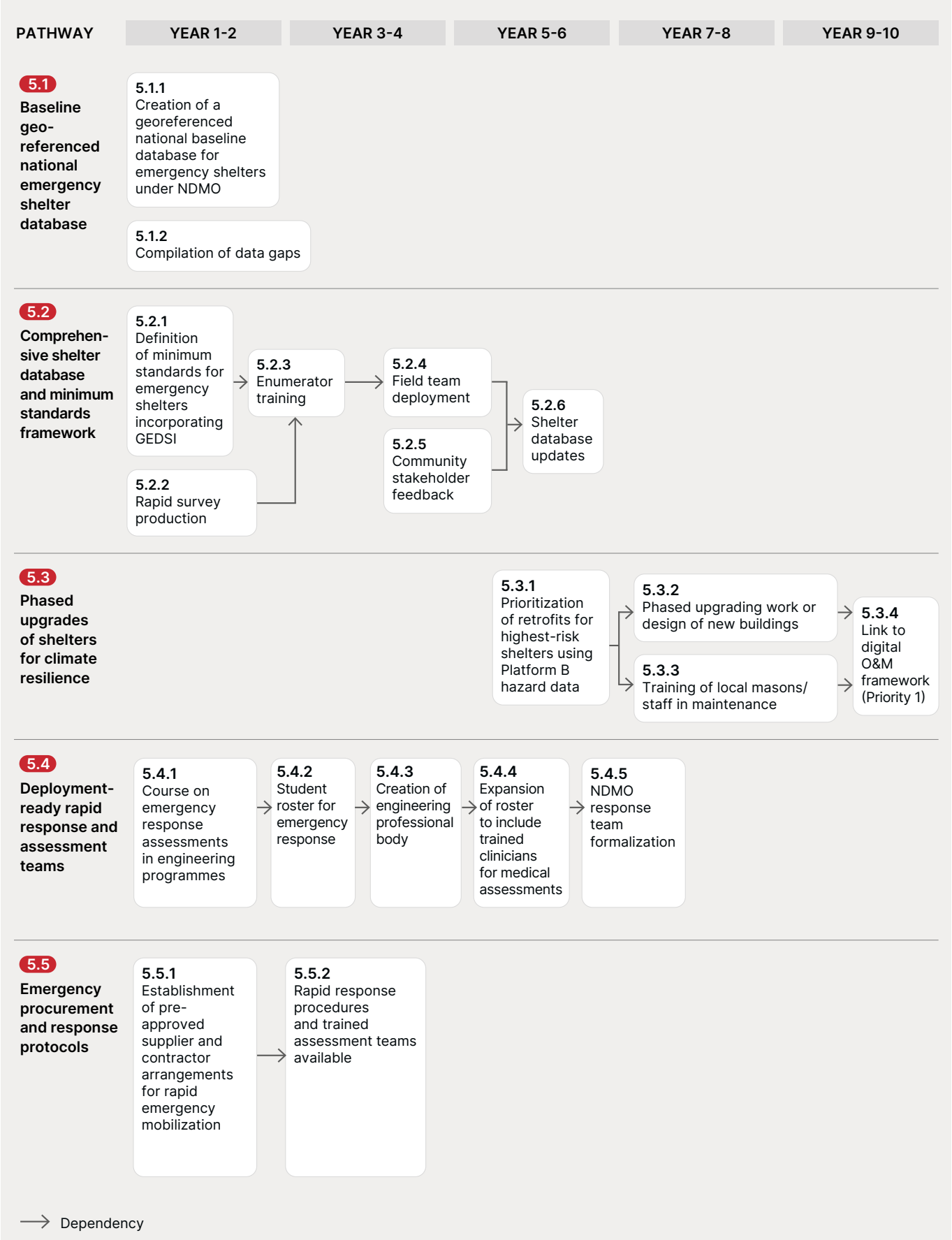
OTH-KADA-2 Redevelopment of Ebeye Community Center, $3.9 million estimated value of project.

Twenty-three projects, for a total estimated value of $14.9 million, related to educational buildings that could also function as emergency shelters.

Regional precedents

Vanuatu Infrastructure Reconstruction and Improvement Project, World Bank Group, reconstruction of 42 schools and 26 buildings post cyclone Pam, with most upgraded classrooms designed to function as emergency shelters ($50 million).

TIMELIME


PATHWAY
YEAR 1-2
YEAR 3-4
YEAR 5-6
YEAR 7-8
YEAR 9-10
5.1
Baseline geo-referenced national emergency shelter database
5.1.1 Creation of a georeferenced national baseline database for emergency shelters under NDMO
5.1.2 Compilation of data gaps
5.2
Comprehen-sive shelter database and minimum standards framework
5.2.1 Definition of minimum standards for emergency shelters incorporating GEDSI
5.2.2 Rapid survey production
5.2.3 Enumerator training
5.2.4 Field team deployment
5.2.5 Community stakeholder feedback
5.2.6 Shelter database updates
5.3
Phased upgrades of shelters for climate resilience
5.3.1 Prioritization of retrofits for highest-risk shelters using Platform B hazard data
5.3.2 Phased upgrading work or design of new buildings
5.3.3 Training of local masons/ staff in maintenance
5.3.4 Link to digital O&M framework (Priority 1)
5.4
Deployment-ready rapid response and assessment teams
5.4.1 Course on emergency response assessments in engineering programmes
5.4.2 Student roster for emergency response
5.4.3 Creation of engineering professional body
5.4.4 Expansion of roster to include trained clinicians for medical assessments
5.4.5 NDMO response team formalization
5.5
Emergency procurement and response protocols
5.5.1 Establishment of pre-approved supplier and contractor arrangements for rapid emergency mobilization
5.5.2 Rapid response procedures and trained assessment teams available
Dependency

5.1

Baseline georeferenced national emergency shelter database

A centralized inventory under NDMO with digitized records of existing buildings, standardized data, and systematic identification of structural and GEDSI information gaps.



School in Majuro © UNOPS

Current challenges

Most emergency shelters are existing public or community buildings (e.g., schools, churches) not originally designed for shelter use, with no comprehensive readiness assessment covering structural safety, services, habitability and inclusive access.

Enabling environment recommended actions

5.1.1 Create a georeferenced national baseline database of existing buildings being used as shelters under NDMO, following standardized data structuring (structure, technical drawings, utilities – power, water, and communication – fire safety, accessibility and GEDSI, maintenance records and needs, and exposure to natural hazards, e.g., distance from shore, elevation on the ground).

5.1.2 Compile a list of missing information for each building used as a shelter.

Expected impact

NDMO gains a reliable foundation for shelter planning and upgrades through a complete, georeferenced baseline of designated shelters and clearly identified information gaps.

GEDSI considerations

Assessing existing shelter buildings through a GEDSI lens will help identify critical gaps in accessibility, safety, dignity and inclusion.

Linkage to other priorities

Priority 1: The database integrates baseline shelter data with the digital maintenance system.

Priority 3: Natural hazard data (Platform B) is used to inform shelter development and maintenance.

Target assets

Coastal infrastructure

Impacts of hazards on assets and services

Water shortages during drought, power shortages in case of disconnection from the public grid, structural damage due to strong winds, flooding due to heavy rainfall, spring tides and storm surges.

Lead institutions

NDMO, with MPWIU supporting technical aspects of shelters; local administrators providing information from the ground.

Implementation timeline

0 10 years

Two years

Capital/upfront costs

Minor

Operational costs/annual ongoing costs

Minor – Hosting costs if applicable, regular information updates, any required database upgrades

Potential financing sources

Adaptation financing, disaster preparedness grants

5.2

Comprehensive shelter database and minimum standards framework

A shelter readiness inventory updated via field assessments against newly established minimum standards.



Water storage for a school in Majuro © UNOPS

Current challenges

Most emergency shelters are existing public or community buildings (e.g., schools, churches) not originally designed for shelter use, and there is no comprehensive readiness assessment covering structural safety, services, habitability and inclusive access.

Enabling environment recommended actions

5.2.1 Define minimum standards for emergency shelters in the RMI based on GEDSI and operational requirements in case of emergency (can refer to the standards set out in the Sphere Handbook).

5.2.2 Produce a rapid assessment survey to collect information about buildings being used as shelters (see draft in Annex G). The survey will assess structural safety, service reliability, and compliance with minimum standards and GEDSI requirements.

5.2.3 Train enumerators in the use of the survey questionnaire, and in the application of minimum shelter standards and the 2021 RMI National Building Code.

5.2.4 Deploy assessment teams to collect baseline information about all existing buildings used as emergency shelters and populate the digital shelter inventory database.

5.2.5 Collect feedback from local stakeholders on needs and expectations.

5.2.6 Update shelter database with information collected.

Expected impact

A comprehensive, georeferenced national shelter database strengthens the capacity of the NDMO to assess readiness, identify critical gaps in safety, accessibility, and GEDSI provisions, and prioritize upgrades – enabling more reliable, inclusive, and effective emergency response for at risk communities. Local enumerators are equipped to independently conduct future shelter assessments, expanding sustainable national assessment capacity.

GEDSI considerations

Best practice GEDSI dimensions should be integrated into operational requirements. Training and opportunities to partake in assessments should be available to women. Feedback on shelter needs and gaps should be collected from vulnerable stakeholders.

Linkage to other priorities

Priority 1: The framework can be interoperable with the digital maintenance system.

Priority 3: The framework shares structural and operational assessment data with Platforms A and B.

Target assets

Coastal infrastructure

Impacts of hazards on assets and services

It is uncertain which shelters are safe during climatic events, leading to community safety concerns.

Lead institutions

NDMO, with MPWIU taking the lead in technical aspects and training of enumerators; local administrators, schools, churches and community organizations supporting shelter needs assessments and data collection campaigns.

Implementation timeline

0 10 years

Five years

Capital/upfront costs

Moderate – site visits

Operational costs/annual ongoing costs

N/A

Potential financing sources

Disaster preparedness grants, adaptation financing

5.3

Phased upgrades of shelters for climate resilience

Targeted physical interventions that retrofit shelters designated as high-risk, supported by local maintenance capacity.


School in Majuro © UNOPS

Current challenges

Most emergency shelters are existing public or community buildings (e.g., schools, churches) not originally designed for shelter use, and there is no comprehensive readiness assessment covering structural safety, services, habitability and inclusive access.

Adaptation investment recommendations

5.3.2 Implement phased upgrading works in partnership with local communities and with robust quality assurance and control activities.

Enabling environment recommended actions

5.3.1 Cross-referencing Platform B (Priority 3), prioritize immediate interventions for the shelters facing the highest level of risk, verifying structural safety as per the 2021RMI National Building Code, exposure to natural hazards, and impact on population.

5.3.3 Combine with training of local masons in maintenance.

5.3.4 Potential to connect with Priority 1 digital maintenance platforms (MoHHS and MPWIU, depending on shelter facility) to enable routine maintenance by tracking developments and highlighting critical issues.

Expected impact

Climate-resilient shelter upgrades deliver safer, inclusive, code-compliant evacuation facilities that remain reliable and functional during hazard events.

GEDSI considerations

→ Shelter assessments and upgrades should incorporate a strong GEDSI dimension. This includes providing adequate space for circulation, safe and gender-segregated toilets, allocated spaces for cooking and washing needs, and lighting; ensuring privacy; meeting caregiving needs; making communication arrangements; and considering the needs of women, girls, persons with disabilities, older persons, and other at-risk community members who may have varying requirements for access, dignity, privacy and safety during emergencies.

→ Training could support women seeking employment as local masons.

Linkage to other priorities

Priority 1: Upgraded shelters are connected to the digital maintenance platform, and life cycle decommissioning responsibilities are assigned.

Priority 3: Multi-hazard data (Platform B) are used during upgrades to determine site-specific asset exposure for prioritization.

Target assets

Coastal infrastructure

Impacts of hazards on assets and services

Water shortages during drought, power shortages in case of disconnection from the public grid, structural damage due to strong winds, flooding due to heavy rainfall, spring tides and storm surges.

Lead institutions

NDMO oversight; NDMO providing and interpreting hazard exposure data from Platform B to MPWIU.

MPWIU taking the lead in shelter upgrading works, training of local masons and Platform 1 integration.

NDMO, with support of the local administration, to conduct project communication activities with local communities and impacted stakeholders (e.g., churches, schools).

Implementation timeline

0 10 years

Five years

Capital/upfront costs

High – construction

Operational costs/annual ongoing costs

Medium – maintenance

Potential financing sources

Adaptation and disaster preparedness grants, co-financing windows

5.4

Deployment-ready rapid response and assessment teams

A trained roster of personnel supported by a newly established engineering professional body and targeted academic training.


Meeting in Majuro © UNOPS

Current challenges

A shortage of trained professionals for disaster and emergency response and assessments is a recurring challenge in the RMI.

The decision to conduct assessments during an emergency is made on a case-by-case basis. There are no established emergency response protocols or procedures, and there is no emergency response team that can rapidly deploy trained personnel.

Enabling environment recommended actions

5.4.1 Collaborate with academic institutions to include a course on emergency response assessments in engineering programmes.

5.4.2 Create a roster of students who have completed the emergency response course and are willing to be rapidly deployed for emergency assessments.

5.4.3 Create an engineering professional body to track rosters, provide continuous training and monitor ethical conduct.

5.4.4 Extend the roster beyond engineers to include trained clinicians so response teams can cover both structural and medical assessment needs during an emergency.

5.4.5 NDMO formally creates trained assessment and response teams.[xvii]

Expected impact

A trained, multidisciplinary roster of engineers, technicians and clinicians strengthens national capacity for rapid post-disaster and post-emergency assessment, shortening response times and building infrastructure and community resilience over time.

GEDSI considerations

Training could support women's empowerment by providing incentives to women who would like to become emergency responders and experts in disaster risk response and reduction.

Linkage to other priorities

Priorities 3 and 4: The priority actions align with the academic partnerships established for GIS and NBS training to create a cohesive, multi-disciplinary local training programme.

Target assets

Coastal infrastructure

Impacts of hazards on assets and services

Currently, weak capacity in emergency response leads to poor response and recovery outcomes.

Lead institutions

MPWIU leads in creating the engineering professional body.

NDMO, with support from the College of the Marshall Islands, the University of the South Pacific and MoHHS, leads in course and roster development.

NDMO leads in creating the formal assessment teams.

Implementation timeline

0 10 years

Seven years

Capital/upfront costs

Minor – cost of consulting inputs

Operational costs/annual ongoing costs

Minor

Potential financing sources

Government budget, enabling environment finance, disaster preparedness grants

xvii. Tasks would include assessing damage, conducting post-disaster needs assessments, including medical needs, and identifying remediation and strengthening strategies. Teams to be trained in rapid response procedures (Priority 5.5).

5.5

Emergency procurement and response protocols

Pre-approved supplier contracts and standardized rapid response procedures for instant mobilization of post-disaster resources.



Majuro Hospital © UNOPS

Current challenges

There is no mechanism in place to rapidly procure emergency items in case of an emergency. All purchases require tendering, and there is no approved list of contractors or vendors, nor a framework to procure emergency supplies at an established price (e.g., food baskets, tents, water purification tablets).[xviii]

The decision to conduct assessments during an emergency is made on a case-by-case basis. There are no established emergency response protocols or procedures for use by dedicated personnel.

Enabling environment recommended actions

5.5.1 Establish pre-approved supplier and contractor arrangements (as per MPWIU suppliers).

5.5.2 Produce rapid response procedures (standard operating procedures, hazard-specific emergency protocols, emergency operations centre procedures based on incident command systems, etc.).[xix]

Expected impact

Streamlined emergency response processes strengthen institutional capacity to deliver rapid and organized emergency responses.

GEDSI considerations

Integrate GEDSI considerations into response procedures.

Linkage to other priorities

Priority 1: Pre-approved supplier mechanisms are used to expedite procurement for urgent maintenance and rapid repairs.

Target assets

Coastal infrastructure

Impacts of hazards on assets and services

GIS-based hazard analysis will be integrated in standard assessment procedures to track infrastructure performance and upgrading actions (Priority 3).

Lead institutions

MPWIU, NDMO, College of the Marshall Islands, University of the South Pacific.

Implementation timeline

0 10 years

Three to four years

Capital/upfront costs

Minor

Operational costs/annual ongoing costs

Minor

Potential financing sources

Government budget, disaster preparedness grants

xviii. MPWIU already has a list that can be reassessed and expanded as required and institutionalized for emergency response.

xix. Assessment and response teams (Priority 5.4) to be trained in these processes.

Strategic Priority 6

Deliver a phased resilience upgrade of the road corridor between Majuro airport and Laura

Impact: A climate-resilient corridor between Majuro airport and Laura that safeguards connectivity and essential services during flooding, storms and coastal hazards

Improved drainage and targeted corridor upgrades help maintain reliable access to the airport, health services, communities and the Laura water lens, reducing disruption, supporting emergency response, and strengthening long-term resilience.

Location
Majuro airport to Laura corridor

Type of infrastructure
Coastal (road and drainage) infrastructure

Natural hazard addressed
Flooding, tsunamis and storms

Assessment basis

- The approximately 30 km corridor between Majuro airport and Laura is a nationally critical transport asset and the only road connecting approximately 2,700 residents in Laura and Ajeltake to Majuro, including the international airport, Majuro Hospital, and other essential services. Insufficient road drainage causes water ponding, reduced passability and pavement deterioration in certain sections of the road during extreme weather events and wave run-up.[xx] Disruptions to transportation affect access to healthcare services, emergency response, supply chains, and airport access, thereby directly affecting community safety, maternal and reproductive health, childcare, and overall family well-being.
- Certain sections (e.g., near the airport and those close to the coast) are more vulnerable to coastal overtopping and are therefore more exposed to risks, which can temporarily disrupt access from Laura and Ajeltake to Majuro during extreme events.

Implementation Pathway for Priority 6

6.1 Climate- and hazard-informed design package for the corridor between Majuro airport and Laura
A road upgrade design developed through corridor-wide condition assessments, hazard risk integration (Platform B), stakeholder engagement and the application of climate-resilient design standards.

6.2 Phased climate-resilient corridor upgrades and capacity building
Physical rehabilitation of the corridor, including integrated O&M and the fulfilment of life cycle requirements, and on-the-job training for local personnel.

GEDSI impact

Strengthening the resilience of the only road connecting Laura and Ajeltake to Majuro safeguards equitable access to essential services (including the hospital) and improves pedestrian safety, reducing the disproportionate impacts of climate-related disruptions on remote communities, women, older persons, and people with reduced mobility.

Potential SDG targets influenced

SDG 9.1; SDG 11.2; SDG 11.5; SDG 13.1

Alignment with NDCs

Adaptation: climate-resilient transport infrastructure and continuity of essential services

Mitigation: reduced frequency of reconstruction, improved transport efficiency, and lower fuel use and embodied emissions

Capital upfront cost

High – depending on the extent of drainage works, pavement rehabilitation and phased implementation sequencing (more than $2 million).

Operational cost

Moderate – Regular maintenance and repairs throughout the infrastructure life cycle (up to $200,000 per year).

Project synergies (NIIP 2023)

RDS-MPWIU-9, Majuro road repair (from the airport to Laura), $29 million estimated value of project.

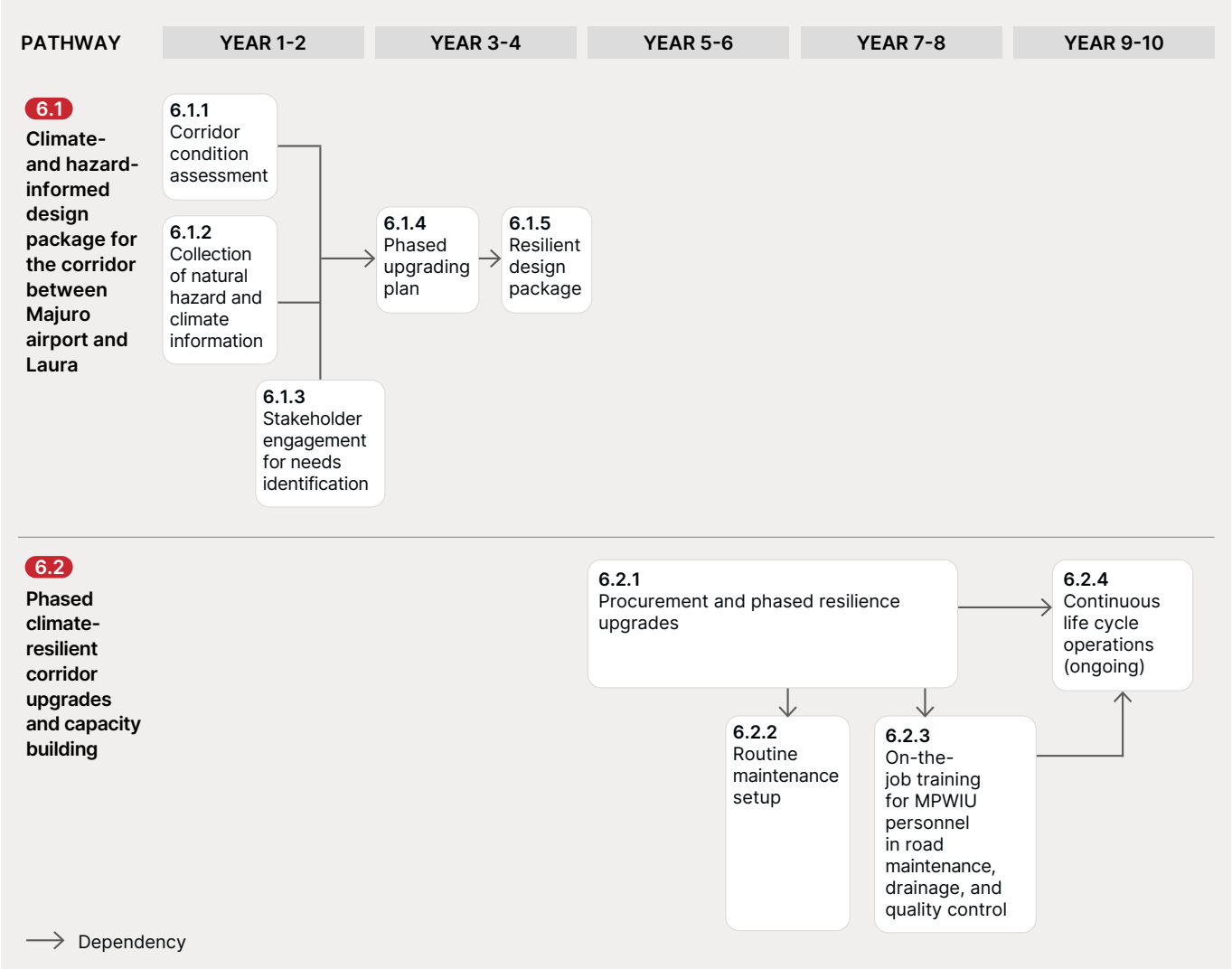
This corridor upgrade should maintain a separate budget line from the Majuro airport runway project (estimated $137 million) to avoid conflating the two.

Regional precedents

Federated States of Micronesia, Prioritized Road Investment and Management Enhancements Project (P172225), Component 2: Climate-Resilient Infrastructure Solutions, $34 million, World Bank Group (investment project financing).

xx. The intensity of hazard impacts differs between road sections, with the most exposed segments facing the greatest levels of stress and operational interruption.

TIMELIME


PATHWAY
YEAR 1-2
YEAR 3-4
YEAR 5-6
YEAR 7-8
YEAR 9-10
6.1
Climate- and hazard-informed design package for the corridor between Majuro airport and Laura
6.1.1 Corridor condition assessment
6.1.2 Collection of natural hazard and climate information
6.1.3 Stakeholder engagement for needs identification
6.1.4 Phased upgrading plan
6.1.5 Resilient design package
6.2
Phased climate-resilient corridor upgrades and capacity building
6.2.1 Procurement and phased resilience upgrades
6.2.2 Routine maintenance setup
6.2.3 On-the-job training for MPWIU personnel in road maintenance, drainage, and quality control
6.2.4 Continuous life cycle operations (ongoing)
Dependency

6.1

Climate- and hazard-informed design package for phased upgrades to the corridor between Majuro airport and Laura

A road upgrade design developed through corridor-wide condition assessments, hazard risk integration (Platform B), stakeholder engagement and the application of climate-resilient design standards.


Majuro Airport to Laura Road © UNOPS

Current challenges

The corridor is affected by inadequate drainage, low-lying and exposed sections, and the interaction between coastal overtopping and the airport boundary, resulting in recurrent water ponding, flooding and accelerated pavement deterioration. MPWIU is currently undertaking a corridor condition assessment, the findings of which should inform the prioritization, design and sequencing of climate-resilient upgrades.

Enabling environment recommended actions

6.1.1 Undertake a corridor-wide assessment of pavement condition, drainage performance, low points and exposure hotspots to define a phased upgrade programme.

6.1.2 Collect updated natural hazard and climate information.

6.1.3 Engage with local stakeholders to understand needs and collect feedback.

6.1.4 Design a phased upgrading plan to systematize rehabilitation, prioritizing critical sections (use the existing MPWIU International Roughness Index/QGIS road condition mapping, Rita to Laura dataset, as the baseline).

6.1.5 Finalize designs using a minimum 1 in 100 year return period for storms and flooding, and accounting for a minimum 50 years of functional life. Design to account for sea level rise, king tides and storm surges, in line with the Intergovernmental Panel on Climate Change AR6 projections, and require all road rehabilitation to bury utility conduits (power, water, telecommunications) within the road or sidewalk to prevent future excavation damage.

Expected impact

Climate-informed road design prioritizing vulnerable sections strengthens long-term infrastructure resilience and guides a phased investment programme aligned with available funding.

GEDSI considerations

Integrate GEDSI considerations into the design by ensuring the development of safe, accessible and inclusive infrastructure that responds to the needs of pedestrians, people with reduced mobility, and communities dependent on the corridor for essential services.

Linkage to other priorities

Priority 1: Life-cycle maintenance and end-of-life requirements are integrated into design and procurement.

Priority 3: Hazard data used to inform the design are fed in to Platform B, and the new baseline road asset data are fed into Platform A.

Target assets

Coastal infrastructure

Impacts of hazards on assets and services

Flooding, disruption of services.

Lead institutions

MPWIU; support from the transport sector and the corridor-serving utilities.

NDMO for hazard and exposure data.

Implementation timeline

0 10 years

Four years

Capital/upfront costs

Moderate – design

Operational costs/annual ongoing costs

N/A

Potential financing sources

Adaptation financing, large-scale infrastructure grants and loans

6.2

Phased climate-resilient corridor upgrades and capacity building

Physical rehabilitation of the corridor, including integrated O&M and the fulfilment of life cycle requirements, and on-the-job training for local personnel.


Majuro Airport to Laura Road © UNOPS

Current challenges

The corridor requires phased implementation of drainage improvements, targeted road rehabilitation and, where required, coastal protection measures to address the most vulnerable sections. Long-term resilience will depend on construction quality, routine maintenance and the strengthening of local capacity for road and drainage asset management.

Adaptation investment recommendations

6.2.1 Implement and carry out procurement for a phased resilience upgrade of the approximately 30 km corridor between Majuro airport and Laura, prioritizing the most exposed sections. Adaptation measures include raising road elevation in low-lying areas, improving drainage capacity, and installing coastal protection where needed to reduce erosion and wave overtopping. Coordinate road works with utility upgrades wherever feasible to maximize efficiency and minimize disruption.

Enabling environment recommended actions

6.2.2. Establish routine inspection and maintenance procedures for drainage, road pavements and coastal protection assets to support long-term performance.

6.2.3 On-the-job training for MPWIU personnel in road maintenance, drainage management and quality control to strengthen long-term local capacity.

6.2.4 Implement life cycle-based operations identified under Priority 1 throughout procurement, construction and asset end-of-life.[xxi]

Expected impact

Targeted road rehabilitation and improved drainage reduce long-term maintenance needs and minimize disruptions during heavy rainfall, king tides, and coastal flooding events. This ensures year-round accessibility and strengthens connectivity between communities, essential services, and the international airport.

GEDSI considerations

Implement corridor upgrades in a manner that minimizes disruption to local communities and maintains safe access to essential services throughout construction.

Capacity building and on-the-job training should promote equitable participation to strengthen local technical skills in road and drainage maintenance.

Linkage to other priorities

Priority 1: Life-cycle costing, capacity building clauses, and decommissioning responsibilities are integrated into the upgrades, and completed road asset data are fed into the digital maintenance platform.

Priorities 2 and 5: Upgrades ensure safe, climate-resilient connectivity to essential health clinics and emergency shelters.

Target assets

Coastal infrastructure

Impacts of hazards on assets and services

Flooding, disruption of services, community safety.

Lead institutions

MPWIU

Implementation timeline

0 — 10 years

Four years (except action 6.2.4, which is ongoing)

Capital/upfront costs

High – construction

Operational costs/annual ongoing costs

Moderate – maintenance

Potential financing sources

Adaptation finance, large-scale infrastructure grants and loans

xxi. Life-cycle costing and decommissioning planning can be done as a pilot for this corridor to inform the proposed legislation for asset life cycle sustainability proposed under Priority 1.

Alignment matrix

To anchor the roadmap within the broader institutional landscape in the RMI, the strategic priorities have been mapped against key national planning frameworks, including the NSP pillars and NIIP priority projects, as well as relevant Sustainable Development Goal (SDG) targets, NDC thematic areas, and climate mitigation co-benefits.

Strategic Priority	NSP 2020-2030 alignment	NIIP 2023 alignment	Relevant SDG targets	NDC thematic areas
PRIORITY 1 Close the operations, maintenance and end-of-life gap	PILLAR 3 · 3.6.1 PILLAR 3 · 3.6.2 PILLAR 5 · 5.1.1 PILLAR 5 · 5.2.2 **Pillar 3** (Infrastructure), especially Strategic Area 3.6 Public Facilities, notably policy objectives 3.6.1 on strategic and resilient infrastructure planning and investment and 3.6.2 on well-designed, built and maintained public facilities. **Pillar 5** (Governance), particularly 5.1.1 and 5.2.2, by strengthening public service effectiveness and budget management for planned priorities.	FIN-OCS-2 · PRIORITY **FIN-OCS-2**: Public Facilities National Maintenance Fund Development, value not quantified and flagged as priority.	SDG 9.1 SDG 11.B SDG 13.1 **SDG 9.1**: develop quality, reliable, sustainable and resilient infrastructure **SDG 11.b**: integrated disaster risk reduction **SDG 13.1**: strengthen resilience and adaptive capacity to climate-related hazards	Adaptation Mitigation **Adaptation**: climate-resilient infrastructure **Mitigation**: waste management
PRIORITY 2 Upgrade and climate-proof neighbouring island clinics	PILLAR 1 · 1.1.5 PILLAR 1 · 1.1.6 PILLAR 2 · 2.2.1 PILLAR 2 · 2.3.1 PILLAR 3 · 3.6.2 **Pillar 1** (Social and Culture), Strategic Area 1.1, Health, especially policy objectives 1.1.5 on quality healthcare infrastructure and 1.1.6 on strengthened outer island health services. **Pillar 2** (Environment, Climate Change and Resilience), especially objectives 2.2.1 and 2.3.1, by improving adaptation and resilience in essential health facilities. **Pillar 3** (Infrastructure), particularly objective 3.6.2 on well designed, built and maintained public facilities.	No direct unfunded NIIP project currently addresses a nationwide neighbouring island clinic resilience upgrade programme.	SDG 3.D SDG 5.6 SDG 6.1 SDG 7.1 SDG 10.2 **SDG 3.d**: strengthen capacity for early warning, risk reduction and management of health risks **SDG 5.6**: ensure universal access to sexual and reproductive health and reproductive rights **SDG 6.1**: universal and equitable access to safe drinking water **SDG 7.1**: access to reliable and modern energy services **SDG 10.2**: promote social, economic and political inclusion	Adaptation Mitigation **Adaptation**: resilient health facilities in remote communities **Mitigation**: renewable energy

Strategic Priority	NSP 2020-2030 alignment	NIIP 2023 alignment	Relevant SDG targets	NDC thematic areas
PRIORITY 3 Build an integrated geospatial asset and hazard information system	PILLAR 3 · 3.6.1 PILLAR 2 · 2.2.1 PILLAR 2 · 2.3.1 **Pillar 3** (Infrastructure), especially Strategic Area 3.6, Public Facilities, through policy objective 3.6.1 on strategic and resilient infrastructure planning and investment. **Pillar 2** (Environment, Climate Change and Resilience), particularly objectives 2.2.1 on adaptation and resilience actions and 2.3.1 on enhanced resilience to disasters and risks, while contributing to better informed implementation of infrastructure policy across sectors.	ENV-MPWIU-1 · $500K MAR-RMIPA-2 · $1M AVI-RMIPA-3 AKIA · $1M MAR-MTCIT-4 · $669K **ENV-MPWIU-1**, RMI geodetic infrastructure, $500,000 estimated value of equipment. **MAR-RMIPA-2** Majuro and Ebeye ports master plan update, $1 million estimated value of project. **AVI-RMIPA-3 AKIA** master plan update, $1 million estimated value of project. **MAR-MTCIT-4** Facility and asset management for MISC, $669,000 estimated value of project.	SDG 9.1 SDG 11.b SDG 13.2 SDG 16.6 **SDG 9.1**: resilient infrastructure **SDG 11.b**: integrated disaster risk reduction **SDG 13.2**: integrate climate change measures into policies and planning **SDG 16.6**: effective, accountable and transparent institutions	Adaptation **Adaptation**: climate risk preparedness
PRIORITY 4 Scale up nature-based and low-cost coastal protection solutions	PILLAR 2 · 2.1.1 PILLAR 2 · 2.2.1 PILLAR 3 · 3.6.1 **Pillar 2** (Environment, Climate Change and Resilience), especially Strategic Areas 2.1, Atoll Environment, and 2.2, Climate Change, notably policy objectives 2.1.1 on protection and sustainability of atoll environments and 2.2.1 on adaptation and resilience actions. **Pillar 3** (Infrastructure), particularly objective 3.6.1 on strategic and resilient infrastructure planning and investment, by broadening the range of feasible coastal protection responses.	ENV-MPWIU-11 · $5.5M ENV-KADA-3 · $1.5M **ENV-MPWIU-11**, Majuro seawall project (phases 3-6), $5.5 million estimated value of project. **ENV-KADA-3**, Ebeye causeway, lagoon side of an embankment, $1.5 million estimated value of project.	SDG 13.1 SDG 14.2 SDG 15.1 SDG 11.b **SDG 11.b**: integrated disaster risk reduction **SDG 13.1**: resilience to climate hazards **SDG 14.2**: sustainably manage and protect marine and coastal ecosystems **SDG 15.1**: conserve and restore terrestrial and inland ecosystems	Adaptation Mitigation **Adaptation**: nature-based solutions **Mitigation**: low-carbon coastal protection materials

Strategic Priority	NSP 2020-2030 alignment	NIIP 2023 alignment	Relevant SDG targets	NDC thematic areas
PRIORITY 5 Strengthen emergency shelter readiness and rapid response systems	PILLAR 2 · 2.3.1 · PILLAR 2 · 2.3.2 · PILLAR 3 · 3.6.2 · PILLAR 1 · 1.3.2 **Pillar 2** (Environment, Climate Change and Resilience), especially Strategic Area 2.3, Disaster Risk Management, notably policy objectives 2.3.1 on enhanced resilience to disasters and risks and 2.3.2 on strengthened disaster preparedness, response and recovery. **Pillar 3** (Infrastructure), especially objective 3.6.2 on well designed, built and maintained public facilities. **Pillar 1** (Social and Culture), particularly objective 1.3.2 on equitable participation of all persons in society.	ENV-OCS-1 · $7.4M · PRIORITY · OTH-MPWIU-13 · $1.5M · PRIORITY · OTH-KALGOV-3 · $3.3M · PRIORITY · OTH-KADA-1 · $757K · TH-KADA-2 · $3.9M · +23 EDUCATION PROJECTS · $14.9M **ENV-OCS-1** Emergency Operations Center in Majuro, $7.4 million estimated value of project, flagged as priority. **OTH-MPWIU-13** Outer island community centres, $1.5 million estimated value of project, flagged as priority. **OTH-KALGOV-3** Kwajalein Atoll Local Government building, $3.3 million estimated value of project, flagged as priority. **OTH-KADA-1** Renovation of Ebeye Community Center, $757,000 estimated value of project. **OTH-KADA-2** Redevelopment of Ebeye Community Center, $3.9 million estimated value of project. **Twenty-three projects**, for a total estimated value of $14.9 million, related to educational buildings that could be used as emergency shelters.	SDG 3.d · SDG 5.2 · SDG 11.5 · SDG 11.b · SDG 13.1 **SDG 3.d**: emergency preparedness (health emergency risk reduction) **SDG 5.2**: eliminate all forms of violence against all women and girls in the public and private spheres **SDG 11.5**: reduce disaster impacts **SDG 11.b**: integrated disaster risk reduction plans **SDG 13.1**: resilience and adaptive capacity	Adaptation · Mitigation **Adaptation**: emergency preparedness, shelter safety and continuity of response systems **Mitigation**: renewable backup power and efficient systems in shelter upgrades
PRIORITY 6 Deliver a phased resilience upgrade of the road corridor between Majuro airport and Laura	PILLAR 3 · 3.1.3 · PILLAR 2 · 2.2.1 · PILLAR 2 · 2.3.1 **Pillar 3** (Infrastructure), Strategic Area 3.1, Transportation, especially policy objective 3.1.3 on reliable roads for efficient movement of people, goods and services. **Pillar 2** (Environment, Climate Change and Resilience), particularly objectives 2.2.1 and 2.3.1, by reducing climate- and disaster-related disruption along a critical access corridor.	RDS-MPWIU-9 · $29M **RDS-MPWIU-9**, Majuro road repair (airport to Laura), $29 million estimated value of project.	SDG 9.1 · SDG 11.2 · SDG 11.5 · SDG 13.1 **SDG 9.1**: resilient infrastructure **SDG 11.2**: access to safe, affordable, accessible and sustainable transport systems **SDG 11.5**: reduce disaster impacts **SDG 13.1**: climate resilience	Adaptation · Mitigation **Adaptation**: climate-resilient transport infrastructure and continuity of essential services **Mitigation**: reduced frequency of reconstruction, improved transport efficiency, and lower fuel use and embodied emissions

Financing and implementation

Establishing financing needs

The ability to implement this roadmap will depend on whether adequate and sustained financing is mobilized to address the most pressing infrastructure resilience needs in the RMI. Establishing the scale of the investment required is, therefore, the first step towards identifying realistic financing pathways and implementation priorities.

Table 10 summarizes the principal financing needs identified through this roadmap, as well as complementary national assessments.

The range of estimated project costs within the NIIP priority pipeline varies widely: approximately 40 per cent are smaller-scale projects valued at under $2 million each, while the 10 largest projects (costing over $10 million each) account for $195 million, driving the bulk of the immediate funding need. In addition, the projects identified during the development of this roadmap have an estimated capital cost of more than $2 million each, apart from one that could range between $500,000 and $2 million.[103]

It is important to note that the immediate projects identified in this roadmap and in the NIIP represent only a fraction of the broader macroeconomic need. The International Monetary Fund estimates that the overall climate-resilient infrastructure investment needs for the RMI add up to approximately $5.0 billion – a sum equivalent to about 19 times the country's 2023 GDP.[104] Focusing strictly on coastal protection, the NAP estimates an investment ranging from $250 million for the protection of specific high-risk areas to over $1.0 billion for the fortification of urban centres against a 0.5 m sea level rise.[105] However, as outlined in the 2025 NDCs, if sea level rise hits worst-case thresholds, protecting the atolls could require up to $35 billion for hard infrastructure alone.[106]

The O&M funding gap is large. As a rule of thumb, the NIIP 2023 requires the allocation of 4 per cent of capital cost per year for ongoing maintenance.

Table 10. Summary of infrastructure financing needs[100-103]

Category	Value	Source
Total unfunded NIIP projects	110 projects	NIIP 2023
Value of unfunded NIIP projects	$758 million	NIIP 2023
High-priority unfunded NIIP projects	41 projects	NIIP 2023
Cost of priority NIIP pipeline	$273 million	NIIP 2023
International Monetary Fund (IMF) estimate of climate-resilient infrastructure needs	$5.0 billion	IMF
Coastal protection needs	$250 million to $1 billion	NAP
Worst-case coastal protection requirement	Up to $35 billion	NDC 2025
Annual O&M requirements (funded pipeline)	$12 million	NIIP 2023
Current annual O&M allocation	$0.75 million	National budget
Estimated 10-year O&M funding gap	$77 million	NIIP 2023

When this benchmark is applied to projects already funded and underway, the annual maintenance requirement rises to approximately $12 million by FY2033, creating a cumulative 10-year shortfall of $77 million if current spending patterns persist. This estimate reflects only the funded pipeline and excludes the 65 per cent of NIIP projects that remain unfunded, indicating that the O&M liability in the long run is significantly larger.

Against this requirement, current domestic spending is extremely limited. The national budget is roughly $50 million per year, of which MPWIU receives about $15 million for the entire infrastructure sector. Only around $750,000 – approximately 5 per cent of the amount allocated for MPWIU – is directed to maintenance across education and health infrastructure. This amount has remained nominally unchanged for nearly two decades. Relative to the conservative $12 million annual requirement (until 2033), domestic maintenance spending is therefore underfunded by a factor of roughly 1:16.

These findings underscore that the implementation of this roadmap cannot rely on one-off capital investments alone. A phased approach will be required, combining strategic prioritization of investments with strengthened institutional capacity, sustainable maintenance financing, and diversified sources of climate finance. The development of a national O&M policy framework and the actions proposed in this roadmap to strengthen the enabling environment will be crucial to ensure infrastructure sustainability. The following section therefore examines the financing landscape and identifies the most suitable funding pathways to support both infrastructure investments and the enabling environment reforms suggested in this roadmap.

Climate finance pathways and donor mapping (FundABLE assessment)

The current financing landscape in the RMI relies heavily on a core group of steadfast development partners. The US Compact of Free Association



Seawall in Majuro © Miyamoto International

(COFA) remains the cornerstone, providing sector grants and a dedicated climate fund.[107] Alongside the COFA, multilateral and bilateral partners such as the ADB, the World Bank (WB) and the Japan International Cooperation Agency (JICA) provide the core capital for major built environment projects.

O&M financing currently comes from six sources (see Table 11), and each has its particular challenges or limitations. Domestic appropriations provide the core $750,000 per year, approved annually by the Nitijela (legislature) on the recommendation of the MPWIU, but this amount remains far below the need. Another source of funding is the COFA, which provides grants equivalent to about 60 per cent of the GDP in the RMI. While the partnership has been renewed for the period of 2024 to 2043, it is primarily capital-focused and does not include dedicated O&M lines – though some sector grants contain operational elements. On the other hand, development partners – including the WB, ADB, Green Climate Fund (GCF) and UN agencies – embed O&M conditionalities and technical support within project budgets. This is the main source of technical maintenance capacity, but support ends when projects close, creating a sustainability gap highlighted in the EnABLE assessment.

State-owned enterprises such as the Marshalls Energy Company, Majuro Water and Sewer Company, and the Kwajalein Atoll Joint Utility Resources fund their own O&M from tariffs. However, revenue collection is weakened by meter tampering and non-payment. While the Marshall Islands Resilience and Adaptation (MIRA) Trust Fund, established in 2022, is intended to be a long-term domestic financing mechanism for adaptation and O&M, it has not yet been capitalized at scale. Finally, emergency financing – through the Disaster Assistance Emergency Fund and the National Contingency Fund – covers only post-event repairs and does not contribute to routine maintenance.

As such, despite these partnerships, a significant financing gap remains in the RMI. Its magnitude exposes severe bottlenecks in the current global finance model. As noted in the 2025 NDCs, the current international funding model is too unpredictable and inadequate to sustain long-term resilience planning. Multilateral development banks and bilateral donors often impose standardized, project-by-project approaches and inflexible co-financing requirements that are not fit for purpose in small island developing states (SIDS). Furthermore, a lack of appetite from the private sector to invest in adaptation measures jeopardizes the ability of the RMI to scale successful pilot projects nationwide.

While direct budgetary support remains the preferred mechanism for climate finance in the RMI, the financing gap and limitations of existing funding sources make donor diversification important. This roadmap utilized the FundABLE Tool, developed by UNOPS, to identify and rank potential funding sources for infrastructure and enabling environment projects.

Table 11. Existing sources of O&M financing

Financing source	Current role	Principal limitation
Domestic budget	Routine maintenance	Insufficient annual allocation
COFA	Sector grants	Primarily capital-focused
ADB, WB, GCF, UN agencies	Project O&M and technical assistance	Support ends with project completion
State-owned enterprises	Utility asset maintenance	Weak tariff collection
MIRA Trust Fund	Intended long-term adaptation finance	Not yet capitalized
Emergency funds	Disaster recovery	Not available for routine maintenance

Applying FundABLE to the RMI infrastructure pipeline yielded 48 potential sources of funding. They were then categorized into tiers of relevance using three main filters tailored to the economic and environmental context in the RMI:

- **Operational alignment**: prioritizes funds mandated to support public goods, climate resilience, and capacity building, while deprioritizing private sector development finance institutions that require commercial, revenue-generating projects.
- **Geographic presence**: favours financiers with dedicated strategies for SIDS, an active presence in the Pacific, or established regional pooling mechanisms.
- **Funding modalities**: targets entities offering highly concessional instruments – such as grants, sovereign concessional loans, and technical assistance – given the limited debt-carrying capacity of the RMI, bypassing commercial debt, equity or complex public-private partnerships.

Figure 21 shows the resulting 23 most relevant sources of funding, grouped into 2 primary tiers:

- **High relevance** (12 financiers): institutions with strong mandates for public infrastructure, climate adaptation and direct Pacific SIDS operations.
- **Medium relevance** (11 financiers): partners with strong thematic funding opportunities (e.g., biodiversity, nature-based solutions or disaster response) or that primarily co-finance large-scale operations in the Pacific through regional entities rather than direct bilateral public grants.

The figure also shows the types of activities the funding sources would support: built environment (project preparation and delivery) and enabling environment.

Figure 21. Summary of possible funding sources (FundABLE analysis)

Source of finance	Financier	Grants	Loans	Equity investments	Guarantees	Budget support	Project finance	Bonds	Project preparation	Project delivery	Enabling activities	Relevance
Details		Instruments							Activities			
Asian Development Bank	ADB	●	●	●	●	○	○	○	●	●	●	High relevance
Australia Department of Foreign Affairs and Trade	Aus DFAT	●	●	●	○	●	○	○	●	●	●	High relevance
Australian Infrastructure Financing Facility for the Pacific	Aus DFAT	●	●	○	○	○	●	○	●	●	●	High relevance
Infrastructure Resilience Accelerator Fund (IRAF)	Coalition for Disaster Resilient Infrastructure (CDRI)	●	○	○	○	○	○	○	●	○	●	High relevance
Deutsche Gesellschaft für Internationale Zusammenarbeit	GIZ	●	○	○	○	○	○	○	●	○	●	High relevance
Global Environment Facility Small Grants Programme	GEF	●	○	○	○	○	○	○	○	○	○	High relevance
Global Environment Facility Trust Fund	GEF	●	●	●	●	○	○	○	●	●	●	High relevance
Green Climate Fund	GCF	●	●	●	●	○	●	●	●	●	○	High relevance
International Development Association	World Bank Group	●	●	○	●	○	○	○	●	●	●	High relevance
Japan International Cooperation Agency	JICA	●	●	○	○	●	●	○	●	●	●	High relevance
New Zealand International Development Cooperation Programme	NZIDC	●	●	○	○	○	○	○	○	●	○	High relevance
Nordic Development Fund	NDF	●	●	●	○	○	●	○	●	●	●	High relevance
Abu Dhabi Fund for Development	ADFD	●	●	○	○	●	○	○	●	●	○	Medium relevance
Agence Française de Développement	AFD	●	●	●	●	●	●	●	●	●	●	Medium relevance
Global Affairs Canada	GAC	●	●	○	○	●	○	○	●	●	●	Medium relevance
Global Biodiversity Framework Fund	GEF	●	○	○	○	○	○	○	○	○	○	Medium relevance
Global Facility for Disaster Reduction and Recovery	GFDRR	●	○	○	○	○	○	○	●	○	●	Medium relevance
Global Shield Financing Facility	World Bank Group	●	○	○	○	○	○	○	●	○	●	Medium relevance
International Climate Initiative	German Federal Ministry for Economic Affairs and Climate Action	●	○	○	○	○	○	○	○	○	○	Medium relevance
Kiwa Initiative	AFD	●	○	○	○	○	○	○	●	●	●	Medium relevance
Korea Green Growth Trust Fund	KR WB	●	○	○	○	○	○	○	○	○	○	Medium relevance
Special Climate Change Fund	GEF	●	○	○	○	○	○	○	●	●	●	Medium relevance
UK Foreign, Commonwealth and Development Office	UK FCDO	●	●	○	○	○	○	○	●	●	●	Medium relevance

Table 12 outlines the proposed financing match for each of the roadmap's six strategic priorities.

Table 12. Summary of financing options for the roadmap priorities

Strategic Priority	Environment type	Key target activities	Primary funding modalities	Matched FundABLE financiers
Priority 1: Close the operations, maintenance and end-of-life gap	Enabling environment	O&M budgeting, human resource organigrams, procurement and tax reforms, digital asset tracking	Technical cooperation, advisory grants	Deutsche Gesellschaft für Internationale Zusammenarbeit, CDRI (IRAF), UK Foreign, Commonwealth and Development Office, Global Affairs Canada, World Bank International Development Association (IDA)
Priority 2: Upgrade and climate-proof neighbouring island clinics	Built environment	Clinic prototypes, solar and battery packages, water catchments, HF radios, GEDSI code compliance	Capital expenditure grants, concessional loans	World Bank (IDA), ADB, JICA, Australian Government Department of Foreign Affairs and Trade, National Snow and Ice Data Center
Priority 3: Build geospatial asset and hazard platform	Enabling environment	Centralized GIS databases, multi-hazard exposure layers, interoperable decision support systems	Project preparation and technical grants	Nordic Development Fund, CDRI (IRAF), Korea Green Growth Trust Fund, World Bank Global Infrastructure Facility
Priority 4: Scale up nature-based and low-cost coastal protection solutions	Built and natural environment	Vegetation-based stabilization, dune restoration, geobags, links with local academic research	Climate adaptation grants, small grants programme	GCF, Global Environment Facility (GEF) Trust Fund, Kiwa Initiative, the GEF Small Grants Programme
Priority 5: Strengthen emergency shelter readiness and rapid response systems	Built and enabling environment	Georeferenced national shelter inventory, rapid deployment rosters, pre-approved supplier framework	Disaster preparedness grants, co-financing windows	GFDRR, Global Shield Financing Facility, bilateral partners
Priority 6: Deliver a phased resilience upgrade of the road corridor between Majuro airport and Laura	Built environment	Corridor-wide diagnostic and systematic drainage upgrades, targeted road and pavement rehabilitation	Large-scale infrastructure grants and loans	Australian Infrastructure Financing Facility for the Pacific, ADB, World Bank (IDA), JICA



Risk management and results framework

Majuro Airport to Laura Road © UNOPS

Risk register: Implementation risks and suggested mitigation measures

A range of operational, institutional, social and environmental risks could affect timelines, costs and quality of implementation of the proposed interventions. Table 13 presents a summary of the main risks that could materialize and their mitigation strategies, noting that risk monitoring during implementation remains an essential component for adequate risk mitigation.

Table 13. Risk register and mitigation strategies for roadmap implementation

Risk	Risk mitigation strategy	Institution responsible	Addressed by Strategic Priorities
Contractor-related risks: poor performance, non-compliance with technical specifications or safeguarding requirements, delays in mobilization, weak financial capacity, or in extreme cases, contractor insolvency or bankruptcy.	Robust procurement processes, careful due diligence, performance-based contracts, clear supervision arrangements, and contingency planning such as framework agreements or backup contractor options.	DIDA/MoFBPS for financing, donor coordination, investment pipeline and budget risks. MPWIU for design and code compliance and construction works.	2, 4, 5 and 6
Land-related issues may delay implementation, especially where land tenure is complex, customary ownership applies, or site access and use agreements are not secured early.	Early stakeholder engagement, legal and administrative due diligence, and clear documentation of land access arrangements are essential.	Local governments for atoll-level coordination and community assets.	4 and 6
Environmental and social risks may arise from construction impacts, waste management, community health and safety concerns, exclusion of vulnerable groups, or insufficient compliance with national and donor safeguarding requirements.	Appropriate environmental and social screening, proportionate management plans, regular monitoring, and dedicated grievance redress mechanisms.	Republic of the Marshall Islands Environmental Protection Authority for environmental safeguards, permitting, environmental compliance of coastal- and nature-based solutions, and waste and decommissioning issues. Local governments for atoll-level engagement.	2, 4, 5 and 6
Limited community participation or weak local ownership may reduce acceptance, delay implementation or undermine sustainability after project completion.	Early and continuous consultation, transparent communication, culturally appropriate engagement, and the meaningful inclusion of women, persons with disabilities, older persons, and remote communities.	Local governments for atoll-level engagement.	1, 2, 3, 4, 5 and 6
Broader delivery risks such as procurement bottlenecks, limited institutional capacity, shipping and supply chain disruptions, weather-related interruptions, and coordination challenges between agencies and partners. In addition, external events such as inflation, fuel price volatility, natural hazards, or global market disruptions may increase construction and transport costs beyond initial estimates.	Realistic scheduling, phased implementation, adequate contingencies in budgets, regular review of cost assumptions, strong inter-agency coordination mechanisms, and adaptive project management arrangements that allow for adjustments as conditions evolve.	MPWIU for coastal infrastructure, roads, drainage, seawalls, public buildings, asset management, design and code compliance, and construction works. MoHHS for health facilities, hospitals, neighbouring island clinics, health service continuity, clinic databases and health operational standards. DIDA/MoFBPS for financing, donor coordination, investment pipeline and budget risks. NDMO for emergency preparedness, natural hazards, and disaster risk information.	1, 2, 3, 4, 5 and 6

Results framework

Monitoring approach

This section presents a results framework to support implementation, monitoring and periodic review of the roadmap. It is not intended to function as a stand-alone monitoring and evaluation system, but rather as a management tool to support the government of the RMI in tracking whether the roadmap is being translated into concrete action and whether the priority actions are strengthening infrastructure resilience over time.

The framework focuses on a limited number of realistic indicators for each strategic priority. These indicators combine implementation progress, institutional change and early resilience outcomes. In many cases, the first years of monitoring should concentrate on whether systems, inventories, standards, teams and procedures are being established, as these form the foundation on which longer-term resilience improvements depend. Over time, as data systems improve, the framework can be refined to include more quantitative and performance-based indicators.

Monitoring should be coordinated through the lead institutions identified under each priority, with periodic consolidation at the national level to support decision-making, budget alignment and engagement with development partners. EPPSO, MPWIU, MoHHS and NDMO are likely to play central roles in this process, depending on the priority concerned. As a practical minimum, progress should be reviewed annually, while selected operational indicators such as maintenance records, asset inventories, shelter readiness or project implementation milestones may be tracked more frequently by the responsible agencies.

Results framework by strategic priority

Table 14. Results monitoring framework

Strategic Priority	Indicator	Means of verification	Lead institution(s)	Monitoring frequency
Priority 1 Close the operations, maintenance and end-of-life gap	Multidisciplinary maintenance teams formally established and assigned responsibilities.	Organigrams, staffing records and budgets	MPWIU and MoHHS, with support from MoFBPS and other sector agencies as relevant	Semi-annual internal tracking; annual consolidated review
	Digital maintenance system operational for priority asset classes under MoHHS and MPWIU.	Records of digital platform maintenance, and maintenance logs	MPWIU and MoHHS	Semi-annual internal tracking; annual consolidated review
	Percentage of priority assets covered by preventive maintenance standards, inspection routines or risk-based prioritization rules.	Maintenance plans, inspection schedules and asset management documentation	MPWIU and MoHHS	Semi-annual internal tracking; annual consolidated review
	Number of new capital projects incorporating life cycle maintenance and end-of-life provisions.	Project concept notes, procurement documents and design documentation	MPWIU and MoHHS	Semi-annual internal tracking; annual consolidated review
	O&M policy framework adopted, and supporting legislative or regulatory amendments approved (e.g., Procurement Code Act, Public Financial Management Act, National Environment Protection Act).	Policies, legislation and official government gazettes	MPWIU, MoFBPS and Cabinet	Annual
Priority 2 Upgrade and climate-proof neighbouring island clinics	Standardized resilient clinic package formally adopted.	Official guidelines and technical standards	MoHHS, with implementation support from MPWIU	Annual
	Percentage of active clinics recorded in the national digital inventory.	Clinic inventory database	MoHHS	Quarterly during rollout; annual review
	Percentage of clinics assessed against the 2021 RMI National Building Code and resilient service criteria.	Assessment forms and technical reports	MoHHS and MPWIU	Quarterly during rollout; annual review
	Number of priority clinics with upgraded water, power and communications services, thermal comfort, and GEDSI features.	Completion reports, supervision records, photographs and technical drawings	MoHHS and MPWIU	Quarterly during implementation; annual review

Strategic Priority	Indicator	Means of verification	Lead institution(s)	Monitoring frequency
Priority 3 Build an integrated geospatial asset and hazard information system	National infrastructure asset platform established and operational.	Platform documentation and governance records	MPWIU	Semi-annual technical review; annual consolidated review
	Institutional ownership formally assigned for the asset and hazard platforms.	Governance arrangements and official mandates	MPWIU and NDMO	Annual
	Minimum standards for datasets, metadata and update procedures formally adopted.	Data standards, protocols and operating procedures	MPWIU and NDMO	Annual
	Percentage of priority coastal assets and hazard layers uploaded to the platform.	GIS databases and asset registers	MPWIU and NDMO	Semi-annual
	Evidence of platform use in investment screening, prioritization of maintenance activities, and infrastructure design or planning.	Meeting minutes, planning documents and technical reviews	MPWIU and NDMO	Annual
	Infrastructure asset management and geospatial training incorporated into national academic programmes.	Training records and academic course materials	Academic institutions with MPWIU support	Annual
Priority 4 Scale up nature-based and low-cost coastal protection solutions	Pilot sites selected using agreed screening criteria.	Site selection records and project documentation	MPWIU	Annual
	Number of pilot interventions implemented and monitored.	Project documentation and monitoring reports	MPWIU	Annual (more frequently during implementation)
	Performance, maintenance and community acceptance data collected for pilot sites.	Inspection records, monitoring reports and community surveys	MPWIU and partner organizations	Annual (more frequently during implementation)
	Evidence that lessons from pilot projects inform future coastal protection investments or designs.	Project proposals, technical designs and planning documents	MPWIU	Annual
	Nature-based solutions and coastal resilience training incorporated into national academic programmes.	Training records and academic course materials	Academic institutions	Annual

Strategic Priority	Indicator	Means of verification	Lead institution(s)	Monitoring frequency
Priority 5 Strengthen emergency shelter readiness and rapid response systems	National shelter inventory established and regularly updated.	Database of shelters, assessment forms and maps	NDMO	Annual preparedness review
	Number of technical teams trained to assess shelters and support rapid deployment.	Training records, deployment rosters and emergency procedures	NDMO and MPWIU	Annual preparedness review
	Number of priority shelters assessed and upgraded against structural, service and GEDSI criteria.	Inspection reports, upgrade records and maintenance documentation	NDMO and MPWIU	Annual preparedness review
	Pre-approved supplier and contractor arrangements operational for emergency response.	Procurement frameworks, supplier lists and response procedures	NDMO	Annual preparedness review
	Number of local masons trained during construction to support long-term maintenance.	Training records and contractor reports	MPWIU	Annual
	Emergency shelter assessment and response training incorporated into national academic programmes.	Academic course materials and training records	Academic institutions	Annual
Priority 6 Deliver a phased resilience upgrade of the road corridor between Majuro airport and Laura	Corridor-wide diagnostic and phased upgrade plan completed.	Diagnostic reports, designs and cost estimates	MPWIU	Annual
	Priority drainage and road sections identified and costed.	Technical assessments and cost estimates	MPWIU	Annual
	Number of high-risk drainage and road sections upgraded.	Procurement records, contractor reports and supervision documentation	MPWIU	Quarterly during implementation; annual review
	Number of local personnel trained through externally supported design or construction packages.	Training records and handover documentation	MPWIU	Annual
	Improvement in road condition and drainage performance along priority sections of the corridor.	Road condition surveys, drainage inspections and maintenance records	MPWIU	Annual

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