Annex 2: Pre-feasibility Study

This pre-feasibility study has been developed as part of the preparation services to the Micronesia Conservation Trust for the proposed programme: *Ecosystem-based Adaptation for Reducing Community Vulnerability to Climate Change in the Northern Pacific Small Island Developing States.* It will be the Annex 2 submitted as part of the programme package being developed for the Green Climate Fund's Simplified Approval Process.

Last edited: 30 March 2023

Abbreviations

ABS:	Areas of Biodiversity Significance
BIOPAMA:	Biodiversity and Protected Areas Management
CBD:	Convention on Biological Diversity
CCD:	Climate Change Division
CMAC:	Coastal Management Advisory Committee
CMI:	College of the Marshall Islands
CEAFM:	Community-based ecosystem approach to fisheries management
CVI:	Climate Vulnerability Index
DRS:	Disaster Resilience Strategy
EbA:	Ecosystem-based Adaptation
EES:	Ecosystems and Ecosystem Services
EIS:	Environmental Impact Assessment
EOI:	Expression of Interest
ENSO:	El Nino-Southern Oscillation
EEZ:	Exclusive Economic Zone
FSM:	Federated States of Micronesia
GCF:	Green Climate Fund
GEF:	Global Environment Facility
GCRI:	Global Climate Risk Index
GCF:	Green Climate Fund
GHG:	Greenhouse gas
GD-PAME:	Global Database on Protected Area Management Effectiveness
HOPE:	Hatohobei Organisation for People and Environment
IDA:	Island Diagnostic Analysis
IUU:	Illegal, unreported and unregulated
LCIPP:	Local Communities and Indigenous Peoples Platform

LEAP:	Local Early Action Planning
LMMA:	Locally Managed Marine Area
MIC	Micronesians in Island Conservation
MCT:	Micronesia Conservation Trust
MC:	Micronesia Challenge
MCRO:	Micronesia Challenge Regional Office
MIMRA:	Marshall Islands Marine Resources Authority
MNRET:	Ministry of Natural Resources, Environment and Tourism
MPA:	Marine Protected Area
MPAME:	Marine Protected Area Management Effectiveness Tool
NAP:	National Adaptation Plan
NDAs:	National Designated Authorities
ND-GAIN:	Notre Dame Global Adaptation Initiative
NBSAP:	National Biodiversity Strategy and Action Plan
NEPA:	National Environmental Protection Authority
NOP:	National Oceans Policy
NPANPF:	National Protected Areas Network Policy Framework
OACPS:	Organisation of African, Caribbean and Pacific
OECMs:	Other effective area-based conservation measures
OUV:	Outstanding Universal Value
PACCSAP:	Pacific-Australia Climate Change Science and Adaptation Planning
PCC:	Palau Community College
PICRC:	Palau International Coral Reef Center
PCS:	Palau Conservation Society
PIPAP:	Pacific Islands Protected Area Portal
PICs:	Pacific Island Countries
PA:	Protected Area
PAM:	Protected Area Management
PAN:	Protected Areas Network

PPF:	Project Preparation Facility
R2R:	Ridge to Reef Programme
RMI:	Republic of the Marshall Islands
RPPL:	Republic of Palau Parliamentary Legislatures
SFP:	Sustainable Finance Plan
SGF	Small Grants Facility
SPREP:	Secretariat of the Pacific Regional Environment Programme
TEK:	Traditional Ecological Knowledge
TEV:	Total Economic Value
TNC:	The Nature Conservancy
UOGML:	University of Guam Marine Laboratory
WDPA:	World Database on Protected Areas

List of figures and tables

Figures

Tables

1. Introduction to the pre-feasibility study

1.1 Objective of the study

This pre-feasibility study has been developed to support the design of the proposed Green Climate Fund (GCF) Enhanced Direct Access (EDA) programme: Ecosystem-based Adaptation (EbA) for Reducing Community Vulnerability to Climate Change in Northern Pacific Small Island Developing States (SIDS). The Micronesia Conservation Trust (MCT) is the Accredited Entity (AE) and will manage the project as a regional Direct Access Entity (DAE), with three national-level funding mechanisms embedded in each country: Federated States of Micronesia (the Micronesia Conservation Trust); Republic of Palau (the Protected Areas Network Fund); and Republic of Marshall Islands (the Marshall Islands Marine Resources Authority-MIMRA).

The primary objective of this study is to assess the factors supporting the relevance of the programme's proposed EDA design for GCF investment, with focus on technical design, cost and benefit analysis, social and environmental impacts, legal and regulatory environments. To elucidate, the study will analyse the context supporting the development of this EDA programme (and why adaptation investment for scaling up EbA solutions is necessary in the northern SIDS), expand on programme activities identified in the approved Concept Note (CN)[1], and analyse the capacity of the AE as well as grassroots organization (see Appendix II) to implement these activities under the following logical framework (available as Annex 2A of the Funding Proposal – and has been elaborated in Section 8 here).

- **Component 1:** Enhanced capacity of local entities and communities to deliver EbA adaptation measures.
- **Component 2:** Improved ecosystem services and community resilience through locally led EbA adaptation measures.
- **Component 3:** Improved knowledge management, applied learning (KMAL) and regional cooperation on locally led EbA measures.

Further, the study demonstrates the timely need for GCF investment for managing observed and future climate changes and their impacts on protected areas and maintaining ecosystem goods and services in the Federated States of Micronesia (FSM), the Republic of Palau (Palau) and the Republic of the Marshall Islands (RMI), the three participating nations in this proposed EDA programme. Primarily, these natural ecosystems act as important buffers against projected climate risks as well as observed climate change impacts in all three nations. Micronesian peoples living in these SIDS rely heavily on the ecosystem services provided by their protected areas and biodiversity hotspots, including:[2]

- **Provisioning services** – these are products obtained from ecosystems for subsistence and livelihoods such as pisciculture.

[1] Concept Note for the project can be accessed here: https://www.greenclimate.fund/sites/default/files/document/26220-ecosystem-based-adaptation-eba-reducing-community-vulnerability-climate-change-northern.pdf
[2] MACBIO (Marine and Coastal Biodiversity Management in Pacific Island Countries): http://macbio-pacific.info/wp-content/uploads/2017/07/MACBIO_Factsheets_MESV4-web.pdf

- **Regulating services** – coastal protection, carbon sequestration maintaining the health of terrestrial areas for agroforestry, maintaining the health of marine and aquatic habitats utilised for pisciculture, providing buffers from extreme weather, such as sudden-onset storm events.
- **Cultural services** – these can include revenues generated from tourism and recreation as well as the cultural identities of Micronesian peoples, which are connected to the island ecosystems.

This pre-feasibility study will demonstrate how the EDA programme will scale up locally led interventions based on the principle of joint management of the human-environmental system aimed at both maximising potential for ecosystem service provision and supporting livelihoods and socio-economic development.[3]

The Intergovernmental Panel on Climate Change (IPCC) – in its WGII Sixth Assessment Report – reconfirms that observed impacts of climate change are heightened in the Pacific SIDS. The effects of the rising and accelerating global mean sea level[4] are potent in the Pacific, which experiences (depending on the region) about two or three times of the average annual increase globally.[5] Coastal cities and rural communities on small islands are already impacted by sea-level rise and inundation, heavy precipitation events, tropical cyclones and storm surges. This is further impacting Micronesia because coastal proximity and subsequent vulnerability of the FSM, Palau and RMI populations are very high.[6]

Table 1: Coastal proximity of the FSM, Palau and RMI populations (Source: Andrew, Neil et al)

Country	Population	% In zone		
		1km	5km	10km
Federated States of Micronesia	115,021	89	100	100
Palau	18,092	100	100	100
Republic of Marshall Islands	59,194	93	100	100

Precipitation is also projected to increase over high latitudes, the equatorial Pacific and parts of the monsoon regions[7], introducing anomaly in documented rainfall patterns in the northern SIDS.

Given these compounding effects of climate change, there is an urgent need to support locally led and relevant EbA measures, improved decision-making and resource management processes, as well as strengthening institutions at the frontier of climate adaptation.

[3] GCF Technical Guidance – Ecosystem and Ecosystem Services [draft].

[4] IPCC – Special Report on the Ocean and Cryosphere in a Changing Climate https://www.ipcc.ch/srocc/chapter/chapter-4-sea-level-rise-and-implications-for-low-lying-islands-coasts-and-communities/

[5] Pacific Coastal and Marine Science Centre (2020) – United States Geological Survey: usgs.gov/centers/pcmsc/science/impact-sea-level-rise-and-climate-change-pacific-ocean-atolls

[6] Andrew, Neil L. et al (2019). "Coastal proximity of populations in 22 Pacific Island Countries and Territories". Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0223249#abstract0

[7] IPCC – ibid.

1.2 Regional baseline: climate change, ecosystem-based adaptation (EbA) and protected areas (PA)

1.2.1 Protected areas and community resilience in FSM, RMI and Palau

Collectively, the ocean and land area of the FSM, RMI and Palau in this EDA programme span over 3 million km^2 of the tropical North Pacific Ocean. While large in ocean area, these Micronesian islands are small in land area and are reliant on coastal and marine resources for food security, livelihoods, and towards the overall achievement of national development goals. The region is home to over 500,000 people, speaking 12 languages, spread across 2,000 islands.[8]

Micronesia's highly diverse natural resources support the livelihoods as well as food security of the Micronesian peoples, who serve as the traditional stewards of their land and sea. The natural features that endow these island nations with biodiversity and scenic beauty also make them uniquely vulnerable to the principal drivers of biodiversity loss and social poverty: compounding impacts of climate change, habitat and environmental degradation, unsustainable fishing and other extractive practices, as well as the prevalence of invasive species. Without immediate and targeted action, these localized and external threats will further degrade.[9]

The Micronesian islands face unique challenges due to their geography, as well as undiversified economic structure and high import dependence:[10] Frequent natural disasters and climate change impose high costs and even threaten the physical viability of some of these islands and expose a majority of the populations. The atoll nations – such as Marshall Islands – are particularly vulnerable to sea level rise. For all FSM, RMI and Palau, land and marine natural environments tend to be fragile and increasingly under pressure from overpopulation, urbanization and overexploitation. This environmental fragility also severely constrains the scope and type of economic activities for these islands.

Despite these challenges, Micronesia has seen the increasing trend of establishing Protected Areas (PAs) particularly within the last 20 years.[11] The development of modern conservation in Micronesia (embracing RMI, FSM and Palau), often has been facilitated by environmental NGOs and government agencies, has incorporated many elements of traditional management and has resulted in a variety of innovative co-management schemes, governance structures and strategies unique to Micronesia and even to each of the island jurisdictions. The bulk of conservation efforts have been focused on establishing PAs through community engagement, mitigating immediate threats, and building networks and creating opportunities to increase capacity for various aspects of PA management. It is important to clarify that many PAs in these countries are not all "no-take" zones-communities live in proximity to or in these PAs and engage in many socioeconomic activities to sustain their livelihoods.

[8] Micronesia Challenge "We are One" Business Plan and Conservation Plan.
[9] MCT – Grant Making Strategy: http://www.ourmicronesia.org/information-for-donors-and-grantees.html
[10] World Bank (2016). Systematic Country Diagnostic: 8 Pacific Island Countries. Available at: https://documents1.worldbank.org/curated/en/313021467995103008/pdf/102803-REPLACEMENT-SecM2016-0025.pdf

[11] Isechal, A.L. et al. (2014). "Assessing the management effectiveness of Marine Protected Areas in Micronesia" in the PICRC Technical Report 14-04. Available at: https://picrc.org/picrcpage/wp-content/uploads/2016/01/Isechal-Management-Effectiveness-in-Micronesia-2014.pdf

PAs serve a significant role in the defense of marine and terrestrial ecosystems against climate change stressors. However, if PAs face the lack of stringent regulations: the expected benefits are fewer or may not materialize at all. In fact, research has shown that, PAs cannot fully address the problems in the absence of other, supporting measures. Since 2010, PAs covering almost 21 million km^2 have been added to the global network, and within the Pacific Islands region, approximately 20% of the total marine area is currently protected, indicating good progress for marine protection. The figure is lower for terrestrial protection however, with only about 6 percent of the total land area currently protected.

Protected areas – and their improved management – are also important bulwarks for maintaining natural ecosystems that provide economic benefits to the Pacific islands. The agriculture, forestry, and fishing sectors represent 22.28% of the GDP in FSM, 3.81% in Palau and 25.3% in RMI as of 2021.[12] Moreover, since the three countries are Small Islands Developing States or SIDS[13], which are a distinct group of developing island countries, they face specific economic challenges such as: remoteness from global markets and deprivation from the benefits of scale, low income and assets, small domestic markets and heavy dependence on a few external markets and international support, high volatility of economic growth, fragile natural environments, and socioeconomic as well as gendered vulnerabilities. Demonstrably. Per capita GDP – compared to global standards – are on the lower side for the participating nations: 109th (Palau), 189th (RMI) and 190th (FSM).[14] This underscores that important ecosystem services provided by PAs are intrinsically tied to the livelihoods of the populations living throughout these island nations – and their broader socioeconomic performance.

Not only do communities in FSM, RMI and Palau rely on the goods and services that ecosystems in these PAs provide, but they are an essential pillar of resource management and conservation. Community based management in Protected Areas (PAs) has had positive socioeconomic impacts such as the diversification of marine-based livelihoods through sustainable aquaculture methods, and the increase of food and water security through sustainable agroforest management.[15] These ecosystems thus not only protect communities against climate hazards and knock-on impacts, but also provide essential ecosystem services communities in the three countries rely on.[16] The improvement of these ecosystem services increases community resilience and adaptive capacity.

To ensure that these ecosystem services continue to provide sources of livelihood to communities, conservation efforts need to be carried out from a climate adaptation lens, and led by local organisations that will ensure successful adaptation outcomes.[17]

[12] World Bank Data Bank- World Development Indicators. Accessed 16/2/2023 at: https://databank.worldbank.org/source/world-development-indicators

[13] SIDS were recognized as having special status both for their environment and development at the Earth Summit, held in Rio de Janeiro, Brazil in 1992. Updated list of SIDS can be found on: https://www.un.org/ohrlls/content/list-sids.

[14] This data is according to the World Bank.

[15] United Nations Development Programme. 2014. Community-Based Action in Small Island Developing States: Best Practices from the Equator Initiative. New York, NY: UNDP

[16] Federated States of Micronesia – State of Environment Report 2018. Available at: https://fsm-data.sprep.org/resource/fsm-soe-2018

[17] Reid H, Hou Jones X, Porras I, Hicks C, Wicander S, Seddon N, Kapos V, Rizvi A R, Roe D (2019) Is ecosystem-based adaptation effective? Perceptions and lessons learned from 13 project sites. IIED Research Report. IIED, London.

All three countries have recognized the multivariate importance of PAs and have continued to invest in these natural ecosystems and biodiversity hotspots through national and regional efforts such as the Micronesia Challenge. Despite these efforts the yearly operational funding gaps for conservation areas in these northern SIDS range between 25 and 70%, and the volume of climate finance flow for these types of interventions have also remained low. This is because overall governmental expenditure on the management and restoration of these resources – particularly as an adaptive action to climate change – remains limited due to paucity of both financial resources as well as inadequate technical capacity to scope, prioritize, develop and implement targeted interventions. Therefore, this adaptation investment through an EDA programme is being proposed and is expected to have pioneering regional impact.

1.2.2 The role of Ecosystem-based Adaptation

Ecosystem-based Adaptation (EbA) falls under the umbrella of nature-based solutions, working with and strengthening nature to deliver economic, social and biodiversity benefits and address the links between tackling climate change and improving livelihoods. EbA is "the use of biodiversity and ecosystem services to help people adapt to the adverse effects of climate change as part of an overall adaptation strategy".[18] It is an increasingly popular strategy- as of 2018, 49% out of 141 countries with adaptation plans referred to EbA actions in their intended NDCs.[19]

EbA puts communities at its centre, one of its most critical success factors being that interventions have to be locally led and participatory.[20] A review by IIED of 13 case studies worldwide found that EbA interventions can provide social co-benefits as well as ecosystem related benefits, and in 10 out of the 12 cases it represented a cost-effective strategy to adapt to climate change's impacts.

The synergies between EbA and existing community-led actions in PAs in RMI, FSM and Palau cannot be ignored. For example, in RMI, the Namdrik Atoll Local Resources Committee (comprised of the Mayor of Namdrik, three of the community's elders, two representatives of the atoll's Women's and Men's groups, one representative of the Teachers' Group, one youth representative, and one representative each of the Atoll's Lijabkanira and Wut Kajdo Groups) works closely with MIMRA, the Marshall Islands Conservation Society and the College of the Marshall Islands in conservation actions in Namdrik Atoll. Amongst many other conservation activities, they have engaged in the restoration of shoreline vegetation, such as mangrove forests, which provide a nursery area for marine species, and has knock-on effects on fish stocks in the area, therefore ensuring the long-term sustainability of people's livelihoods.[21]

Moreover, countries have already established precedents for EbA to strengthen ecosystem services. In FSM, a response to the climate shocks ecosystem services have suffered is the development of Ecosystem-based adaptation plans, including community-based Local Early Action Plans (LEAP),

[18] CBD: Convention on Biological Diversity (2009) Connecting biodiversity and climate change mitigation and adaptation. Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change. CBD Technical Series No. 41. Montreal, Canada

[19] Seddon, N, Reid, H, Barrow, E, Hicks, C, Hou-Jones, X, Kapos, V, Rizvi, A and Roe, D (2016c) Ecosystem-based approaches to adaptation: strengthening the evidence and informing policy. Research overview and overarching questions. IIED, London.

[20] Reid H, Hou Jones X, Porras I, Hicks C, Wicander S, Seddon N, Kapos V, Rizvi A R, Roe D (2019) Is ecosystem-based adaptation effective? Perceptions and lessons learned from 13 project sites. IIED Research Report. IIED, London.

[21] United Nations Development Programme. 2014. Community-Based Action in Small Island Developing States: Best Practices from the Equator Initiative. New York, NY: UNDP.

which were developed through participatory approaches, in part through the Micronesia Challenge.[22] In Palau, the latest State of the Environment report recommends maintaining and upscaling the successful community adaptation of coral reef management to encompass nearshore fisheries as well.[23] Similarly, in RMI's State of the Environment latest available report, one of the recommendations regarding climate change adaptation across the thematic areas of food and water security, health and flood risks (which were qualified as being "poor"), was to enhance local livelihoods and community resilience through initiatives such as the existing Micronesia Challenge and the Reimaanlok community-based conservation management framework (more information on the Reimaanlok framework can be found in section 4.3)[24]

The existing community-based management of PAs in the SIDs context can be therefore leveraged to implement EbA interventions, as the latter represent cost-effective, localized strategies to protect and rehabilitate ecosystem services that will increase community resilience, which are currently vulnerable to climate change. Moreover, this project supports and is part of a continuum of actions under the Micronesia Challenge, therefore contributing to the improved management and financing of PAs.

1.3 Observed and future climate change in Micronesia

1.3.1 Observed climate impacts in the region.

Recent work by IPCC presents an important summary for policymakers that embrace latest climate modelling scenario work and finding implications for Pacific Island Countries (PICs) around the world as follows:[25]

- Climate change in Pacific SIDS is causing substantial damages, and increasingly irreversible losses, in terrestrial, freshwater and coastal and open ocean marine ecosystems and the extent and magnitude of climate change impacts are larger than estimated in previous assessments.
- Widespread deterioration of ecosystem structure and function, resilience and natural adaptive capacity, as well as shifts in seasonal timing have occurred due to climate change, with adverse socioeconomic consequences.
- Climate change has reduced fisheries yields and aquaculture production includes marine and freshwater fisheries/production.
- Flood- and storm-induced damages in coastal areas include damages to infrastructure, driven by increased storm surges as well as anomalies in precipitation patterns.
- Ocean warming and ocean acidification have adversely affected food production from shellfish aquaculture and fisheries in some oceanic regions.
- Increasing weather and climate extreme events have exposed millions of people to acute food insecurity and reduced water security, with the largest impacts observed in many locations and/or communities in Small Islands.

[22] Federated States of Micronesia (2018). "State of the Environment Report". Available at: https://fsm-data.sprep.org/resource/fsm-soe-2018

[23] Republic of Palau (2019) "State of the Environment Report". Available at: https://palau-data.sprep.org/system/files/2019%20SOE%20Palau.pdf

[24] Republic of Marshall Islands (2016) "State of the Environment Report". Available at: https://rmi-data.sprep.org/dataset/republic-marshall-islands-state-environment-reports

[25] IPCC (2022) – Sixth Assessment Report. Regional fact sheet: small islands. Available at: https://www.ipcc.ch/report/ar6/wg1/downloads/factsheets/IPCC_AR6_WGI_Regional_Fact_Sheet_Small_Islands.pdf

- Unsustainable land-use and land cover change, unsustainable use of natural resources, deforestation, loss of biodiversity, pollution, and their interactions, adversely affect the capacities of ecosystems, societies, communities and individuals to adapt to climate change.
- Globally, less than 15% of the land, 21% of the freshwater and 8% of the ocean are protected areas. In most protected areas, there is insufficient stewardship to contribute to reducing damage from, or increasing resilience to, climate change.

1.3.2 Projected climate change in the region

Over the last 100 years, the global climate has warmed by approximately 0.74°C and is expected to rise a further 1.3°C to 1.8°C by the end of the century. Corresponding with the rise in global temperatures are a host of changes in other climate and physical processes, including changes in total and seasonal precipitation, altered ocean currents, and sea level rise. This projected rise is primarily in response to anthropogenic greenhouse warming.

Across the Oceania Region, the average temperature is expected to rise by 0.80°C by 2030, relative to a 1980 to 1999 baseline. Corresponding with the rise in global and regional temperatures are changes in other climate and physical processes including more extreme rainfall days during the wet season and expected intensification of cyclones. In addition, the region can expect altered ocean currents and a rise in sea level of between 4cm and 15cm by 2030 and up to 0.7m by the end of the century.

Based on the recent findings from IPCC (2022), the following near-term and mid/long-term risks to terrestrial, coastal and marine ecosystems apply to Pacific SIDS in general and Micronesia regionally:

Near-term risks to ecosystems (2021-2040)

- Near-term warming and increased frequency, severity and duration of extreme events will place many terrestrial, freshwater, coastal and marine ecosystems at high or very high risks of biodiversity loss (medium to very high confidence, depending on ecosystem).
- Near-term risks for biodiversity loss are moderate to high in forest ecosystems (medium confidence), kelp and seagrass ecosystems (high to very high confidence) and warm-water coral reefs (very high confidence).

Mid to long-term risks to ecosystems (post 2040)

- Biodiversity loss, and degradation, damages to and transformation of ecosystems are already key risks for PICs due to past global warming and will continue to escalate with every increment of global warming (very high confidence).
- In small islands, groundwater availability is threatened by climate change (high confidence).
- Changes to stream-flow magnitude, timing and associated extremes are projected to adversely impact freshwater ecosystems in many watersheds by the mid-to long-term across all assessed scenarios (medium confidence).

1.3.3 Climate vulnerabilities in the region

The people and ecosystems of PICs remain highly vulnerable to these effects due to an inherently high exposure as well as a relatively low adaptive capacity. Of relevance to Pacific SIDS, the recent IPCC (2022) work, significantly, is citing:

IPCC (2022) High Confidence Statements

- Projected climate change, combined with non-climatic drivers, will cause loss and degradation of much of the world´s coral reefs and low-lying coastal wetlands (very high confidence).
- Global hotspots of high human vulnerability are found particularly in (amongst others) Small Island Developing States (high confidence).
- Vulnerability will also rapidly rise in low lying SIDS and atolls in the context of sea level rise and in some mountain regions, already characterised by high vulnerability due to high dependence on climate-sensitive livelihoods, rising population displacement, the accelerating loss of ecosystem services and limited adaptive capacities (high confidence).

The projected future rise in the severity of climate change impacts will result in physical changes to coastal landforms, endangering coastal populations and infrastructure, as well as threatening many coastal and marine ecosystems. For example, the combination of sea level rise and ocean acidification presents a dire threat to the survival of coral reef ecosystems and the biophysical and socio-economic benefits that they provide, not just for communities but to entire countries through fisheries, tourism and coastal protection. This could also exacerbate existing developmental and sustainability challenges, and, in some cases, even threaten the long-term inhabitability of entire islands. There is an urgent need to strengthen their adaptive capacity and improve their resilience to deal with these impacts, which also threaten to undo hard-earned overall progress on socioeconomic indicators in the region.

FSM, Palau and RMI in particular are vulnerable to some of the most damaging effects of climate change including changing precipitation patterns, increasing temperatures, increasing intensity of extreme weather events, sea level rise and ocean acidification and warming. According to the Notre Dame Global Adaptation Initiative (ND-GAIN), FSM is the fifth most vulnerable country to climate change and 116th least ready country for the impacts of climate change while Palau is the 76th least ready country, and RMI being the 109th least ready country.

1.3.4 Direct impacts and spill over effects on protected areas

As stated by IPCC (2022), safeguarding biodiversity and ecosystems (within PAs) is fundamental to support climate resilient development, in light of the threats that climate change poses to them and their roles in adaptation and mitigation. Recent analysis drawing on a range of lines of evidence, suggest that maintaining the resilience of biodiversity and ecosystem services at a global scale depends on effective and equitable conservation of approximately 30% to 50% of Earth's land, freshwater and ocean areas, including currently near-natural ecosystems.[26]

Coastal and marine ecosystems and the services they provide are the basis for Pacific resilience in terms of livelihoods and economic growth, food security, and cultural identity. For example, in terms of food security, many inhabitants of PAs live in rural areas along island coasts, where there is an

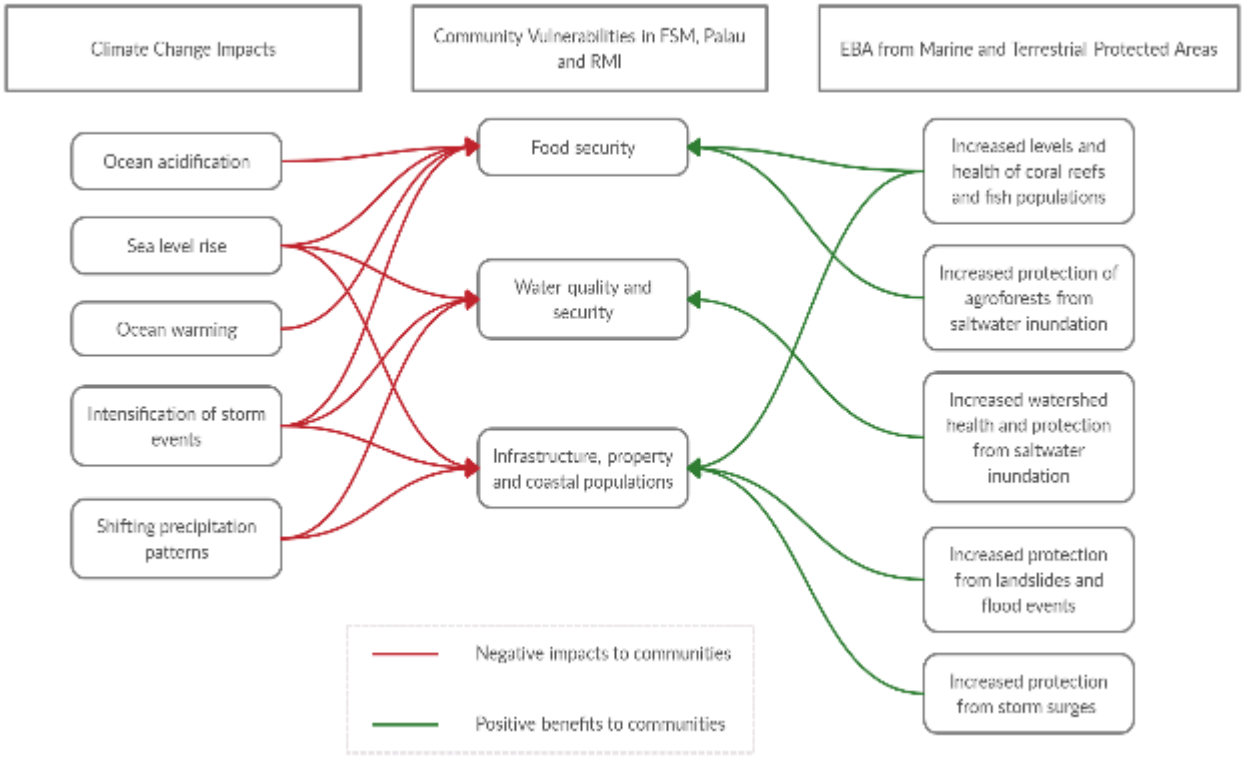
[26] The IPCC report has been used extensively:
https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_FinalDraft_FullReport.pdf

abundance of protein-rich marine food and fertile lowlands suitable for agriculture or within small coastal cities and towns. The health of marine systems is vital to many subsistence and artisanal fishing communities and is a primary source of livelihood and protein for a majority of the population living in coastal rural communities, and increasingly as a source of food for growing urban populations, which now average more than 50% of Pacific Island populations. In the Pacific Islands, data shows that the consumption of fish protein is almost 1.5 times the global average. As such, the fisheries and pisciculture play a critical role in the economic, social and cultural fabric of those communities. In 2010 the total economic value (TEV) of Pacific Island coral reefs was estimated to be US$3.8 billion per year, including about US$1.3 billion contributed from indirect or non-use values. Similarly, the TEV of mangrove forests were estimated to be worth US$ 3.9 billion annually.

Coastal ecosystems, particularly intertidal wetlands and reefs, also play a critical role in reducing the vulnerability of rural (and urban) coastal communities, through their multiple roles in wave attenuation, sediment capture, vertical accretion, erosion reduction and the mitigation of storm surge and debris movement. Even under good management, coral cover is expected to decrease from the present-day maximum of 40% to 15 – 30% by 2035 and 10 – 20% by 2050, matching the rate of decline over the past 30 years as a consequence of climate change impacts. Changes to coral reefs and other fish habitats, and the direct effects of CO_2 emissions on fish and invertebrates, are likely to reduce harvests from small-scale, coastal fisheries by up to 20% by 2050, and by up to 50% by 2100. A key strategy for mitigating fisheries losses due to climate change impacts is to ensure other threats to coral reefs are reduced to a minimum while simultaneously increasing the incentives for sustainable fishing so that over-fishing alongside coral reef decline does not completely destroy the fisheries sector. It is therefore essential to sustain healthy functioning coastal and marine ecosystems for as long as possible as a strategy for supporting and sustaining the resilience of Pacific SIDS in the face of increasing and compounding climate change impacts.

A summary of climate impacts and associated effects, and how both marine and terrestrial protected areas provide key climate resilience services through EbA to communities in the Northern Pacific. Additionally, Figure 1 below provides a visual representation of how protected areas result in resilience to climate change impacts (developed during the Concept Note phase).

Figure 1: Climate change impacts and EbA options for marine and terrestrial PAs (Source: Concept Note)



Marine Protected Areas

Ocean acidification – Oceans have absorbed almost one third of human $C0_2$ emissions causing surface layers to be significantly more acidic (some estimates at 26%) since preindustrial times. Acidification is a major threat to marine ecosystems affecting plankton and reef-building organisms such as molluscs, corals and algae. Protected areas can help rebuild certain fish populations that play a significant role in the marine inorganic carbon cycle through the excretion of high- magnesium calcite crystals that then act as a first line of defence against reduced saturation states caused by acidification. This increases food security for local populations that rely on fishing and other marine harvesting activities for subsistence and income generation.

Sea-level rise and saltwater inundation – Thermal expansion and increased meltwater from terrestrial ice caps have increased the volume and sea level of the world's oceans, including sea-level rise that has already been measured in the Northern Pacific. Coral reefs offer protection against rises in sea level, leading to increasing momentum for ecosystem-based adaptation to safeguard people, infrastructure and property against adverse climate change impacts. Unfortunately, because of the paucity and short-term nature of available data and the complexity and heterogeneity of coral reef ecosystems, predictions of future coral cover are variable and uncertain. While coral reef data can yield important insights into the global drivers of coral reef ecosystem calcification, they are limited in their ability to accurately predict future states of coral reef ecosystem calcification.[27] Current models often do not take into account the fact that local buffers in ocean chemistry and climate refugia may enhance adaptive capacity to the negative impacts of ocean acidification in future

[27] Wolfe, K., & Roff, G. (2022). Global predictions of coral reef dissolution in the Anthropocene. *Communications Earth & Environment*, *3*(1), 42.

decades, while recovery of coral communities can rapidly increase net ecosystem calcification.[28] One study found that severe sea-level rise under RCP 8.5 scenarios predict the complete submersion of reef flats and the movement of reef slope coral communities below the euphotic depth, while under RCP 4.5 the spatial extent of habitats with low coral cover and generic diversity will actually increase.[29] While it is impossible to predict the health and extent of coral reefs, meta-analyses reveal that coral reefs provide substantial protection against natural hazards by reducing wave energy by an average of 97%, that coral reefs can provide comparable wave attenuation benefits to artificial defences such as breakwaters, that reef defences can be enhanced cost effectively, and that there is opportunity to guide adaptation and hazard mitigation investments towards reef restoration to strengthen this first line of coastal defence.[30]

Shifts in species distribution – Climate change is expected to create a global diaspora of wildlife. Uneven warming and salinity will affect ocean currents that will, in turn, influence the distribution of taxa and marine ecosystems. Redistribution of species towards more temperate waters may reduce diversity in tropical and subtropical regions. Regionally networked protected areas can provide a stepping stone for dispersal, safe 'landing zones' for colonising species and possible refuge for those unable to relocate. By increasing reproductive output, protected areas increase ecologically meaningful dispersal distances, improving population connectivity as well as promoting genetic diversity by increasing population sizes and broadening the selective environment. This increases food security for local populations that rely on fishing and other marine harvesting activities for subsistence and income generation.

Decreased productivity and oxygen availability – Climate change is warming the average temperature of the ocean and decreasing oxygen levels. Surface warming increases stratification and can reduce mixing, nutrient availability, and primary production. Fisheries productivity is also declining as a result of the warming and dissolving oxygen. Effectively managed protected areas play well-understood roles in supporting fishery management, rebuilding exploited stocks and degraded habitats, increasing production, and facilitating replenishment of fishing grounds. This increased resilience results in increased food security for local populations that rely on fishing and other marine harvesting activities for subsistence and income generation.

Terrestrial Protected Areas

Increased landslides and flooding – Some of the higher, volcanic islands in FSM, Palau and RMI contain steep slopes that are often stabilized by deep-rooted, endemic vegetation. Shifting precipitation patterns include more intense rainfall events that could cause severe flooding and landslides that impact local populations and infrastructure. The protection of natural vegetation allows vegetation, such as endemic forests, to act as a buffer to extreme rainfall events and reduce the risk of flooding and subsequent landslides. Not only does this protect populations living near steep slopes, maintaining vegetation also protects reef health by reducing the impact from sediment flows caused by erosion.

[28] Ibid.

[29] Morgan, K. M., Perry, C. T., Arthur, R., Williams, H. T., & Smithers, S. G. (2020). Projections of coral cover and habitat change on turbid reefs under future sea-level rise. *Proceedings of the Royal Society B*, *287*(1929), 20200541.

[30] Ferrario, F., Beck, M. W., Storlazzi, C. D., Micheli, F., Shepard, C. C., & Airoldi, L. (2014). The effectiveness of coral reefs for coastal hazard risk reduction and adaptation. *Nature communications*, *5*(1), 1-9.

Sea-level rise and saltwater inundation – Thermal expansion and increased meltwater from terrestrial ice caps have increased the volume and sea level of the world's oceans, including sea-level rise that has already been measured in the Northern Pacific. Intact coastal wetlands (predominantly mangrove forests in FSM, Palau and RMI) offer protection against rises in sea level, leading to increasing momentum for EBA to safeguard people, infrastructure and property against adverse climate change impacts.

Intensification of storms – Warmer oceanic waters will drive more intense tropical storms and cyclones that can cause more severe flooding and inundation of coastal communities. Protected areas around coastal zones (such as mangrove forests) can reduce loss, damage, and degradation of these storms for coastal populations.

Water quality and security degradation – Watersheds throughout the Northern Pacific rely on natural vegetation for enhanced water quality as well as sustainable access. Shifting precipitation patterns due to climate change threaten to decrease freshwater quality and quantity for communities due to increased runoff and sedimentation. Additionally, sea level rise could increase saltwater inundation into underground aquifers. Protecting tropical forests, mangrove forests and other vegetation in FSM, Palau and RMI allows these systems to continue to provide resilience against landslides, floods and saltwater inundation that would negatively impact freshwater quality and access for communities throughout the region.

Agroforestry degradation – Much of the food produced for subsistence purposes in the Northern Pacific is in low-lying areas that are subject to flooding and saltwater inundation. Saltwater inundation can cause over-salinization of soil and result in significant reduction in crop yields. Protected areas, however, act as a barrier between agro-forests and other agricultural areas and sea level inundation.

In essence, coastal habitats such as mangroves are critical for FSM, RMI and Palau (and others) as they protect coastal communities from sea-level rise and storm surges, while supporting fisheries, sequestering carbon and providing other ecosystem services as well, as detailed in Section 7. Efforts to restore, conserve and/or recover these natural habitats help people confront the impacts of climate change and assist them in adapting better to ongoing as well as projected impacts. The proposed EDA programme, hence, bases itself on these findings.

1.4 Summarised country profiles

This section is a summary of the country profiles, including the status of their protected areas (PAs). For a more detailed description, refer to sections 2,3 and 4 for climate risks and impacts and section 5 for the status of PAs.

Federated States of Micronesia	
Climate Hazards	• Temperature increases of 1.4°C-1.5°C (RCP 4.5 by 2041-2070) • Annual mean precipitation is projected to increase by 3%, although uncertainty due to inconclusive ENSO projections. (RCP 4.5 by 2041-2070) • 1-in-20-year daily rainfall will become a 1-in-7-year event for RCP 2.6 by 2090 • Sea-level rise of 41-90cm by 2090 under RCP 8.5. • Ocean acidification: aragonite saturation below 3 under RCP 8.5, providing marginal conditions for healthy coral reefs.

Protected Areas	• According to the UNEP-WCMC database, FSM's protected areas total 491.25km^2, although from stakeholder consultations it is understood that this data is inaccurate.[31] • FSM's warm water coral reefs cover 3171.836 km^2. Out of these, only 1.8% are protected, that is 55.661 km^2.[32] FSM's mangrove habitat covers 8794.42 hectares as of 2020. This represents 31.93% of its coastline (1248.15km).[33]
Policy and Legislation for PAs	The National Protected Areas Network Policy Framework (NPANPF) was established in 2015. It is designed to facilitate the national government's delivery of assistance to its states in the protection of biodiversity, key habitats, and other valuable resources. The NPANPF establishes procedures[34] for the management entities of PA sites to apply to join the protected area management network and outlines the benefits of membership in the national network, including access to long-term and sustained technical and financial assistance.
Community-based management	At State level, the conditions for a PA site to be recognized is for the site to be officially recognised through (i) the legal system for those states where terrestrial or marine areas are set on public areas, such as Pohnpei and Kosrae; (ii) require the endorsement from the community and/or in same cases through an ordinance from the local municipal government for states where land and marine areas are owned by communities (i.e., clans, land owners).[35]
Financing	• A PAN of 30% marine and 20% terrestrial areas (based on the previous goals identified under the Micronesia Challenge) under effective conservation would cost 29M USD and 4.4M USD annually. • Existing funds through recurring allocations were estimated to be 962,975 USD from a variety of sources as of 2019.
Palau	
Climate Hazards	• Under an RCP 4.5 scenario, annual mean temperature is set to increase by 1°C for the 2041-2070 • Under an RCP 4.5 scenario, climate change is not expected to have a notable impact on precipitation in the medium term (2041-2070), and will increase by 1% for the period 2071-2100

[31] UNEP-WCMC (2021), SPREP Pacific Islands Protected Area Portal. *Federated States of Micronesia Protection Coverage.* Available at: https://pipap.sprep.org/country/fm

[32] UNEP-WCMC (2021), SPREP Pacific Islands Protected Area Portal. *Federated States of Micronesia Protection Coverage.* Available at: https://pipap.sprep.org/country/fm

[33] Bunting P, Rosenqvist A, Hilarides L, Lucas RM, Thomas N, Tadono T, Worthington TA, Spalding M, Murray NJ, Rebelo L-M. Global Mangrove Extent Change 1996–2020: Global Mangrove Watch Version 3.0. *Remote Sensing*. 2022; 14(15):3657. https://doi.org/10.3390/rs14153657

[34] The PAN Operations Manual is currently under development. Each state is working on their own state chapters, which will outline the process and the requirements for being part of the PAN and receiving funding through the network.

[35] Franco C., Yatilman R., Nash R. and Bruton-Adams, M. 2022. Strengthening Protected Area Management through effective community participation in the Federated States of Micronesia

	• Wet season increases, with extreme rainfall days increasing in frequency. Proportion of weaker storms will increase even if typhoons are projected to decrease with moderate confidence. • By 2090, sea-level rise is projected to amount to a 20-60cm increase under a very high emissions scenario according to PACCSAP.[36]
PAs Overview	As of March 2023, Palau's marine protected areas have a surface area of 702.21km^2 and 32.54km^2 of terrestrial areas. Palau's warm water coral reefs cover 506.399km^2. Out of these, almost 100% are in protected areas (506.253 km^2).[37] As of 2020 Palau has 5687.71 ha of mangroves, representing a 29.55% linear coverage of the 710.72km coastline.[38] For a full list of protected areas, look at Appendix IV.
Policy and Legislation for PAs	In 2003, the Palau Protected Area Network (PAN) Act was passed to provide a framework for marine and terrestrial protected area management. The PAN Fund leverages different financial resources (such as the Green Fees revenues) to manage these areas since 2012.
Community-based management	The Protected Areas Network (PAN) Act involves local communities by enabling them to undertake a scientific and social assessment of their local environment and supports traditional systems of natural resource management.[39] The Act establishes a nationwide framework that empowers communities to designate and manage marine and terrestrial protected areas.[40]
Financing	The Green Fee is the primary source of PAN funds and varies per year based on the number of visitors to Palau, as it is a departure tax non-Palauan passport holders have to pay. 100% of Green Fees go into PAN efforts. The Palau sustainable finance plan identified that a fully realized PAN of 30% marine and 20% terrestrial areas under effective conservation would cost $3.2 million annually.
Republic of the Marshall Islands	
Climate Hazards	• For an RCP 4.5 scenario, there is a projected 1°C increase for 2041-2070 • SMHI and the WMO's models project a 5% increase in annual mean precipitation by 2041-2070 for an RCP 4.5 scenario. In the longer term (2071-2100), the same increase is projected. • Under an RCP 8.5 emission scenario, the northern Marshall Islands will see 1-in-20-year daily rainfall event become, on average, a 1-in-5-year

[36] Chapter 10- Palau", *Climate Change in the Pacific- Scientific Assessment and New Research- Volume 2: Country Reports* (PACCSAP, 2011) <https://www.pacificclimatechangescience.org/wp-content/uploads/2013/09/Palau.pdf > accessed 2022

[37] UNEP-WCMC (2021), SPREP Pacific Islands Protected Area Portal. *Palau Protection Coverage.* Available at: https://pipap.sprep.org/country/pw

[38] Bunting P, Rosenqvist A, Hilarides L, Lucas RM, Thomas N, Tadono T, Worthington TA, Spalding M, Murray NJ, Rebelo L-M. Global Mangrove Extent Change 1996–2020: Global Mangrove Watch Version 3.0. *Remote Sensing*. 2022; 14(15):3657. https://doi.org/10.3390/rs14153657

[39] https://www.futurepolicy.org/oceans/palaus-protected-areas-network-act/

[40] https://www.futurepolicy.org/oceans/palaus-protected-areas-network-act/

	event by 2090. For the same conditions, the southern islands will see 1-in-20-year rainfall events become 1-in-6-year events by 2090.
PAs Overview	RMI's total marine protected area amounts to 4343.28km^2 and 34.07km^2 terrestrial protected area, according to data collected in March 2023. For a full list of PAs, see Appendix IV. 46 PAs are designated "no-take" zones, meaning that no extractive activities can take place and there is a high level of biodiversity protection.
Policy and Legislation for PAs	The Protected Areas Network (PAN) Act of 2015 was enacted to establish a national system of protected areas, a PAN Office to implement the PAN Act, and a sustainable funding mechanism to support the PAN. It was amended in 2018 to allow oversight by the MIMRA (Marshall Islands Marine Resources Authority) Board and to also include traditionally protected areas under the PAN.
Community-based management	The role of communities in PA management is best represented through the Reimaanlok framework, which precedes the PAN Act. It is an 8-step process that can be initiated by NGOs, CSOs and local governments, characterised by inclusive and deliberative processes to merge biophysical conservation practices with traditional practices, with the ultimate goal of conserving and climate proofing PAs.
Financing	The RMI sustainable finance plan under the MC estimated that effective conservation would cost 1.9M USD annually, based on estimates for community-based conservation costs across 25 atolls and network-wide coordination and activities. It also identified an annual funding gap of 0.64M USD for conservation areas.[41]

1.5. Current programmes and frameworks in Micronesia

Micronesia Challenge

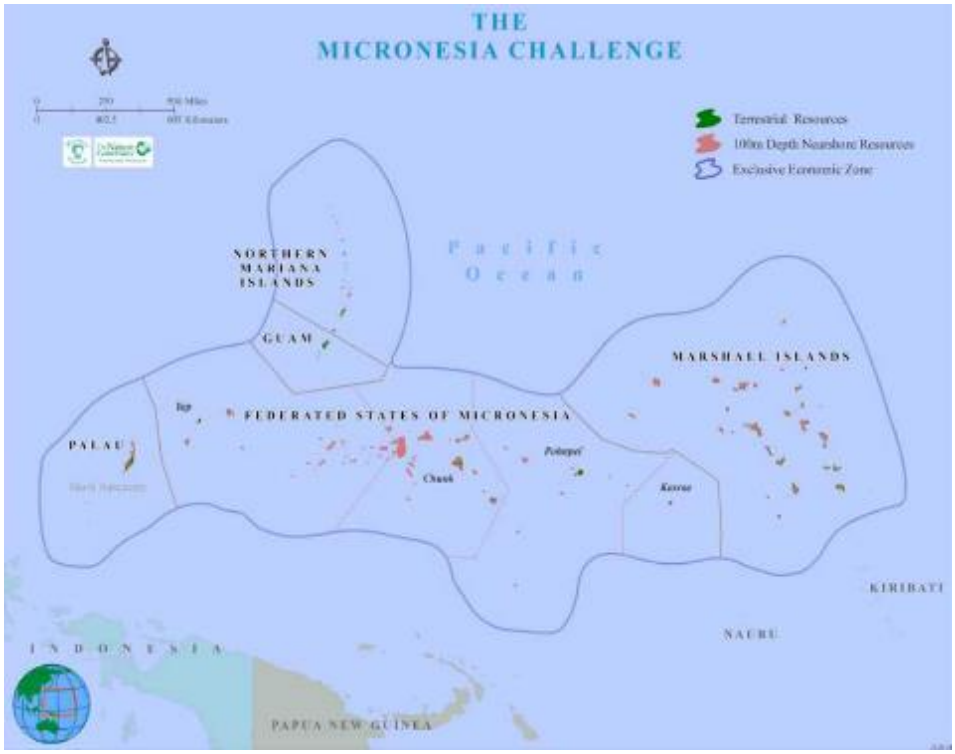
The Micronesia Challenge is a regional initiative and commitment aiming to effectively manage at least 50% of near-shore marine resources and as at least 30% of terrestrial resources across the region of Micronesia by 2030.[42] To date, all national conservation commitments and financial responsibilities (pledges) in the region have been designed to align to the Challenge and have resulted in the development of numerous connected conservation projects as well as the creation of additional terrestrial and marine protected areas (see Figure 1). Since 2006, the Micronesia

[41] M. Gombos (2020) *Micronesia Challenge Evaluation.* Available at: http://themicronesiachallenge.blogspot.com/p/community.html

[42] The Federated State of Micronesia – Sixth National Report to the Convention on Biological Diversity (2020) (Biology, 2020).

Challenge has raised or leveraged USD 85 million for conservation efforts, including USD 26 million invested in a regional endowment.[43]

Figure 2: Participating countries of the Micronesia Challenge (Source: The Nature Conservancy)



Under the Micronesia Challenge, FSM, Palau and RMI have pledged to commit financial and human resources towards meeting the 2030 target. This demonstrates that the three island nations are invested in the long-term protection and management of terrestrial and marine areas, and that PA management will continue to be both a policy priority following programme completion. As of 2019, no participating country or territory had yet fully achieved the 2030 goal of conserving 50% of near-shore marine resources and 30% of terrestrial resources. However, Palau and FSM have exceeded the near-shore marine resources goal and are both relatively close to achieving the terrestrial conservation goal (details in Table 2). It should be noted that MCT is currently working on a regional mechanism to improve the tabulation of these indicators, and the percentages below defined per jurisdiction.

Table 2: Progress on near-shore and terrestrial area conservation through the Micronesia Challenge (Source: Micronesia Challenge Evaluation)

Country/Territory	Near-shore marine area under some form of management status (%)	Terrestrial area under conservation status (%)
FSM	39	15
Palau	70	16
RMI	18	N/A

[43] Micronesia Challenge 2030.

CNMI	N/A	N/A
Guam	15	30

An evaluation of the Micronesia Challenge and its conservation initiatives was undertaken in 2020.[44] The evaluation identified several different areas/gaps that need to be addressed for effective future implementation of the conservation initiative. These include:

- Increasing resources towards climate change resilience.
- Improved regional level coordination.
- Communication and collaboration among stakeholders.
- Increased monitoring and evaluation.
- Policies to ensure that a fixed percentage of any large conservation grant be allocated to the Micronesia Challenge endowment.
- Increased engagement with the private sector.
- A more explicit ridge to reef approach to conservation management.
- Increased engagement with outer island communities.
- Additional data management.
- Improved coordination efforts, among other recommendations.

Pacific Ridge to Reef Programme (R2R)

The Pacific Ridge to Reef programme is a Global Environment Facility (GEF-5) multi-focal area programme guiding coordinated investment of GEF grant funding across its focal areas within the Pacific SIDS. These focal areas include:

- Biodiversity conservation.
- Land degradation.
- Climate change adaptation and mitigation.
- Sustainable land management
- Sustainable forest management.
- International waters.

The R2R Programme is built on achievements of previous investments via a focus on national Integrated Water Resource Management (IWRM) demonstration projects. These are aimed at providing an opportunity for participating countries to implement and experiment with new management models and methods.[45] The practical, on-the-ground solutions to water and sanitation issues demonstrated by the national IWRM projects acted to stimulate support at both community and national government levels for policy reform and the mainstreaming of integrated approaches as part of national sustainable development planning. The main goal of the programme is to enhance Pacific Island countries' ecosystem goods and services through integrated approaches to land, water, forests, biodiversity, and coastal resource management that additionally contribute to poverty reduction, sustainable livelihoods, and climate resilience.

The experience and local capacity towards improved integrated environmental and natural resource management generated through the GEF Pacific IWRM project have been recognized both regionally

[44] See: http://themicronesiachallenge.blogspot.com/p/about.html

[45] Information on the R2R programme and the IWRM products is available at: https://www.pacific-r2r.org/history-r2r

and within the 14 participating Pacific Island Countries as an appropriate entry point for the testing of innovative approaches and measures to integrate land, forest, water, and coastal management, including climate change adaptation in Pacific SIDS. In this connection, the GEF multi-focal area, multi-GEF agency programme entitled *"Pacific Islands Ridge-to-Reef National Priorities – Integrated Water, Land, Forest and Coastal Management to Preserve Biodiversity, Ecosystem Services, Store Carbon, Improve Climate Resilience and Sustain Livelihoods"* (or the GEF Pacific R2R Programme) was developed to provide an opportunity for Pacific SIDS to develop and implement truly integrated approaches for the sustainable development of island economies and communities.

FSM, Palau and RMI all have countrywide R2R projects under implementation that are customized to the needs of the country and the threats they face. Summary details of interventions in each relevant nation are outlined below:

FSM

The FSM R2R project is designed to engineer a paradigm shift in the approach to, and management of, natural resources from an ad-hoc species/site/problem-centric approach to a holistic ecosystem-based management "ridge to reef" approach guided by planning and management process that are informed by actual data. The shift to an ecosystem-based approach within National and State governments is designed to ensure that "whole island systems" are managed to enhance ecosystem goods and services, to conserve globally important biodiversity and to sustain local livelihoods.

Of relevance to this new GCF project preparation, the R2R project will also enhance the FSMs capacities to effectively manage its PA estate as well as increasing the coverage of the terrestrial and marine protected area network especially on the High Islands.

Palau

Of relevance to this GCF project, the R2R project will support Palau's two linked national efforts to protect biodiversity and sustainably use natural resources: the Protected Areas Network (PAN) and the Sustainable Land Management (SLM) Initiative. In addition, it will support coordination between the two efforts and other cross-sector issues that transcend boundaries and sectors.

The PAN focuses on both locally managed marine and terrestrial protected areas. The SLM initiative addresses land uses and both direct and indirect impacts outside of PAs. When coordinated, the PAN and SLM will provide Palau with a powerful framework to manage resources sustainably from the local to the national levels. This project will provide critical enabling support for national coordination of and will build capacity to manage cross-sector issues within and beyond these individual initiatives.

RMI

The StarR2R project is purposely designed to support the implementation of the Reimaanlok roadmap, thus contributing to the overarching goal of a sustainable and resilient nation. It is a five-year (2017–- 2022) project aimed at operationalizing Reimaanlok.[46] The overall objective of the project is to strengthen and sustain outer island biodiversity and livelihoods in four priority outer atolls of Aur, Ebon, Likiep, Wotho, and one outer island, Mejit, through improved management and conservation of their natural, social, and cultural resources. As an implementing partner in the project, the International Organization for Migration (IOM), alongside and in consultation with its

[46] The Reimaanlok framework is based on participatory community-based conservation practices that merges conservation practices from the biophysical sciences with traditional community-based atoll practices and processes to achieve mutually agreed outcomes. For more information on the Reimaanlok framework, see section 5.3.

respective Coastal Management Advisory Council (CMAC) partners, carried out four key activities of R2R from February 2019 – July 2020. The Cultural Survey, Socio-Economic Survey, Feasibility Study, and Livelihoods Project. Aur Atoll activities included the Cultural Survey (Local Early Action Planning (LEAP)) and Socio-Economic Survey.

Pacific Islands Framework for Nature Conservation and Protected Areas (2021-2025)

The Pacific Islands Framework for Nature Conservation and Protected Areas 2021-2025 (SPREP 2021) is the principal regional strategy document for environmental conservation in the Pacific. Its purpose is to provide broad strategic guidance for nature conservation planning, prioritization, and implementation in the region. It reflects the urgent need for transformative action in response to the multiple accelerating threats, both established and emerging, that are faced by nature and people in the Pacific, identifying the key regional priorities for action that are needed to make progress towards the 30-year Vision[47], Mission and Goals for conservation that were adopted by Pacific leaders in 2002.

These regional priorities are presented in the form of six Strategic Objectives for the period 2021-2025 (each Strategic Objective is accompanied by selected Action Tracks that represent priority areas for implementation[48]):

- Empower people to take action for nature conservation, based on the understanding of nature's importance for our cultures, economies, and communities.
- Integrate environmental and cultural considerations into the goals, processes, and trajectories of economic development in the Pacific.
- Identify, conserve, sustainably manage and restore ecosystems, habitats, and priority natural and cultural sites.
- Protect and recover threatened species and preserve genetic diversity, focusing on those of particular ecological, cultural and economic significance.
- Manage and reduce threats to Pacific environments and drivers of biodiversity loss.
- Grow Pacific capacity and partnerships to effectively monitor, govern and finance nature conservation action.

BIOPAMA Programme

BIOPAMA Programme is an initiative of the Organisation of African, Caribbean and Pacific (OACPS) Group of States financed by the European Union 11th European Development Fund. In the Pacific, BIOPAMA is implemented by the International Union for Conservation of Nature (IUCN) in partnership with SPREP and the European Commission Joint Research Centre. This partnership has

[47] "Our people proudly honour, value and protect our natural and cultural heritage and cultural identity for the wellbeing of present and future generations; the waters of our streams, lagoons and oceans are bountiful and unpolluted; our mountains are wild, our forests intact and our beaches unspoiled; our towns and gardens are healthy and productive; our societies are vibrant, resilient and diverse; we have equitable relationships with our global partners and our economies thrive; our cultures and traditions are widely appreciated; and the products of our creativity and labor are especially prized".

[48] Implementation of the Framework is primarily the responsibility of Pacific Island countries and territories, supported by the member organisations of the Pacific Islands Roundtable for Nature Conservation (PIRT) and other regional and domestic conservation partners and funders.

seen significant enhancements of the Pacific Islands Protected Area Portal (Dashboard), which is deemed to be the region's one-stop resource for protected area information.[49]

Strengthening and enabling the Micronesia Challenge

This International Waters (IW) (GEF-7) project will strengthen transboundary integrated marine resource management for healthy marine ecosystems and sustainable coastal fisheries in the Micronesian Large Ocean States of the FSM, Palau and RMI.[50] The project is designed with three components aimed at national and regional support, combined with knowledge management and monitoring and evaluation.

The first component will achieve national-level goals through national working group meetings that will develop science-based recommendations to support advancing integrated management of marine resources aligned under Micronesia Challenge 2020 and 2030 goals. The second component aims to strengthen the Micronesia Challenge Regional Office (MCRO) through capacity building and significantly raising local, regional, and global awareness to of the Micronesia Challenge, and the coordination role of MCRO by taking advantage of major ocean-related events. A third project component aims to capture the wealth generated from the Micronesia Challenge over the past decade, to disseminate nationally, regionally, and also internationally through IW: Learn.

[49] https://rris.biopama.org/PA_Dashboard

[50] https://oceansolutions.stanford.edu/strengthening-and-enabling-micronesia-challenge-2030

2. In profile: Federated States of Micronesia

2.1 Context A: geography and demographics

Geography of FSM

FSM consists of 607 small islands separated into four States (Yap, Chuuk, Pohnpei and Kosrae) located in the Northern Pacific Ocean, in the region of Micronesia. The islands are spread over a vast region in the Pacific, between 1°S and 14°N latitude, and between 135°E and 166°E longitude. FSM consists of 708.36 km^2 of land area with a vast exclusive economic zone (EEZ) covering over 2.9 million km^2. The distance between the eastern-most State (Kosrae) and the western-most State (Yap) is 2,700 km. Much of FSM lies just above the equator, approximately 4,000 km southwest of Hawaii and approximately 3,000 km north of eastern Australia.

Figure 3: Map of the Federated States of Micronesia

The four States have varying amounts of land area. Yap State is approximately 119 km^2 in land area, Chuuk is approximately 126 km^2, Pohnpei is 342 km^2 and Kosrae 109 km^2. Each of the four States is centred on one or more main high, volcanic islands and all the States except Kosrae have inhabited outer-island atolls. Yap State is made up of four volcanic islands, seven small islands and 130 atolls (of which 22 are inhabited). Pohnpei State is made up of one large volcanic island and six inhabited atolls. Chuuk is made up of seven volcanic island groups within the Chuuk Lagoon and 24 outer

island inhabited atolls.[51] Many of the islands in FSM are extinct shield volcanoes, with steep and rugged centres that are densely vegetated and eroded. Mangroves grow around the coastal fringes. Land elevations range from near sea level to up to approximately 760 m. Other islands are relatively flat, small and swampy, with low-lying, forested atoll islets typically 1–5 m above mean sea level.

Table 3: Geographic characteristics of islands in the FSM (Source: J.R. Campbell)

High, Volcanic Islands	Atoll Islands
Remnants of extinct shield volcanoes	Coral, rubble, and sand deposited on shallow reefs
Large land area relative to length of coastline	Small land area, absolutely and relative to coastline
High and steep slopes, subject to erosion	Low elevation
Mix of shallow and deep, fertile soils	No or minimal (impoverished coral sand) soils
Fringing mangroves, lagoons, and barrier reefs	Fringing reef, limited, or no mangroves
Perennial and/or ephemeral streams	No or minimal surface water
Large groundwater resource	Shallow freshwater lens
Orographic rainfall, with flash flooding	Convectional rainfall
Relatively abundant natural resources	Narrow natural/economic resource base
Extensive stands of primary and secondary forest	Vegetation predominately herbaceous strand, or strand forest
High biodiversity	Relatively low biodiversity
Relatively high population numbers, concentrated in coastal areas	Relatively low population numbers, but high concentrations
Transport and other infrastructure and services relatively well developed	Poorly developed transport and other infrastructure and services

2.2 Context B: governance and socioeconomic context

Governance in the FSM

Under the 1979 constitution, FSM has three levels of government: national, State, and municipal. The national government exercises only certain powers expressly delegated to it by the constitution. The four State governments of Chuuk, Kosrae, Pohnpei, and Yap are relatively autonomous. Each State has its own governor, judiciary, and legislative bodies, along with relevant government departments. States are further divided into 75 municipalities as above.

[51] GCF – Federated State of Micronesia Country Programme.

Socioeconomic context in the FSM

As of 2018, FSM had a total GDP of USD 401.9 million (current prices).[52] The breakdown of GDP by industry sector includes the following:

- Agriculture.
- Hunting and forestry (16%).
- Real estate, renting and business activities (13%).
- Education (11%).
- Public administration (11%).
- Wholesale and retail trade (11%),
- Fisheries (9%).
- Transport, storage and communications (6%).
- Health and social work (5%).
- Finance (4%).
- Construction (2%).
- Utilities (2%).
- Hotels and restaurants (2%).
- Other miscellaneous activities (1%).

GDP per capita in constant prices differs per State, with Yap having the highest (USD 3,468) followed by Pohnpei (USD 3,393), Kosrae (USD 2,344), and Chuuk (USD 1,436). GDP per capita across all FSM was USD 2,408 in 2018. The unemployment rate as of the last national census (2010) was 9%, although the jobless rate is much higher. The private sector employs the most individuals (7,282) followed by State governments (4,740), public enterprise (854) and federal government agencies (795).[53] In total, municipalities employee 360 individuals.

The minimum wage in FSM is USD 2.65 per for individuals employed within the national government. For State government works, the minimum wage differs per State: USD 2.00 in Pohnpei, USD 1.25 in Chuuk, USD 1.42 in Kosrae and USD 1.60 in Yap. Additionally, Pohnpei State has a separate minimum wage of USD 1.75 for private sector workers. Although incomes have risen by approximately 18.85% between 2004 and 2018, inflation has reduced real wages. Average annual income has decreased from USD 6,627 to USD 4,961.[54]

In addition to tax revenue, revenue from the sale of tuna fishing licenses for FSM waters and captive insurance, FSM receives economic assistance and other monetary and non-monetary benefits from the United States through the Compact of Free Association (COFA).[55] The first COFA was negotiated in the early 1980s and signed into US law in 1986. In 2003, the Compact was renegotiated, and the amendments were approved by the FSM Congress in 2004. The renegotiated Compact will be in effect until 2023 and will ultimately provide USD 1.3 billion in economic assistance to FSM.

The ongoing global pandemic is projected to have consequences for the FSM economy over the coming years.[56] Construction, transportation and communications and the tourism sectors are estimated to shrink for at least the next fiscal year. Overall GDP is expected to decline by approximately 5% over fiscal year 2020 and 2% over fiscal year 2021. The private sector is expected to be the hardest hit, with an estimated private sector GDP reduction of 18.7% between 2019 and

[52] FSM Statistics – GDP, GNI & GNDI: FY2007 to FY2018.
[53] FSM Statistics – Labor Market and Participation.
[54] FSM. First Voluntary National Review on the 2030 Agenda for Sustainable Development.
[55] FSM. First Voluntary National Review on the 2030 Agenda for Sustainable Development.
[56] Assessing the Impact of COVID-19 on the Federated States of Micronesia Economy.

2021. The national government announced a USD 15 million pandemic stimulus package to mitigate the negative economic impacts of COVID-19. Additionally, projections are likely to change in the coming months as FSM and other nations around the world enact and retract policies related to travel and economic activity in response to the shifting realities of the pandemic (increased infection rates, development of a vaccine, etc.).

A Household Income and Expenditure Survey (HIES) was conducted by the government in FSM between 2013 and 2014. The HIES found that to meet basic caloric needs in FSM, one requires an average of USD 1.84 per adult per day and meeting all basic needs requires an average of USD 4.34 per adult per day.[57] Throughout FSM, approximately 10% of the population falls below the food poverty line and approximately 41% of the population falls below the total basic needs poverty line. The State of Chuuk has the highest proportion of its population that falls under the food poverty line (16.6%) and the total poverty line (45.5%) compared to the other States, whereas Kosrae does not have any individuals that fall under the food poverty line and approximately 21% of its population falls under the total poverty line. For most of FSM, the poorest individuals and households allocate more than half of their total expenditures on the purchase of food.

The HIES study highlighted several additional key findings on the socioeconomic context in FSM, which have been expanded upon below, by using composite indices and SDG indicator analysis:

- The Gini Coefficient at the national level is approximately 38.6%. Each State had a similar coefficient to the national level (Yap – 38.8%; Chuuk – 38.8%; Pohnpei – 37.7%; Kosrae – 37.1%).
- Poverty rates are higher in households with more children.
- There is a strong inverse relationship between the level of education and poverty which is observed.
- Female-headed households are poorer than male-headed households in all States.
- The poverty rate among workers in the public sector is lower than among workers elsewhere.

Composite Indices – For FSM, only the HDI is currently available as of July 2022.

Index (scale, organization)	rank / score
Human Development Index, out of 189 countries (UNDP)	136
Gender Inequality Index, out of 162 countries (UNDP)	n/a
Gender Development Index clustered with group (UNDP)	n/a
Global Gender Gap Index out of 153 countries (WEF)	n/a

National Aggregate Statistics – available indicators are presented below.

SDG1	Chosen indicators	Values

[57] FSM Statistics – Poverty Profile of the Federated States of Micronesia.

	% Of population below international poverty line % Of population below national poverty line % Of population below lower middle-income poverty line % Of population in multidimensional poverty % Of population vulnerable to multidimensional poverty % Of male-headed households (HHs) % Of female-headed households	15.4%[58] 41.2%[i] 38.7[ii] 20.4[iii] n/a n/a n/a

SDG 3	Chosen indicators	Values
	% Exposure to gender-based violence (lifetime probability) # Adolescent fertility rate, (modelled estimate, births per 1000 women) # Maternal mortality ratio (modelled estimate, per 100,000 live births) # Infant mortality rate (Modelled estimate, per 1000 live births)	32.8%[59] 43[60] 165[i] 10.2[ii]

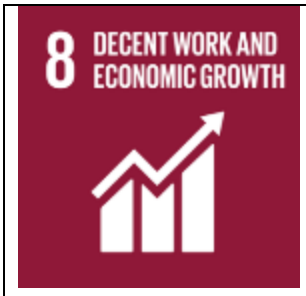
SDG 4	Chosen indicators	Values
	% Literacy rate, adult female % Literacy rate, adult male % Literacy rate, youth female % Literacy rate, youth male # Children out of school, primary, female # Children out of school, male % Progression to secondary, female % Progression to secondary, male	n/a n/a n/a n/a n/a n/a n/a n/a

SDG8	Chosen indicators	Values

[58, i – iii] World Bank (2019). Poverty and Equity Brief: https://databank.worldbank.org/data/download/poverty/95142451-550D-4C1B-A389-26FD74C6B018QA-2019/Global_POVEQ_FSM.pdf

[59 i – ii] https://evaw-global-database.unwomen.org/en/countries/oceania/micronesia-federated-states-of

[60] UNICEF (2013). FSM – Tracking progress in maternal and child survival: https://www.unicef.org/pacificislands/media/826/file/FSM.pdf

	% Labour force participation rate, female # Labour force, total % Vulnerable employment, female % Vulnerable employment, male % Wage and salaried workers, female % Wage and salaried workers, male % Employment in agriculture, female % Employment in agriculture, male % Of time, unpaid care work, female % Of time, unpaid care work, male	n/a n/a n/a n/a n/a n/a n/a n/a n/a n/a

2.3. Current Climate in FSM

Temperature

FSM has a tropical climate which exhibits little seasonal variation in temperature. Between 1901-2020, most of the islands have a mean annual ambient temperature of 27.1ºC[61], and there is less than 1.5 ºC variation between the hottest and coolest months.[62]

Precipitation

There is a dry season between November and April and a wet season between May and October. Because of its location in the north-west Pacific, FSM is affected by the Inter-tropical Convergence Zone (ITCZ), which results in heavy amounts of rainfall throughout the country.[86] Average annual rainfall is generally heavier within the eastern half of the country. The easternmost state of Kosrae has the most amount of average annual rainfall (516.4 cm) and the westernmost state of Yap has the least amount of rainfall (310.4 cm).

The country is affected by year-to-year climate variability due to the El Nino-Southern Oscillation (ENSO) (FSM Climate, 2015; CP, 2017). Due to the large geographic extent of FSM, the El Nino and La Nina phases of the ENSO affect the country in different ways. During El Nino, the more eastern state of Pohnpei experiences drier conditions during its dry season, but above average rainfall during its wet season. During La Nina, Pohnpei experiences above average rainfall during its dry season. The more western states of Yap and Chuuk experience overall increased rainfall during El Nino and less rainfall during La Nina.[63]

[61] World Bank Group, 'Climate Risk Country Profile: Micronesia' (World Bank Group 2021) <https://climateknowledgeportal.worldbank.org/sites/default/files/country-profiles/15818-WB_Micronesia%20Country%20Profile-WEB.pdf.> accessed 27 September 2022.

[62] Pacific-Australia Climate Change Science and Adaptation Planning Program, 'Current and Future Climate of The Federated States of Micronesia' (2015) <https://www.pacificclimatechangescience.org/wp-content/uploads/2013/06/7_PACCSAP-FSM-11pp_WEB.pdf> accessed 27 September 2022.

[63] Pacific Australia Climate Change Science and Adaptation Planning Program, 'Current and Future Climate of the Federated States of Micronesia'

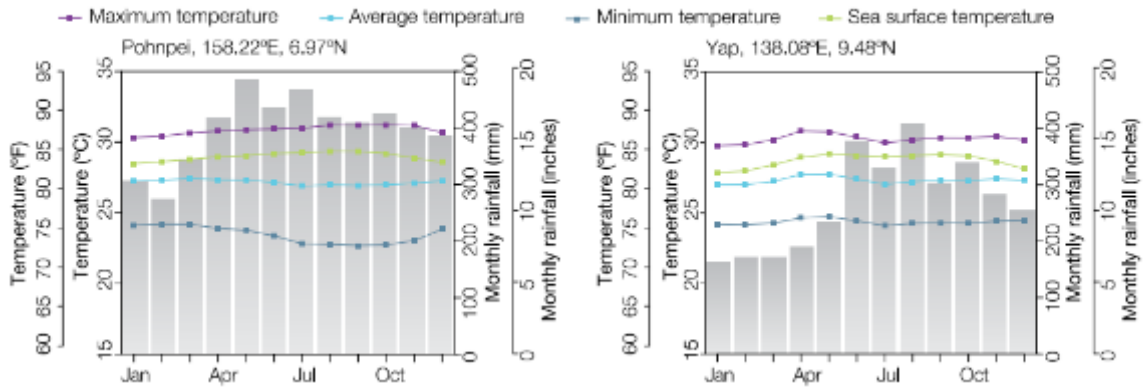


Figure 4- Seasonal temperature and precipitation in Pohnpei and Yap[87]

Extreme weather events

FSM is subject to droughts, typhoons, storm waves, and flooding events. Periods of drought and excessive rainfall are associated with different phases of ENSO. Above-average numbers of tropical storms occur due to ENSO events.

FSM are affected by typhoons between June and November. Between 1977 and 2010, 248 typhoons passed through or originated in FSM, averaging at 71 per decade. There is high variability from year to year in the number of typhoons, but they generally occur more frequently during El Niño years.[85]

2.4. Observed climate change in the FSM.

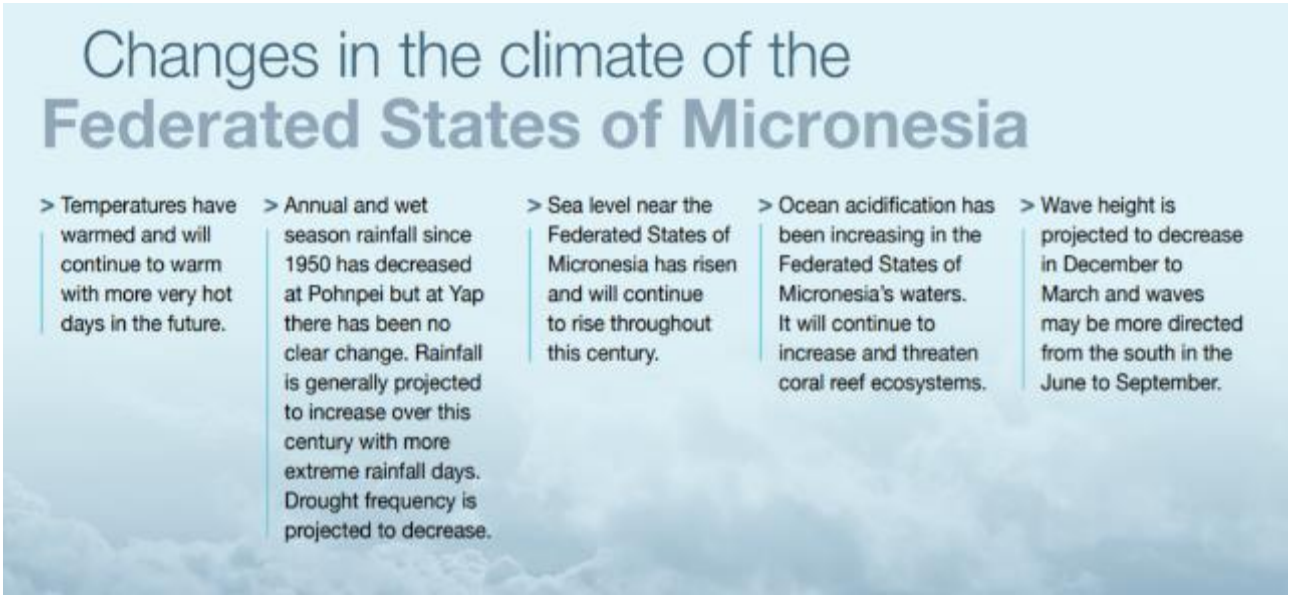


Figure 5- Observed changes in FSM (PACCSAP)

Temperature

Temperature data since the 1950s highlights a general warming trend for FSM. Annual maximum air temperatures at three sites across FSM (Pohnpei, Yap and Chuuk) have risen between 0.10°C–0.14°C per decade since the 1950s, according to World Bank research.[64] However, there is variation in air temperature trends within FSM. For the state of Pohnpei, the greatest trends involve minimum air temperature, whereas for Yap, the greater trends are observed in maximum air temperature. In terms of trends for seasonal and annual mean air temperatures, increases have been evident at both

[64] World Bank Group, 'Climate Risk Country Profile: Micronesia'

Pohnpei (1950–2009) and Yap (1951–2009), with Pohnpei's wet season (May–October) mean temperature increase being quite high at 0.24°C per decade. For the state of Pohnpei, the number of warm days and warm nights have also been increasing in line with global warming trends, although such extremes and trends in minimum temperatures at Yap are "not consistent with Pohnpei or global warming trends and may be due to unresolved inhomogeneities in the record".[65]

Overall, despite inconsistencies within FSM, findings are in line with the IPCC 6AR, which states that there is *high confidence* that mean temperatures in the Pacific SPCZ have increased since 1951.[66]

Precipitation

In terms of annual and seasonal rainfall patterns, analysis by the Australian Bureau of Meteorology and CSIRO (2014) highlights that there has been a statistically significant (at 5%) declining trend in May–October rainfall at Pohnpei, which may imply "either a shift in the mean location of the ITCZ away from Pohnpei and/or a change in the intensity of rainfall associated with the ITCZ".[67] Excluding this value in Pohnpei's wet season, the analysis found no statistically significant change in precipitation in Pohnpei and Yap wet and dry seasons.

Overall, according to FSM's Second National Communication to the UNFCCC, there have been declining trends in annual rainfall since the 1950s at Yap (declines of 0.31 inches (7.9mm) per decade), Pohnpei (−3.46 inches (−88mm) per decade), and Chuuk (−1.93in (−48.9mm) per decade).

In terms of daily rainfall patterns, only the negative trends in annual Very Wet Days (defined as amount of rain in a year where daily rainfall is greater than the 95th percentile for the reference period 1971–2000) at Pohnpei, and annual consecutive Dry Days (defined as less than 1mm of rainfall in a day) at Yap are statistically significant.[94]

Figures 7 and 8 summarize the trends in precipitation and temperatures for Pohnpei and Yap using average annual values.

[65] Pacific-Australia Climate Change Science and Adaptation Planning Program (PACCSAP), 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports' (2014), p.66. <https://www.pacificclimatechangescience.org/wp-content/uploads/2014/07/PACCSAP_CountryReports2014_WEB_140710.pdf>

[66] Gutierrez JM, Narisma GT and Jones RG, "Atlas," *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2021)

[67] PACCSAP 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports'

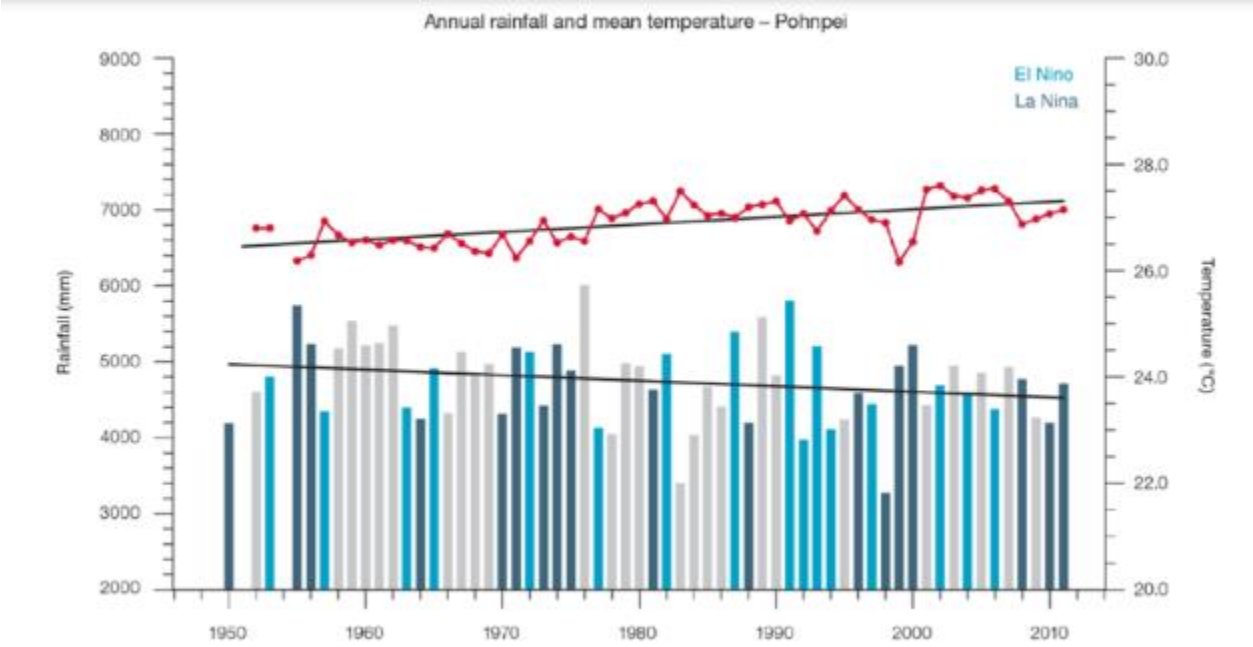


Figure 6- Annual average values of mean temperature (red dots and line) and total precipitation (bars) in Pohnpei. Grey bars denote neutral years.

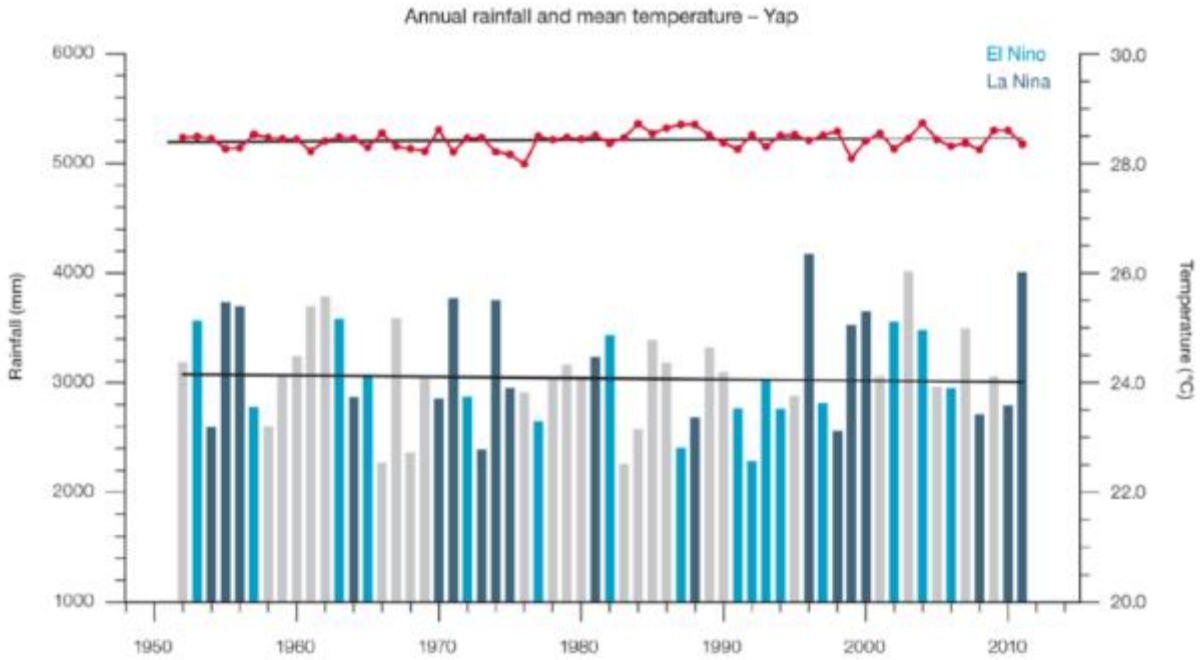


Figure 7- Annual average values for mean temperature (red dots and line) and total precipitation (bars) in Yap. Grey bars denote neutral years.[68]

Overall, there is little consensus in observed rainfall trends, with the IPCC 6AR stating that there is low confidence in a change in mean rainfall since 1951 for the SPCZ region, where FSM is located.[69]

[68] PACCSAP, 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports', p.70

[69] Gutierrez JM, Narisma GT and Jones RG, "Atlas," *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2021)

Extreme weather events

As previously mentioned, inter-annual variability in typhoon events is high, ranging from 0 (such as in 1999) to 12 in 1987. Typhoons are more frequent in El Niño years and neutral years, and less frequent in La Niña years. There have been 212 tropical cyclones, of which 37 (17%) were considered severe events between 1981 and 2011. ENSO patterns are associated with differences in typhoon frequency.

PACCSAP recommends against a country-scale assessment of the frequency and intensity of typhoons, which is why long-term trends for this aspect are not presented.[70]

Sea-level rise

Sea-level rise around FSM has been measured using satellite altimeters for the 1993-2010 period. The rise amounts to 10mm per year, larger than the global average of 3.2 ± 0.4 mm per year. **Error! Reference source not found.** shows how FSM compares to the rest of the Western-Pacific region, showing how it is located in an area where sea level has risen the most.

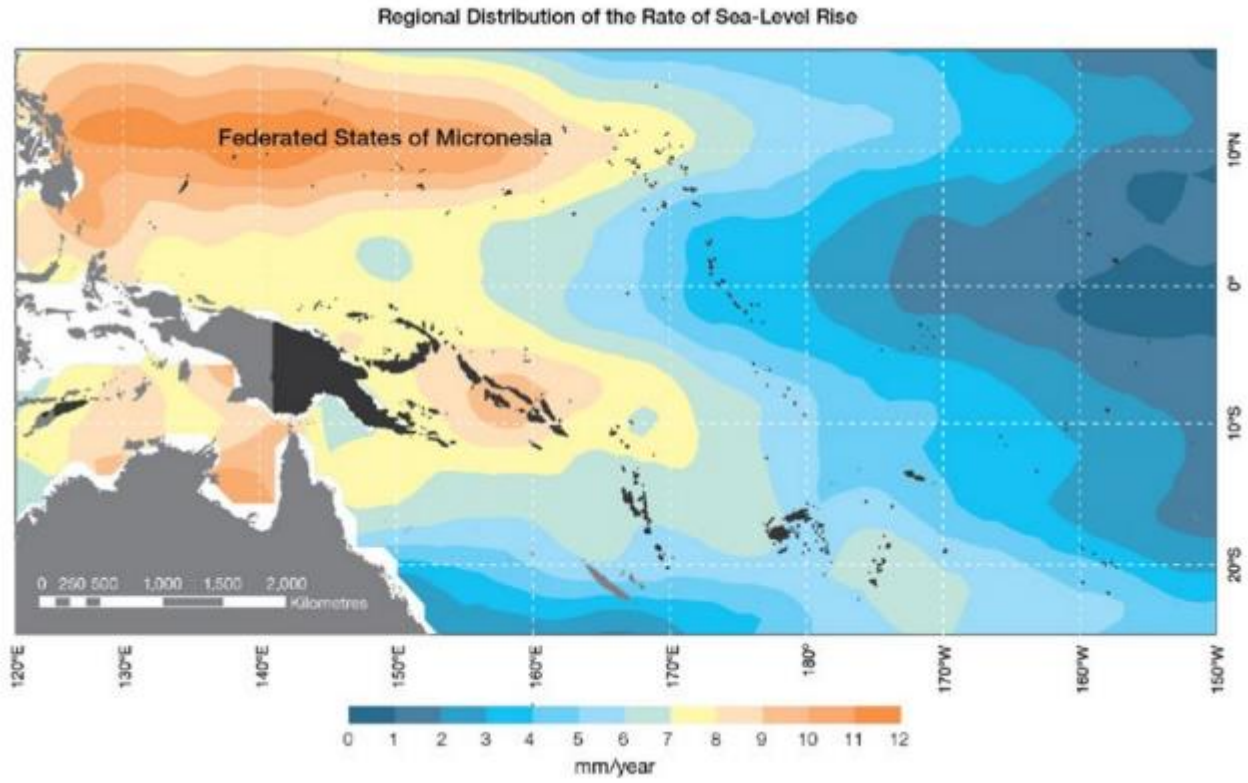


Figure 8- Regional distribution of sea-level rise between 1993-2010[71]

Ocean acidification

In other studies of coral growth, aragonite saturation states above 4 were optimal for coral growth and the development of reef ecosystems. Values between 3.5 and 4 are deemed adequate, while values between 3 and 3.5 are considered to favour marginal coral growth. In the FSM region, ocean aragonite saturation rates have declined from 4.5 in the late 18th century, to an observed value of 3.9 ± 0.1 by 2000, indicating an increasing trend in ocean acidification.

[70] PACCSAP, 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports',

[71] "Chapter 4- Federated States of Micronesia", *Climate Change in the Pacific- Scientific Assessment and New Research- Volume 2: Country Reports* (PACCSAP, 2011) <https://www.pacificclimatechangescience.org/wp-content/uploads/2013/09/FSM.pdf> accessed 2022

2.5. Projected climate change in the FSM

Changes to climate that are projected for FSM include:

- An increase in annual mean ambient temperatures and extreme high daily temperatures.
- An increase in average annual rainfall.
- Decrease in the frequency of droughts.
- Increase in sea level rise.
- Increase in ocean acidification and coral bleaching.
- Increase in year-to-year variability in wave height.
- Increase in typhoon intensity (decrease in overall frequency) (FSM Climate, 2015).

Key predicted impacts of climate change are summarised below. Sources include Climate Information summary reports[72], the Pacific-Australia Climate Change Science and Adaptation Planning (PACCSAP) and the IPCC 6th Assessment Report.

Temperature

All models show an increase in temperatures in the Federated States of Micronesia. Under an RCP 4.5 (Medium emission) scenario, many models predict an increase of 1.4°C-1.5°C in annual mean ambient temperature for the period 2041-2070, and of 1.8°C for the 2070-2100 period, in comparison to the 1981-2010 baseline.[73]

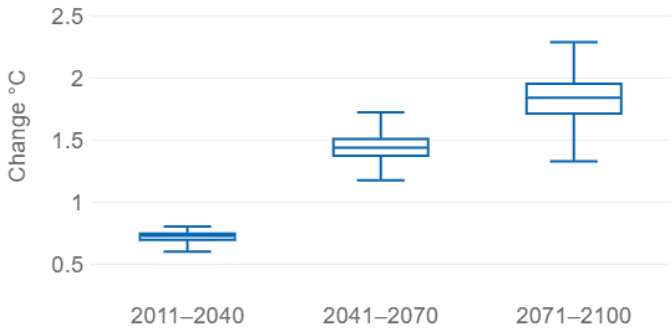


Figure 9- Annual mean temperature change for FSM for an RCP 4.5 scenario by obtaining the median from different models.

Under an RCP 8.5 (High emission) scenario, many models agree that mean annual temperatures will increase between 2°C and 2.3°C for the 2041-2070 period in comparison to the 1981-2010 baseline. For the 2071-2100 period, models predict an increase ranging from 3.5°C and 3.9°C in mean annual ambient temperature.[74]

[72]SMHI, Climate Information, https://climateinformation.org/, last accessed: (29 September 2022).

[73] SMHI, Climate Information, https://climateinformation.org/, last accessed: (29 September 2022).

[74] SMHI, Climate Information, https://climateinformation.org/, last accessed: (29 September 2022)

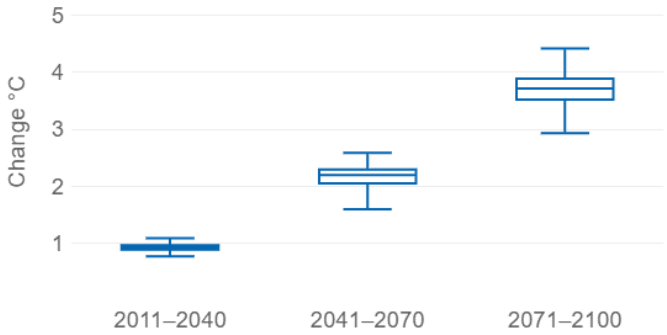


Figure 10- Annual mean temperature change for FSM for an RCP 8.5 scenario by obtaining the median from different models.

Similarly, PACCSAP predicts an increase in mean annual ambient temperature for all RCP scenarios across the western and eastern islands. For 2090, a temperature increase of between 2.1 to 4.1°C is projected for RCP8.5 (very high emissions) relative to a 1986-2005 baseline period. These findings are in line with the IPCC's data, which compiles over 30 models for the Equatorial Pacific Ocean region. By 2100, for an RCP 4.5 scenario, it predicts a 1.9°C increase and for RCP 8.5 an increase of 3.5°C using the same baseline as PACCSAP. Overall, despite using different intervals for projections, there is consensus that temperatures are projected to increase.[75]

Precipitation

For an RCP 4.5 scenario, annual mean precipitation is projected to increase by 3% for the 2041-2070 period, but little change for the 2071-2100 period in comparison to a 1981-2010 baseline period. Under an RCP 8.5 scenario, annual mean precipitation will increase by 2% in the near future (2041-2079), and by 9% for the 2071-2100 interval, using the same baseline period.[76]

However, the effect of climate change on precipitation in FSM is unclear due to natural variability in this region.[77] According to a PACCSAP analysis, there is general agreement between models that rainfall will increase under an RCP 8.5 scenario by 2090, but the magnitude of this change is unclear due to uncertainty over the future behaviour of ENSO.

[75] Iturbide, M., Fernández, J., Gutiérrez, J.M., Bedia, J., Cimadevilla, E., Díez-Sierra, J., Manzanas, R., Casanueva, A., Baño-Medina, J., Milovac, J., Herrera, S., Cofiño, A.S., San Martín, D., García-Díez, M., Hauser, M., Huard, D., Yelekci, Ö. (2021) *Repository supporting the implementation of FAIR principles in the IPCC-WG1 Atlas*. Zenodo, DOI: 10.5281/zenodo.3691645. Available from: https://github.com/IPCC-WG1/Atlas

[76] SMHI, Climate Information, https://climateinformation.org/, last accessed: (29 September 2022)

[77] PACCSAP, 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports'

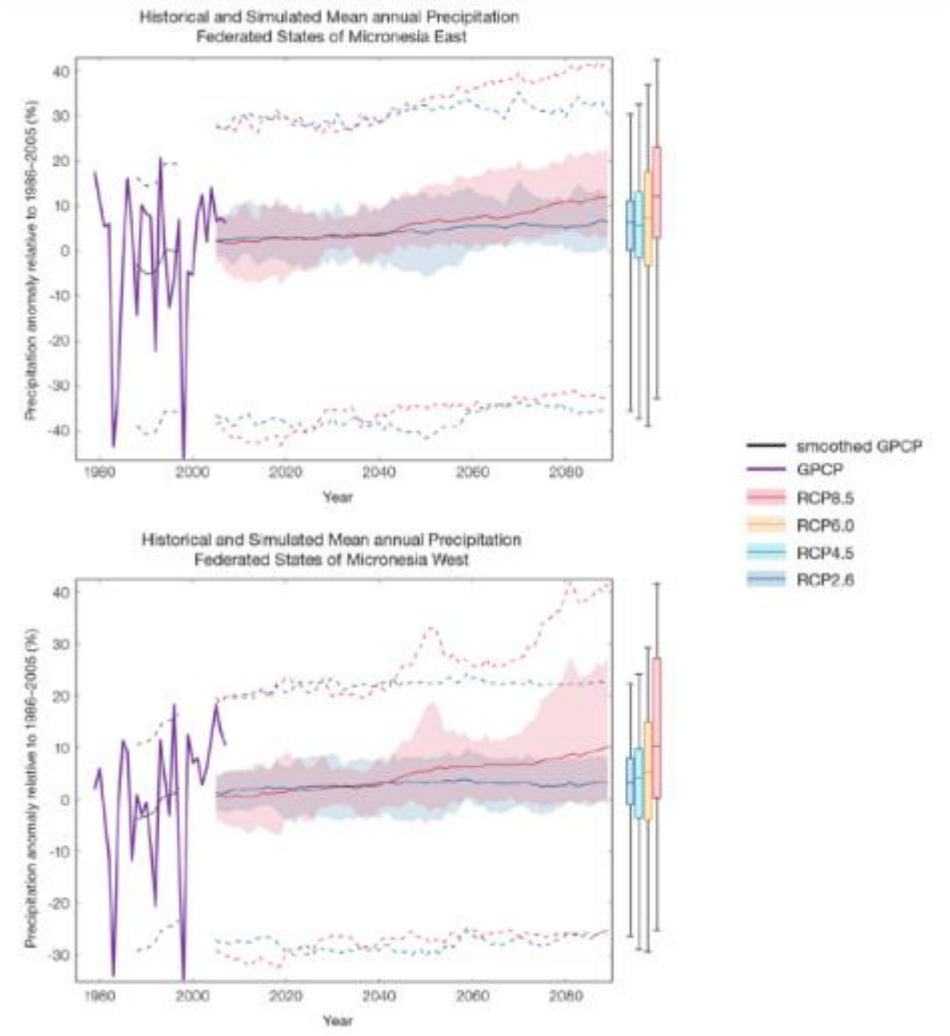


Figure 11- Historical and projected % precipitation increase in Eastern and Western FSM for different emission scenarios (1996-2005 baseline).[102.]

Extreme weather events

In terms of extreme rainfall, 1-in-20-year daily rainfall amount is projected to increase in the eastern part of FSM by approximately 38mm for RCP8.5 by 2090. The majority of models project the current 1-in-20-year daily rainfall event will become, on average, a 1-in-7-year event for RCP2.6 and a 1-in-6-year event for RCP8.5 by 2090. These projections use a 1986-2005 period as a baseline. Similar trends are projected for the western islands, where 1-in-20-year daily rainfall amount will increase by 47mm under RCP 8.5 scenario by 2090.[102] There is high confidence in an increase in frequency and intensity of extreme precipitation events because of a warmer atmosphere being able to hold greater moisture, but low confidence in the magnitude of this increase.[102.]

According to PACCSAP, the duration of droughts is expected to decrease under all scenarios for both the eastern and western FSM. There is medium confidence in the projections of drought frequency and duration because of the uncertainty in the magnitude of rainfall projections, and no consensus about projected changes in the ENSO, which directly influence droughts.

Sea-level rise

Under a high emission scenario (RCP 8.5), sea level is projected to rise between 41-90cm by 2090, relative to the 1986-2005 period according to the PACCSAP analysis. This statement is done with medium confidence due to uncertainty around projections on the Antarctic ice sheet contribution. This upward trend is in line with IPCC findings in the Pacific Equatorial region, where it is projected

that under an RCP 8.5 scenario, sea levels will rise by 70cm by 2100 relative to a 1995-2014 baseline.[78]

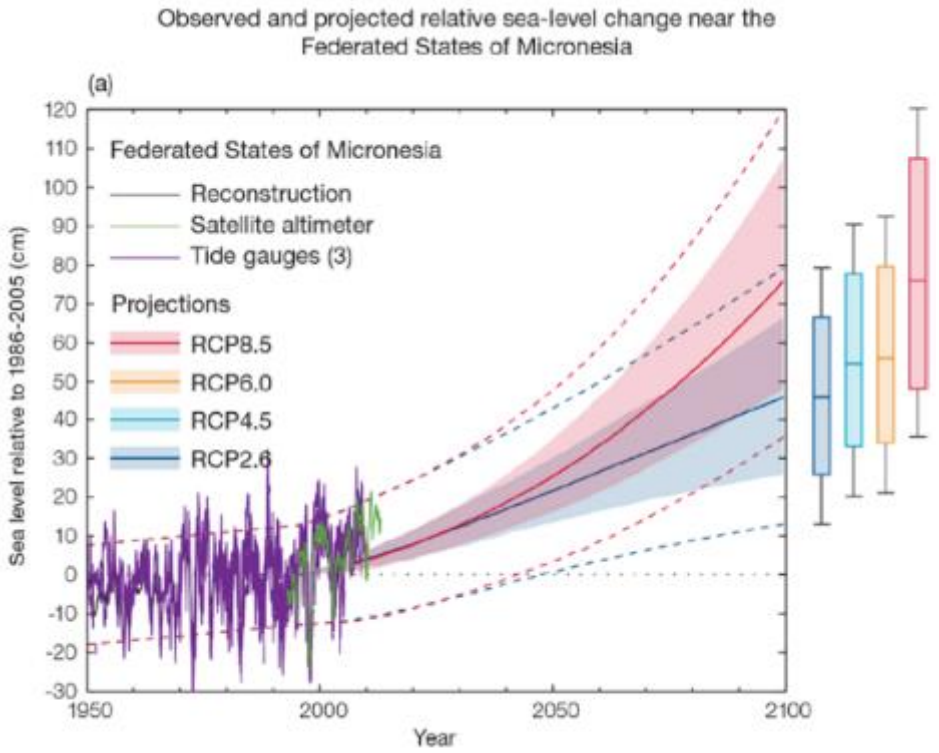


Figure 12- Sea level rise projections in the FSM region under different emission scenarios[79]

Ocean acidification

There is high confidence, according to PACCSAP, that ocean acidification will continue to increase as oceanic carbon dioxide concentrations continue to rise. Projections from all analysed models by PACCSAP indicate that for RCP 4.5 and RCP 8.5 scenarios, the aragonite saturation state will lower to approximately 3.5, which is deemed to provide marginal conditions for healthy coral reefs. For RCP 8.5, aragonite saturation states will decline until below 3, which seriously impacts the reef ecosystem and the services they provide.[101]

Overall, climate change is predicted to cause significant changes to weather patterns which will then directly result in different harvesting patterns than previously known. Intensified rain can cause overflow from watersheds, contributing to excess nutrient runoff that can affect seagrass beds, which are another critical spawning sites for many species (Houk, Golbuu, Gorong, Gorong, & Fillmed, 2013). Excessive nutrient runoff can also lead to severe algae growth that blocks light needed for plants, such as seagrass, to grow. When they die, the process of decay decreases the oxygen in the water killing fish, crabs, and other aquatic animals.

Changes in ocean temperatures and chemistry are altering the physiological functioning, behaviour, and demographic traits (such as productivity) of the marine environment leading to shifts in size, spatial range and seasonal abundance of aquatic species and populations. These changes are

[78] Iturbide, M., Fernández, J., Gutiérrez, J.M., Bedia, J., Cimadevilla, E., Díez-Sierra, J., Manzanas, R., Casanueva, A., Baño-Medina, J., Milovac, J., Herrera, S., Cofiño, A.S., San Martín, D., García-Díez, M., Hauser, M., Huard, D., Yelekci, Ö. (2021) *Repository supporting the implementation of FAIR principles in the IPCC-WG1 Atlas.* Zenodo, DOI: 10.5281/zenodo.3691645. Available from: https://github.com/IPCC-WG1/Atlas

[79] PACCSAP, 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports'

reducing the health of marine ecosystems and limiting their ability to provide both nutritional and protective services to the people of the islands. The project proposed here seeks to increase the resilience of these systems to combat the impacts on marine ecosystem services in the FSM.

2.6. Climate-induced vulnerabilities in FSM

FSM is among many small island countries with the highest vulnerability to natural hazards, including typhoons, droughts and flooding. Climate change has the potential to raise the frequency and intensity of these threats, bringing new threats, in the form of coastal flooding and seawater inundation from sea level rise. The highest elevation of low-lying atolls in the FSM is only a few metres above sea level. Under various climate change scenarios, there is a real possibility these low-lying atolls will see a considerable reduction of their landmass.

In a recent Vulnerability Assessment (2016) completed by the FSM Department of Finance and Administration in collaboration with the Pacific Community and the Green Climate Fund (GCF), the following impacts were noted by state of the FSM[80]:

- **For Yap:** Recent and current stresses include earthquakes, tsunamis, typhoons, flooding, drought, and high seas storm surges in its outer islands.
- **For Chuuk:** Droughts, typhoons, tropical storms, storm-waves, flooding, landslides, and high sea surges in its outer islands.
- **For Pohnpei:** Droughts, variable rainfall patterns, typhoons during El Nino periods, tropical storms, landslides and high sea levels during El Nina.
- **For Kosrae:** Tropical storms and typhoons, drought, landslides, higher than normal high tides, large sea swells, increased impact of storm surges and flooding as a result of sea level rise.

More than 80% of communities in the FSM are vulnerable to sea-level rise and flooding, given that most villages and settlements are situated in atolls, coastal areas or in areas around rivers and streams. Salt-water intrusion is intensifying in coastal wetlands and groundwater systems and freshwater lenses on outer islands are increasingly vulnerable. The continued rising of sea surface temperatures has already led to the increased intensities of tropical typhoons in the region. In April of 2015, Typhoon Maysak, a category 5 super-typhoon, caused widespread devastation across both Chuuk and Yap with high winds, sea level inundations and heavy rainfall. Nearly 29,000 people, or more than a quarter of the country's population, were directly affected by the storm across the FSM, with costs for recovery exceeding $8.5 million dollars.

While the islands were still reeling from the ongoing effects of Typhoon Maysak, a severe drought caused by considerably lower than usual seasonal rainfall in early 2016 led the President of the FSM to declare a National State of Emergency. The severity of the 2016 drought across the region led local and international government agencies evaluating the situation to proclaim it the worst drought in recorded history.

This climate change concern is also present for Kosrae and other high islands in the nation. Due to sea level rise, high islands are experiencing a reduction of their landmass with increased land fragmentation. The road and other coastal built infrastructures are impacted by coastal flooding and erosion. Coastal taro swamps and farmlands are also being inundated and destroyed by the sea water. The isolation from major markets and dependency on imports by sea and air means food

[80] FSM Department of Finance and Administration (2016), Rapid Vulnerability Assessment Report: Federated States of Micronesia Readiness Phase. Pacific Community, Green Climate Fund

security and livelihoods on the vulnerable FSM States can be seriously impacted by natural hazards and climate change.

The Global Climate Risk Index (GCRI) ranks FSM as the third most at risk country amongst peers in the Pacific SIDS considering the long-term GCRI (1998–2017). Many factors contribute to FSM's vulnerability. These include:

- Traditional land use and tenure.
- Unstable slopes in the high islands.
- Complexities in groundwater availability.
- Conflicting plans for watershed use by owners and various groups.
- Limited understandings on climate change risks.
- Data gaps.
- A lack of adequate financing (IMF 2019).

There is little public land, and land ownership is a complex and traditional foundation of political power in FSM. These issues converge to place FSM, especially communities on atoll islets and in other coastal settings, at the forefront of risk from climate change. Increases in temperature and intensified extreme weather have, for example, the potential to lower agriculture output, increase vulnerability of critical infrastructure that threatens loss of access to basic services, depress labour productivity, and affect human health. Continued sea-level rises will impact coastal infrastructure and settlements located on or near the coast will be threatened.

Projected changes to climate change will impact terrestrial and marine ecosystems in FSM, of which its citizens depend on for subsistence and their livelihoods. Across FSM, 40% of land area is used for agricultural purposes and most crops grown in the country are used for subsistence. Endemic rainforests and other natural vegetation throughout the islands of FSM allow for a buffer between changing precipitation patterns and increasing ambient temperatures, which can negatively affect crop yields in agroforests. Approximately 55% of households engage in fishing activities in both reef and open ocean habitat, with most households fishing for subsistence purposes. The overall health and biodiversity in reefs and fisheries affect how these systems respond to climatic changes such as rising ocean temperatures and ocean acidification.

Additionally, the overall health of protected and natural areas affects the overall ability of FSM communities and infrastructure to adapt to sea level rise and increasing tropical storm and typhoon intensity. For example, mangrove forests provide a natural buffer to tropical storms and subsequent tidal surges.

Saltwater intrusion from rising sea levels and increasing extreme weather events such as storm surges has the potential to damage crops and contaminate freshwater supplies. Many people live within the coastal zone and are therefore vulnerable to climate related changes in precipitation, sea level, storms and coastal erosion. In addition, as drought and sea level rise are impacted by regional El Nino-Southern Oscillation processes, formerly self-sustaining atoll communities now rely on imported food and water during times of stress. Exacerbated by sea level rise, extreme king tides are causing intense coastal inundation that damages taro beds, soil, agro-forestry resources, and critical infrastructure along the coast, particularly on low lying atoll islets.

Both the oceanic and coastal fisheries in FSM depend on the natural habitats of the Pacific Ocean to sustain them, including coral reef ecosystems, mangroves and wetlands among others. These habitats also serve the important function of protecting villages and communities from storms and flooding, the intensity of which is expected to increase with climate change. Increases in sea level

rise, strong winds, ocean temperature and acidification have the potential to impact on natural resources, economy and livelihoods, with climate change impacts drastically reducing coastal fish catches as well as shifting oceanic fisheries out of their historical waters around FSM. Some projections indicate climate change will lead to Skipjack tuna biomass moving East by 2035 to 2050 (IMF 2019). The simulated effect of climate change on coral reefs is likely to reduce production of coastal fisheries, but to enhance habitats for freshwater fisheries and aquaculture. According to the analysis by IMF (2019), the potential economic benefits overall to the pacific region from an eastward shift in skipjack tuna could exceed the threats, if careful management of tuna fisheries is ensured.

FSM is vitally dependent on access to well-functioning and reliable transportation systems, in particular, maritime and air transport systems. When extreme events strike, which will become more likely and frequent with a changing climate, maritime transport becomes a critical lifeline for outer islanders to access food, water, energy supply, and emergency response services, making citizens of FSM who live on outer islands, particularly vulnerable to climate change risks.
Ongoing development practices in hazardous areas and areas close to the coast have enhanced levels of vulnerability and worsen the impacts of coastal hazards. In Kosrae, for example, most public infrastructure is located near the coast and are exposed to these hazards. Key human-induced drivers of vulnerability include:

- Sand and coral rubble removal from the reef flat.
- Beach mining (removal of sand, gravel, and cobble) from the beach, primarily for construction aggregates.
- Dredging of reef flats (e.g.: in front of the Tafunsak Village).
- Stream outlet repositioning or changing swamp drainage patterns and flows.
- Inappropriate building of seawalls and land reclamation in areas already prone to flooding.

2.7. Impacts of climate change in PAs

The growing body of research about the relationship between climate change and ecosystem health in the FSM confirms anecdotal observations that healthy, functional ecosystems are crucial to the success of climate change adaptation strategies. As described in the FSM's Second National Communication to the United Nations Framework Convention on Climate Change, the climate-change risks facing the country are increasingly documented through extensive vulnerability and adaptation assessments.

The following information is derived from FSM's State of the Environment Report (2018)

Terrestrial ecosystems

Watersheds and water: Managing watersheds in FSM is a priority. Land disputes and customary tenure systems mean that the establishment of watersheds has been a complicated process. The status of watersheds across the 4 states has been deemed "fair", and anthropogenic pressures such as land use and built developments will compound the effects of projected droughts and extreme weather events.[81]

40% of water resources in FSM exist as groundwater, which has been evaluated as "fair". In the main high islands, water quality is appropriate for domestic use. However, in outer islands, bacterial contamination of water is commonplace. Outer island residents rely on water catchment systems, as atoll islands are usually not big enough for wells. This means that outer islands are extremely vulnerable to El Niño and climate-change induced droughts because of the small rain catchment

[81] Federated States of Micronesia (2018) *State of the Environment Report.*

spatial area and low-lying topography. Furthermore, sea-level rise increases the risk of salt intrusion in the already sparse groundwater resources.

In terms of surface water quality, it was qualified as “poor” in the 2018 State of the Environment Report. Pohnpei and Kosrae’s surface water sources are main source of drinking water. In Yap, streams are dry for 20% of the year. Human pressures affecting surface water quality (poor waste disposal, piggeries, inadequate sanitation, deforestation) will be compounded by sea-level rise and extreme rainfall events.

Forests: Although forests in the FSM have a long history of disturbance from human settlement and use, which has influenced the forest structure and species composition over time, no major changes in forest structure were observed between 2006–2017. The largest expanse of forest, around 330km^{2,} is found within Pohnpei, while Yap contains the smallest forest of the four states with almost 70km^2.[82]

Mangroves: Mangroves in FSM are in a deteriorating trend. Although FSM mangrove forest showed a 6% increase, particularly in Chuuk with a 63% increase between 1976 and 2006, the states of Kosrae and Yap had a slight decrease in mangrove cover (2% and 3% respectively). A 2012 survey showed that approximately 10% of Yap’s extensive mangroves had died since 2006. Most of this loss of mangroves in Yap was attributed to the impact of typhoon Sudal, a category 3–4 cyclone, which passed over the state in 2004.

In Yap, the ability of mangroves to store carbon ranged from 853 Mg/ha in the seaward zone to 1,385 Mg/ha in the landward zone. Mangroves sequester about 34% of the carbon held by all of the island’s vegetation, although they compose only 12% of the land area of Yap’s main islands. Therefore, mangroves in FSM not only provide coastal protection and a habitat for fish nurseries but protecting them can provide mitigation co-benefits.

Marine Ecosystems:

Coral Cover: Coral reefs are important ecosystems for FSM communities who still depend on marine resources, both economically and culturally. There are three types of coral reef formations surrounding the islands: fringing reefs, barrier reefs and atolls. It has been suggested that of the 4,925 km2 of FSM’s coral reefs, 30% are under medium to high threat caused by local pressures, such as overfishing, land-based pollution, poor land use and urbanization (Chin et al. 2011; Houk et al. 2015).

While tropical coral reefs are among the most productive and important ecosystems in the world, climate change stressors are quickly affecting their ability to thrive, nourish, and protect marine species and protect the people and communities that depend on them. A rapid ecological assessment in Chuuk in early 2016 and recent assessments in Pohnpei and Kosrae found significant coral bleaching as evidence of this dangerous trend.[83] Intense coral bleaching is often followed by coral death, though corals can recover from mild bleaching events. Adding to the stress of high temperatures is the increasing acidification of the ocean, caused by rising levels of carbon dioxide in the air that is then absorbed by seawater. One of the impacts of ocean acidification is that less carbonate is available in the form necessary for coral reefs to build their calcium carbonate skeletons. The skeletons that these small coral polyps build are a fundamental building block of coral reef ecosystems, which are in turn, vital for the survival of communities in the FSM.

[82] Ibid

[83] Houk, P. et al (2016). Status and management of coral reefs and fisheries resources in Chuuk Lagoon and Kuop Atoll, Federated States of Micronesia. Technical report for the Nature Conservancy and the US Department of Interior

Reef Fisheries and marine species: Reef fisheries are deemed to be in “Fair” condition but are currently deteriorating. Currently, due to human pressures such as overfishing, more compromised fisheries are found in islands with high populations and low reef area. Cetaceans, turtles, rays and shark populations native to FSM are deemed to be in a “fair” condition. Climate change will impact migration, breeding and other parts of the life cycle. In turtles for example climate change can impact natural sex ratios of hatchlings due to beach temperature change as well as loss of nesting beaches through sea-level rise and extreme weather. Overall, ocean acidification and rises in temperature will aggravate the anthropogenic pressures that fisheries and endangered species face (marine pollution, unsustainable fishing practices etc.).

3. In profile: Palau

3.3. Context A: geography and demographics

Geography of Palau

Formerly known as the Western Caroline Islands, the Palauan island chain stretches about 400 miles from a north latitude of 7 degrees and 20 minutes to a southwestern latitude of 3 degrees and 30 minutes. Palau is 550 miles directly east of the Philippine Island of Mindanao. Guam is 815 miles to the northeast and Hawaii is 4,600 miles east. Palau's total land area is 188 square miles. Approximately 78% of this is the island of Babeldaob, the second largest island in the Micronesian Pacific after Guam.

Geologically, Palau varies from Kayangel atoll in the north, to islands of volcanic origin in the centre and the famous limestone "Rock Island" further south. Over 350 miles from Koror to the south are the seldom visited, sparsely populated "Southwest" islands. Koror is spread over three islands connected by causeways and bridges. A recently constructed 412-meter suspension bridge connects Koror to Babeldaob where the international airport is located. Much of the coastline around Koror is mangrove forest, and there are no natural sand beaches in Koror. Babeldaob, Koror, and the Rock Islands are protected by an outer reef several miles from shore. Palau has highly diverse terrain which varies geologically from the high, mountainous main island of Babelthuap to low, coral islands usually fringed by large barrier reefs. Land use in Palau is broken down as follows:

- Agricultural land (10.8%).
- Arable land (2.2%).
- Permanent pasture (4.3%).
- Forest (87.6%).
- Other (1.6%).[84]

Please see the Figure 14 in the next page for a map of Palau.

[84] CIA, The World Factbook (2018), Palau.

Figure 13: Map of Palau

Population dynamics in Palau

Palau has a population of 21,685, over 80% of which live in urban areas. Ethnic groups include Palauan (70%), Asian (mainly Filipinos followed by Chinese and Vietnamese) 28%, white 2%. Average life expectancy at birth is 72 years (69 years for males and 75 years for females). The median age of the population is 32 years old.

3.4. Context B: governance and socioeconomic baseline

Governance in Palau

Palau has a constitutional government in free association with the United States of America. The Compact of Free Association was entered into with the United States on 1 October 1994, also marking Palau's independence.

Palau has three branches of government:

- The President is directly elected and serves a four-year term. The President and Vice-President run on separate tickets. The Council of Chiefs, comprised of the highest traditional chiefs from each state, acts in an advisory capacity to the President on traditional laws and customs.
- The legislative branch, the Olbiil Era Kelulau (Palau National Congress), consists of two chambers, the Senate and House of Delegates. All legislators serve four-year terms.

- The judicial system consists of the Supreme Court, the Court of Common Pleas, and the Land Court. The Supreme Court has trial and appellate divisions and is presided over by the Chief Justice. Judges are appointed to life terms by the President with approval from Palau's National Congress.

Each of Palau's 16 states also elects its own governor and legislature.[85]

Socioeconomic context in Palau

Palau's economy is dominated by tourism, fishing, and subsistence agriculture. As of 2016, Palau's labour force was 11,610. 86.4% of the workforce are in the services sector, with 1.2% in agriculture and 12.4% in industry. The government is the largest employer of the work force.

Palau's economy relies heavily on financial assistance from the United States and the US Dollar is the official currency of Palau. Under the Compact of Free Association (Compact) with the US that took effect after the end of the UN trusteeship on 1 October 1994. The US provided Palau with roughly $700 million in aid for the first 15 years following commencement of the Compact in 1994 in return for unrestricted access to its land and waterways for strategic purposes. Palau's per capita GDP is one of the highest in the region (USD 15,232 in 2019[86]), is roughly double that of the Philippines and much of Micronesia.

Business and leisure tourist arrivals reached a record 167,966 in 2015, a 14.4% increase over the previous year, but fell to 138,408 in 2016. Long-run prospects for tourism have been bolstered by the expansion of air travel in the Pacific, the rising prosperity of industrial East Asia, and the willingness of foreigners to finance infrastructure development. Proximity to Guam, the region's major destination for tourists from East Asia, and a regionally competitive tourist infrastructure enhance Palau's advantage as a destination.

Composite Indices – For Palau, only the HDI is currently available as of July 2022.

Index (scale, organization)	Rank / score
Human Development Index, out of 189 countries (UNDP)	50
Gender Inequality Index, out of 162 countries (UNDP)	n/a
Gender Development Index clustered with group (UNDP)	n/a
Global Gender Gap Index out of 153 countries (WEF)	n/a

[85] Government of the Republic of Palau (2022). Available at: https://www.palaugov.pw/about-palau/#:~:text=Palau%20has%20a%20constitutional%20government,serves%20a%20four%20year%20term.

[86] World Bank Data (2019)

National Aggregate Statistics – available indicators are presented below.

SDG 1	Chosen indicators	Values
	% Of population below international poverty line % Of population below national poverty line % Of population below lower middle income poverty line % Of population in severe multidimensional poverty % Of population vulnerable to multidimensional poverty % Of male-headed households (HHs) % Of female-headed households	n/a 24.9% (2013) n/a n/a n/a n/a n/a

SDG 3	Chosen indicators	Values
	% Exposure to gender-based violence (lifetime probability) # Adolescent fertility rate, modelled estimate, births per 1000 women) # Maternal mortality ratio modelled estimate, per 100,000 live births) # Infant mortality rate modelled estimate, per 1000 live births) # Children under five mortality modelled estimate, 1000 births)	n/a 33.8% (2017) n/a 16.6 (2018) 17.9 (2018)

SDG 4	Chosen indicators	Values
	% Literacy rate, adult female % Literacy rate, adult male % Literacy rate, youth female % Literacy rate, youth male # Children out of school, primary, female # Children out of school, male % Progression to secondary, female % Progression to secondary, male	n/a n/a n/a n/a n/a n/a n/a n/a

SDG 8	Chosen indicators	Values
	% Labor force participation rate, female # Labor force, total % Vulnerable employment, female % Vulnerable employment, male % Wage and salaried workers, female % Wage and salaried workers, male % Employment in agriculture, female % Employment in agriculture, male % Of time, unpaid care work, female % Of time, unpaid care work, male	n/a n/a n/a n/a n/a n/a n/a n/a n/a n/a

3.5. Current climate in Palau

Temperature

Due to its location, Palau has a tropical climate with little seasonal variation. The average daily temperature in Palau is approximately 28 ºC, with a seasonal variation of approximately 0.8 ºC.

Precipitation

The wet season runs between May and October and the dry season between February and April. Palau is located relatively close to the Pacific Warm Pool and is influenced year-long by the Inter-tropical Convergence Zone (ITCZ) and the trade winds. This results in a relatively large amount of precipitation. Average annual rainfall in Palau is more than 240 cm per year.[87] There is high seasonal variability in precipitation, with El Niño years being drier and La Niña years experiencing longer wet seasons.

[87] Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports (2014) and Climate Change in the Pacific: Scientific Assessment and New Research. Volume 1: Regional Overview. Volume 2: Country Reports (2011).

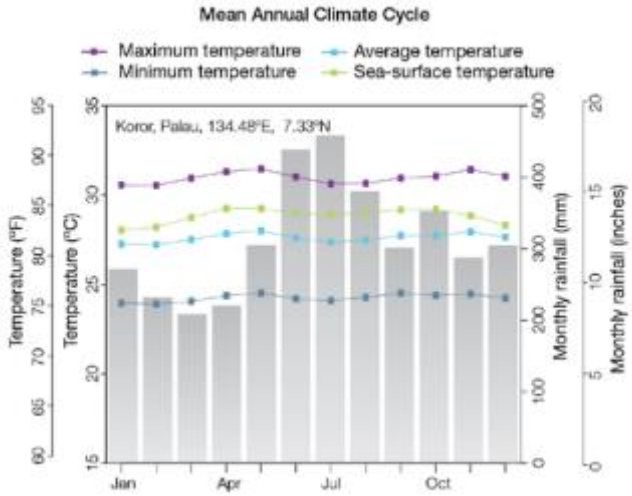


Figure 14- Mean monthly precipitation (bars) and temperature (lines)

Extreme weather events

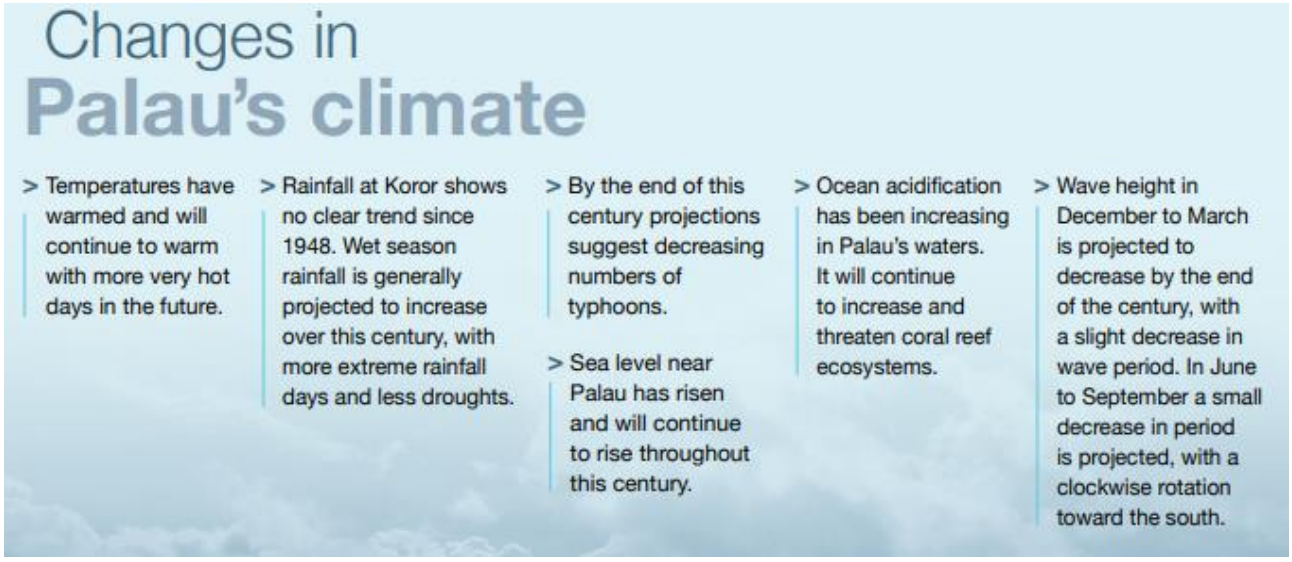
Additionally, Palau's climate is affected year-to-year due to the ENSO (Palau Climate, 2014). On the most populous island of Koror, El Nino events result in dry seasons that exhibit cooler and drier conditions and La Nina events result in wetter than average conditions. Due to its location south of the main typhoon zone, Palau is rarely affected by strong typhoons; however, the country still experiences damaging effects from tropical storms. Typhoon Haiyan – in 2013 – which was one of the most powerful tropical cyclones ever recorded, devastated parts of Kayangel in its wake, pictured in Figure 18.

Kayangel Island's village center and dock—as well as the island's primary area of taro production—before (left) and after (right) Super Typhoon Haiyan. Photos: Patrick L. Colin, Coral Reef Research Foundation.

Figure 15- Effects of Cyclone Haiyan in 2013 (Coral Reef Research Foundation)

3.6. Observed climate change in Palau.

Figure 16: Observed changes in Palau (Source: PACCSAP)



Temperature

Warming trends are observed in Palau. Since 1953, annual mean temperatures have increased at a rate of 0.10°C per decade, while annual maximum temperatures have increased by 0.20°C per

decade[88]eIn the Koror region, the annual number of warm days and warm nights have increased, with the annual number of cool days having decreased.[89]

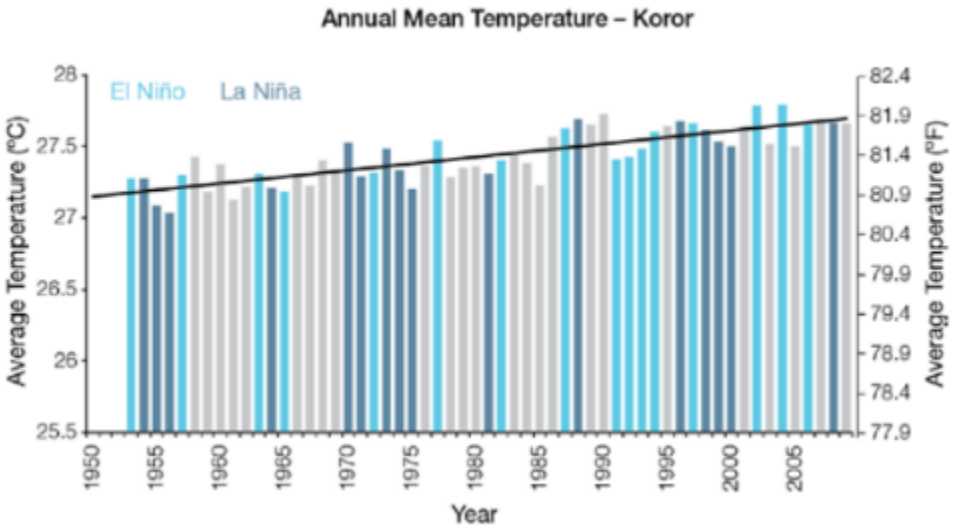


Figure 17- Annual mean temperature in Koror, Palau. Light blue bars represent El Niño years and dark blue represents La Niña years.[90]

Precipitation

In terms of precipitation,[111] studies have pointed to significant natural multi-decadal rainfall variability in the South Pacific Convergence Zone (which Palau is situated within). Observation records over 400 years shows that abrupt changes of ~1800 millimeters (mm) can occur between wet seasons, these often link to ENSO atmospheric circulation patterns. However, no changes in rainfall patterns significantly outside the range of normal inter-annual variation have been documented and linked to human-induced climate change.[91] Similarly, the IPCC AR6 states that there is little confidence in mean and extreme precipitation since 19511.[92]

Extreme weather

In the dry season, drought is sometimes a problem for Palau, and can become acute during strong El Niño conditions. The Western Pacific Monsoon is active in Palau and typically brings heavy rainfall between the months of June and August. Despite this, water rationing has been implemented in times of prolonged drought during the dry season. In March 2016, Palau became another Pacific

[88] Pacific-Australia Climate Change Science and Adaptation Planning Program (PACCSAP), 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports' (2014), <https://www.pacificclimatechangescience.org/wp-content/uploads/2014/07/PACCSAP_CountryReports2014_WEB_140710.pdf>

[89] Temperature and precipitation trends have been quoted from the World Bank Climate Risk Country Profile for Palau: https://climateknowledgeportal.worldbank.org/sites/default/files/2021-06/15820-WB_Palau%20Country%20Profile-WEB.pdf

[90]. "Chapter 10- Palau", *Climate Change in the Pacific- Scientific Assessment and New Research- Volume 2: Country Reports* (PACCSAP, 2011) <https://www.pacificclimatechangescience.org/wp-content/uploads/2013/09/Palau.pdf > accessed 2022

[91] Pacific-Australia Climate Change Science and Adaptation Planning Program (PACCSAP), 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports' (2014), <https://www.pacificclimatechangescience.org/wp-content/uploads/2014/07/PACCSAP_CountryReports2014_WEB_140710.pdf>

[92] Gutierrez JM, Narisma GT and Jones RG, "Atlas," *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2021)

Island nation to declare a state of emergency. Rainfall in the capital Koror had been at its lowest in 65 years over the previous four months (Feb−May), and the city's only dam had dried up, according to data from SPC. States with groundwater sources were particularly vulnerable because they relied on rain to recharge their groundwater sources and water lenses.

According to PACCSAP, typhoons tend to affect Palau between June and November. Between 1977 and 2011, 97 typhoons developed or crossed through Palau, with a high inter-annual variability. The differences between tropical cyclone average occurrence in El Niño, La Niña and neutral years are not statistically significant[93]. As for FSM, PACCSAP does not recommend a country-scale assessment of trends in intensity and frequency of typhoons.[119]

Sea level rise

Sea-level rise near Palau is at 9mm per year (measured since 1993), which is larger than the global average of 3.2 ± 0.4 mm per year. Figure 19 shows the regional distribution of sea level rise between 1993 and 2010, as well as where Palau is located.

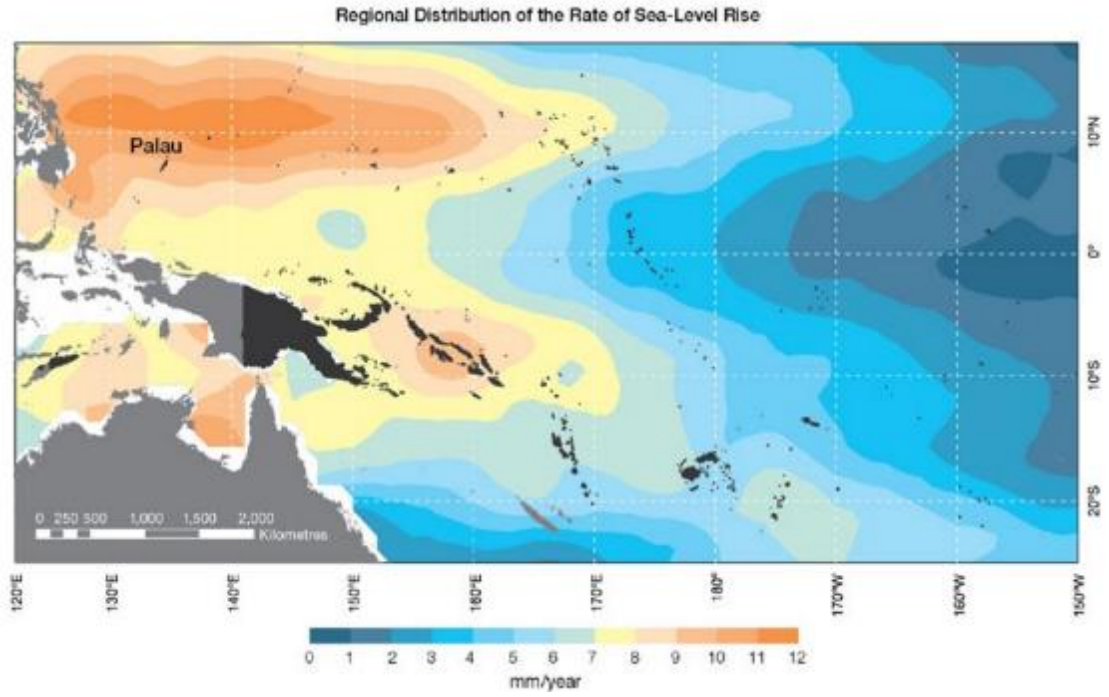


Figure 18- Sea level rise between 1993-2010 show in mm/year

Ocean acidification

As previously mentioned, seawater aragonite saturation states above 4 are considered to foster optimal coral growth and healthy reef ecosystems. In the Palau region, saturation rates have declined from 4.5 in the late 18th century to an observed value of 3.9± 0.1 by the year 2000. This is considered adequate for coral growth but points to the acidification of seawater in the region.

[93] PACCSAP 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports'

3.7. Projected climate change in Palau

Changes to climate that are projected for Palau include increases in annual mean air temperature and sea surface temperature, increases in extreme high daily temperatures, an overall increase in precipitation and additional extreme precipitation days, a decrease in typhoon intensity and frequency, increase in sea level rise and an increase in ocean acidification (Palau Climate, 2014). Key predicted impacts of climate change are summarised below and are taken from Pacific-Australia Climate Change Science and Adaptation Planning (PACCSAP) Program, the IPCC Atlas and the WMO, WCRP and GCF site-specific reports.

Temperature

Many models predict an increase in temperatures. Under an RCP 4.5 scenario, annual mean temperature is set to increase by 1°C for the 2041-2070 period and by 2°C for the 2070-2100 period, using a 1981-2010 reference period. Similarly, under a high emissions scenario (RCP 8.5), annual mean temperature is projected to increase 2°C for 2041-2070, and 3°C for 2071-2100, using the same baseline.[94]

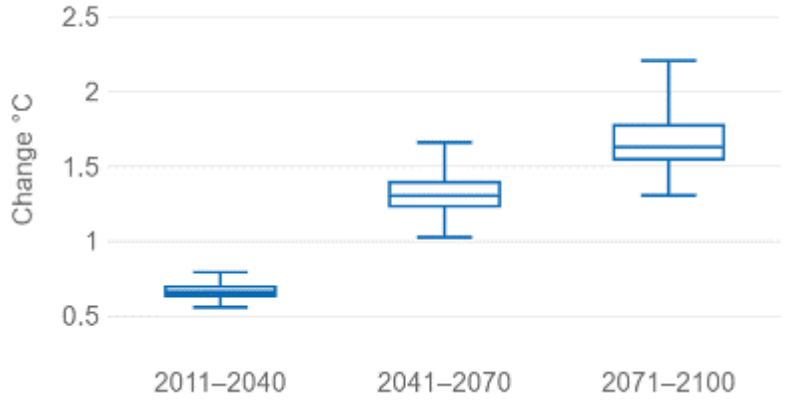


Figure 19-Annual mean temperature change projections based on the means of models collected by SHMRI for an RCP 4.5 scenario.

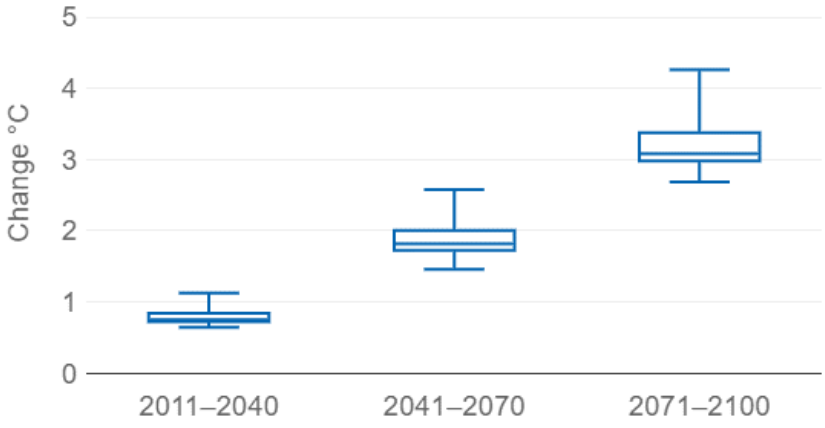


Figure 20- Annual mean temperature change projections based on the means of models collected by SHMRI for an RCP 8.5 scenario.

Similarly, PACCSAP research shows that projections for all emissions scenarios indicate that the annual average air temperature and sea-surface temperature will increase in the future in Palau. For

[94] SMHI, Climate Information, https://climateinformation.org/, last accessed: 29 September 2022

example, for RCP 8.5, there is a projected increase ranging from 2.1 °C to 4.0°C by 2090.[95] Increases in average temperatures will also result in a rise in the number of hot days and warm nights, and a decline in cooler weather.

Furthermore, annual and seasonal maximum and minimum temperatures have increased at Koror since 1951. Maximum annual temperatures have increased at a rate of 0.2°C per decade and mean temperatures have increased at 0.10ºC per decade (Figure11). The number of warm days and warm nights has increased since 1952. These temperature increases are consistent with the global pattern of warming and expected to continue on an upwards trend.

Precipitation

Like elsewhere in the Equatorial Pacific region, there is little consensus on precipitation projections. Under an RCP 4.5 scenario, climate change is not expected to have a notable impact on precipitation in the medium term (2041-2070), and will increase by 1% for the period 2071-2100, using a 1981-2010 baseline. Under an RCP 8.5 scenario, some models agree on a decrease by 4% in precipitation in the medium term (2041-2070), and a 1% decrease for 2071-2100, using the same reference period.[96]

PACCSAP presents that rainfall during the wet season is projected to increase over the course of the 21st century. However, there is some uncertainty in the rainfall projections and not all models show consistent results. Wet and dry years will still occur in response to natural variability.[97]

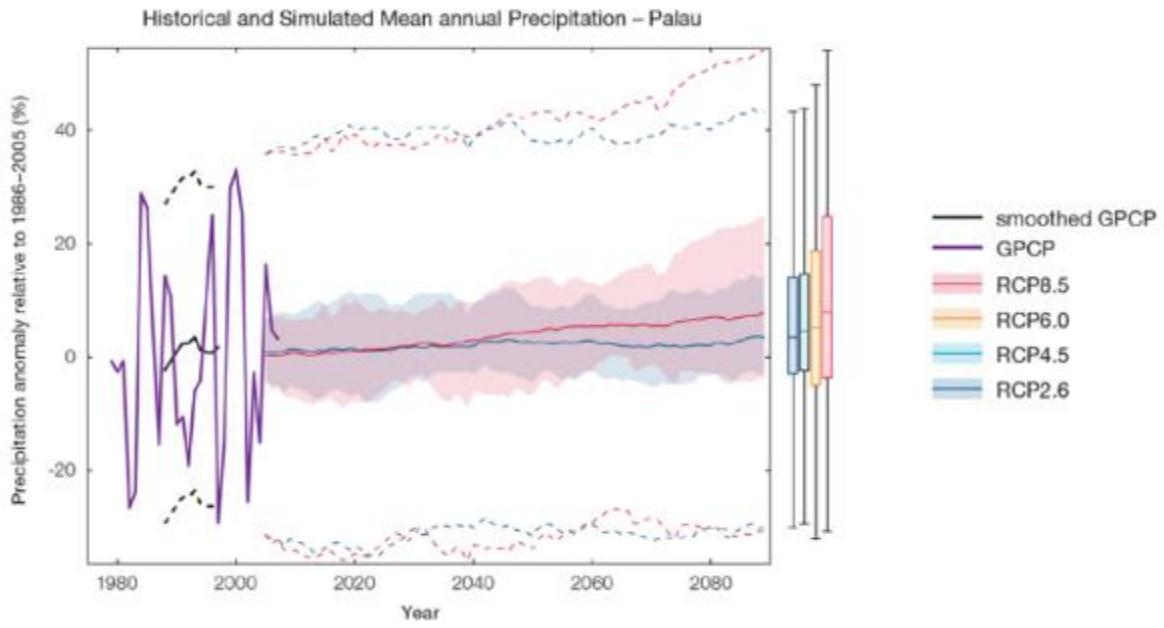


Figure 21- Mean annual precipitation projections for different emission scenarios, relative to 1986-2005 baseline.

[95] PACCSAP 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports'

[96] SMHI, Climate Information, https://climateinformation.org/, last accessed: 29 September 2022

[97] PACCSAP 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports'

Extreme weather

Wet season increases are consistent with the expected intensification of the West Pacific Monsoon and the Intertropical Convergence Zone. According to PACCSAP, there is high confidence that the intensity of extreme rainfall days will increase and become more frequent, due to a warmer atmosphere being able to hold more moisture. There is moderate confidence that droughts will become less frequent throughout this century because of this.[98] PACCSAP also states that there is moderate confidence that typhoons will decrease, but that projections show that the proportion of weaker storms will increase.

Sea level rise

Sea level is expected to continue to rise in Palau. By 2090, sea-level rise is projected to amount to a 20-60cm increase under a very high emissions scenario according to PACCSAP.[99] The sea-level rise combined with natural year-to-year changes will accentuate the impact of storm surges and coastal flooding. As there is still much to learn about sea level, particularly how large ice sheets such as Antarctica and Greenland contribute to sea-level rise, scientists warn larger rises than currently predicted could be possible.

As for other Pacific Island nations, sea-level rise threatens vital infrastructure, settlements, and facilities that support the livelihoods of island communities of Palau. Sea level is expected to continue to rise in Palau. Storm surges and coastal flooding will be exacerbated by sea-level rise combined with natural year-to-year variations.

Ocean acidification

Under all four emissions scenarios the acidity level of sea waters in the Palau region will continue to increase over the 21st century, with the greatest change under the very high emissions scenario. The impact of increased acidification on the health of reef ecosystems is likely to be compounded by other stressors coral bleaching, storm damage and fishing pressure. This is due to increased oceanic uptake of carbon dioxide. Projections show that aragonite saturation levels will reach below 3.5 by 2040, having a detrimental impact on reef ecosystems.[100]

For an RCP 8.5 scenario, the aragonite saturation state continues to strongly decline thereafter to values where coral reefs have not historically been found (under 3). Under RCP4.5 scenario, the aragonite saturation plateaus around 3.2.[101]

[98] Chapter 10- Palau", *Climate Change in the Pacific- Scientific Assessment and New Research- Volume 2: Country Reports* (PACCSAP, 2011) <https://www.pacificclimatechangescience.org/wp-content/uploads/2013/09/Palau.pdf > accessed 2022

[99] Chapter 10- Palau", *Climate Change in the Pacific- Scientific Assessment and New Research- Volume 2: Country Reports* (PACCSAP, 2011) <https://www.pacificclimatechangescience.org/wp-content/uploads/2013/09/Palau.pdf > accessed 2022

[100] Chapter 10- Palau", *Climate Change in the Pacific- Scientific Assessment and New Research- Volume 2: Country Reports* (PACCSAP, 2011) <https://www.pacificclimatechangescience.org/wp-content/uploads/2013/09/Palau.pdf > accessed 2022

[101] PACCSAP 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports'

3.7. Climate-induced vulnerabilities in Palau

Like other PICs, Palau is particularly vulnerable to the effects of disasters, including the impacts of climate change e.g., severe weather events and rising sea levels. Projected changes to Palau's climate will impact terrestrial and marine ecosystems throughout the country, where citizens depend on natural ecosystems for subsistence and their livelihoods. In Palau, approximately 25% of households operate land for agricultural purposes. Sea level rise is expected to result in increased saltwater inundation, which will negatively affect agricultural lands (particularly taro patches). Additionally, increased overall precipitation and extreme precipitation is expected to result in increased erosion and sedimentation, which will negatively impact water quality and, subsequently, agriculture and overall food security.

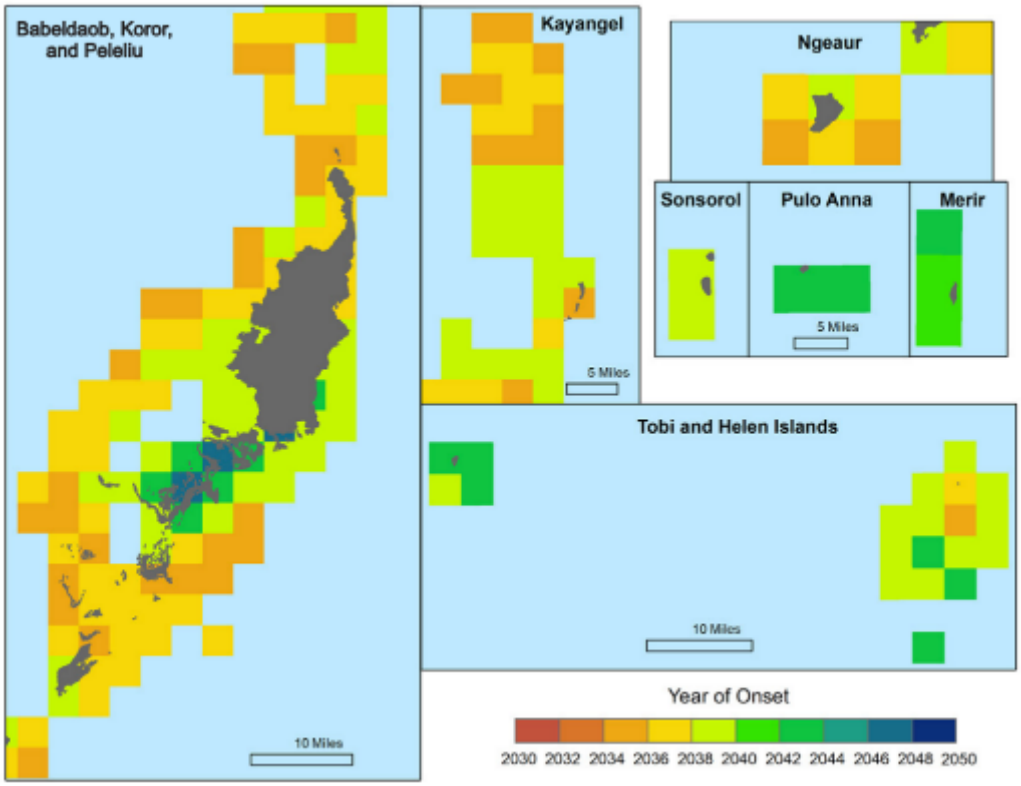
Protected areas such as mangrove forests act as natural defences for saltwater inundation. Forests and other terrestrial vegetation additionally provide protection against erosion caused by ongoing and extreme precipitation events. Regarding fishing, approximately 37% of Palau households engage in fishing activities. The overall health and biodiversity in reefs and fisheries effects how these systems respond to climatic changes such as rising ocean temperatures and ocean acidification.

Palau is also a popular eco-tourism destination (Palau had a total of approximately 90,000 foreign visitors in 2019 – more than five times the total population). A decline in the health and aesthetics of protected areas that attract international tourists will have a direct negative impact on a significant portion of the Palau economy. Coral bleaching – for example – is of particular concern.[102]

In Palau, 30°C is considered the threshold for initiation of coral bleaching, and Palau's corals were exposed to intense heat stress during the first global bleaching event in 1998, according to Colin (2009). Although Palau's reefs recovered, there is very high confidence that average sea surface water temperature will continue to increase in the western North Pacific. Thus, widespread coral bleaching is projected to occur annually in Palau by 2040, as shown in the figure below.

[102] https://www.eastwestcenter.org/system/tdf/private/climate-change-in-palau-pirca-2020-low-res.pdf?file=1&type=node&id=38811

Figure 22: Onset simulations for coral bleaching



3.8. Impacts of climate change in PAs

Increasing atmospheric temperatures and saltwater inundation because of climate change may threaten Palau's freshwater supplies, despite the island's abundant rainfall. Historically, Palau has had distinct wet and dry seasons, but these have become less distinct as storms have hit during traditionally drier months, and dry periods can occur when rain is expected. Typhoons and other severe storms have wreaked havoc on local infrastructure and fisheries, and an increase in storm frequency associated with climate change could pose a significant threat to Palau in the future.[103]

Terrestrial ecosystems:

Of relevance to terrestrial PAs in Palau, sedimentation is the primary source of pollution, and it degrades the quality of surface water. Poor erosion controls, the loss of riparian buffers, and poor land-use practices all contribute to sedimentation. Poorly maintained septic tanks, leaching from nearby landfills and saltwater intrusion pollutes the groundwater sources. Land-based pollution, as well as gasoline and oil from outboard motors and ships, have an impact on coastal water quality. The water quality in Palau may also face challenges such as sewage, chemical pollution, and oil spills from future development on the larger islands.[104]

Mangroves: 33% of mangroves are managed in some way, although given the importance of mangroves to food and climate security, the target for management is 75%. The number of mangroves in No-Take Protected Areas and the PAN is low. Mangrove MPAs appear to be

[103] https://info.undp.org/docs/pdc/Documents/2017%20Palau%20SOE_FINAL.pdf

[104] https://www.palaugov.pw/wp-content/uploads/2022/01/State-of-the-Environment-Report-Republic-of-Palau-2019.pdf

performing well.[105] Sea-level rise, increased rainfall and projected extreme weather events are all climate pressures that will affect mangrove cover, although their impacts are still unclear.

Forests: Despite being in a "good" condition according to the 2019 State of Environment Report, Palau's forests are highly vulnerable to climate change, and follow a negative trend.[106] Typhoons and storms damage vegetation: 88% of Babeldaob (Palau's main island) is at a slope of 12% or greater, the majority of the island is at medium to high risk of slope failure following intense rainfall events. This leads to the uprooting of trees and vegetation, for example. Moreover, higher rainfall accelerates erosion and loss of topsoil. Increased dry seasons will cause stress on tree species not adapted to droughts and cause wildfires (currently, there are 15 wildfires per year inside PAs).[107]

Marine ecosystems

Coral reefs: Over 60% of coral reefs are in good condition and 25% of reefs are in poor condition. With the exception of Eastern Outer Reefs, shallow reefs have recovered well from earlier bleaching and typhoon events. Some areas of Eastern Outer reefs are still recovering from 2012 and 2013 typhoon events. Projected temperature increases (and coral bleaching), ocean acidification and extreme weather events are all climactic hazards that will impact coral reefs in Palau. For example, in 2017, after tropical Storm Lan, Palau's Wester Outer reef suffered damage and from a decrease in live coral cover (3m depth: 34% to 19%, 10m depth: 50% to 41%), according to surveys conducted 2-3 weeks after the event. This is just an example to demonstrate the impact of extreme weather events on coral reefs, which will intensify due to climate change.[108]

Nearshore fisheries: Reef fisheries are particularly affected by the loss of coral cover (due to extreme weather events, ocean acidification and temperature increases). One study predicted a 76% decline in total reef fish catch in Palau by 2050, 50% of the decline due to climate change.[109] Fishery resources are impacted by seagrass cover decline as well. In one study, 4 MPAs were monitored annually, where it was found that seagrass cover declined in 2012 and 2013 by 30 to 50% from their 2011 level.[110]

[105] Republic of Palau (2019). *State of the Environment Report.* Available at: https://www.palaugov.pw/wp-content/uploads/2022/01/State-of-the-Environment-Report-Republic-of-Palau-2019.pdf

[106] Ibid.

[107] Ibid.

[108] Ibid.

[109] Barange, M. G. Merino, J.L. Blanchard, J. Scholtens, J. Harle, E.H. Allison, J.I. Allen, J. Holt, and S. Jennings (2014)" Impacts of climate change on marine ecosystem production in societies dependent on fisheries" *Nature Climate Change* 4: 211–216.

[110] Mereb, G., M. Gouezo, R. Johnatan, D. Odsulong, A. Isechal (2016) The importance of long-term monitoring to assess the effectiveness of seagrass beds within a marine protected areas network in Palau, Micronesia. ICRS 2016 Poster.

4. In profile: Republic of the Marshall Islands

4.1. Context A: geography and demographics

4.1.1. Geography of the Marshall Islands

The Marshall Islands is a Pacific Island state comprised of 1,200 small islands and islets, spread out across 750,000 square miles of ocean but just 70 square miles of total land mass. The capital Majuro is an atoll of 64 islands. Governmental buildings are housed on three fused islands on the eastern side of the atoll: Djarrit, Uliga, and Delap.

Figure 23: Map of the Republic of Marshall Islands

4.1.2. Population dynamics in Marshall Islands

The Marshall Islands has a population of approximately 79,906, which is spread out across its territory.[111] The population growth rate (as of 2020) was 1.43%. The main ethnic groups are Marshallese (92.1%), mixed Marshallese (5.9%).

Average life expectancy at birth is 74.4 years (76.7 years for females and 72.1 for males).

[111] CIA World Factbook (2022)

4.2. Context B: governance and socioeconomic baseline

4.2.1. Governance in the Marshall Islands

The Republic of Marshall Islands has mixed presidential-parliamentary system in free association with the United States of America. The Compact of Free Association with the United States entered into force on 21 October 1986, which also marked the Marshall Islands' independence. The National Government of the Marshall Islands is comprised of three branches:

- **Executive Branch:** The President is elected by Parliament from among its own members for a four-year term. The cabinet is selected by the President from among the members of Parliament.
- **Legislative Branch:** Bicameral National Parliament consists of: The Council of Iroij, a 12-member group of tribal leaders advises the Presidential Cabinet and reviews legislation affecting customary law or any traditional practice. Members are appointed to serve 1-year terms. ii) Legislative power resides in the Nitijela, which has 33 seats, with members elected by popular vote to serve for four-year terms. The Council of Chiefs is a 12-member body that advises on matters affecting customary law and practice.
- **Judicial Branch includes five tiers of courts:** The Supreme Court; High Court; District Court; Community Courts; and Traditional Courts.

Regional government is comprised of 33 municipalities.

4.2.2. Socioeconomic context in the Marshall Islands

The Republic of the Marshall Islands (RMI) is an upper-middle income Pacific Island economy. The national economy is small, with an annual GDP of around USD 240 million, and a per capita GDP of USD 4,000 and a 3.5 percent real growth rate. GDP is mainly derived of payments made by the United States under the terms of the amended Compact of Free Association.[112]

The remoteness of the RMI from major markets (2,300 miles from Honolulu, 1,900 miles from Guam, and 2,800 miles from Tokyo) severely impacts the economy. The Marshallese economy combines a small subsistence sector in the outer islands with a modest urban sector in Majuro and Kwajalein. In 2020, the share of agriculture in the Marshall Island'' gross domestic product was 21.76 percent, industry contributed approximately 12.8 percent and the services sector contributed about 67.17 percent.[113]

The RMI government is the country's largest public employer, employing approximately 46 percent of the salaried work force. The U.S. Army Garrison – Kwajalein Atoll (USAG-KA) is the second largest employer. A semi-modern service-oriented economy is located in Majuro and in Ebeye, on Kwajalein Atoll, and is largely sustained by government expenditures and by USAG-KA. Primary commercial industries include wholesale/retail trade, business services, commercial fisheries, construction, and tourism. Fish, coconuts, breadfruit, bananas, taro, and pandanus cultivation constitute the subsistence sector. However, as the land in RMI is not very nutrient rich, the agricultural base is limited. The RMI has a narrow export base and limited production capacity and

[112] CIA World Factbook (2022)

[113] Statista (2022).

is therefore vulnerable to external shocks. Export revenues in 2018 totaled USD 130 million.[114] Primary export products include frozen fish (tuna), tropical aquarium fish, ornamental clams and corals, coconut oil and copra cake, and handicrafts. The country is also developing its financial services industry, with a view to becoming an offshore banking locale. The RMI continues to rely heavily on imports and continues to run trade deficits (USD 63 million in 2018).

The Marshallese economy remains dependent on donor funding. The RMI is part of the former US-administered Trust Territory of the Pacific Islands that gained independence in 1986 and continues to use the U.S. dollar as its currency. Since independence it has operated under a Compact of Free Association with the United States. Since 2004, the U.S. has provided over USD 800 million in direct assistance, subsidies, and financial support to the Marshall Islands, equivalent to approximately 70 percent of the country's total GDP during the same period. The Marshall Islands has received additional aid from Australia, Japan, Taiwan Province of China, the United Arab Emirates (UAE), Thailand, the European Union, and organizations such as the Asian Development Bank.

The U.S., China, South Korea, Japan, Germany, and the Philippines are the Marshall Islands' major trading partners.

Composite Indices – For RMI, only the HDI is currently available as of July 2022.

Index (scale, organization)	rank / score
Human Development Index, out of 189 countries (UNDP)	117
Gender Inequality Index, out of 162 countries (UNDP)	n/a
Gender Development Index clustered with group (UNDP)	n/a
Global Gender Gap Index out of 153 countries (WEF)	n/a

National Aggregate Statistics – available indicators are presented below.

SDG 1	Chosen indicators	Values
	% Of population below international poverty line % Of population below national poverty line % Of population below lower middle income poverty line % Of population in severe multidimensional poverty % Of population vulnerable to multidimensional poverty % Of male-headed households (HHs) % Of female-headed households	n/a n/a n/a n/a n/a n/a n/a

[114] https://www.imf.org/-/media/Files/Countries/ResRep/pis-region/small-states-monitor/pacific-islands-monitor-issue-14-april-2021.ashx

SDG 3	Chosen indicators	Values
	% Exposure to gender-based violence (lifetime probability) # Adolescent fertility rate, (modelled estimate, births per 1000 women) # Maternal mortality ratio (modelled estimate, per 100,000 live births) # Infant mortality rate (Modelled estimate, per 1000 live births) # Children under five mortalities (modelled estimate, per 1000 births)	n/a n/a n/a 38 (2018) 46 (2018)

SDG 4	Chosen indicators	Values
	% Literacy rate, adult female % Literacy rate, adult male % Literacy rate, youth female % Literacy rate, youth male # Children out of school, primary, female # Children out of school, male % Progression to secondary, female % Progression to secondary, male	98% (2011) 98% (2011) 99% (2011) 98% (2011) n/a n/a n/a n/a

SDG 8	Chosen indicators	Values
	% Labor force participation rate, female # Labor force, total % Vulnerable employment, female % Vulnerable employment, male % Wage and salaried workers, female % Wage and salaried workers, male % Employment in agriculture, female % Employment in agriculture, male % Of time, unpaid care work, female % Of time, unpaid care work, male	29% (2011) n/a n/a n/a n/a n/a n/a n/a n/a n/a

4.3. Current climate in RMI

Temperature

RMI has a tropical climate with a relatively constant temperature year-round. The mean annual ambient temperature in 2019 in the capital Majuro was approximately 28ºC. The mean maximum air temperatures in the warmest months are less than 1ºC warmer than those in the coldest months.[115]

Precipitation

The dry season in RMI extends from December to April and the wet season extends from May to November. Due its location in the northern Pacific, RMI receives a relatively large amount of precipitation through the Inter-tropical Convergence Zone. Precipitation, however, varies between the north and south of the country. More northern atolls and islands receive approximately 125 cm of rain each year and more southern atolls/islands receive approximately 250 cm of rain each year.

Like FSM and Palau, RMI is affected by year-to-year climate variability due to ENSO (RMI Climate). In general, RMI experiences more precipitation during La Nina events. During El Nino events, RMI experiences warmer than normal wet seasons along with warmer and drier dry seasons.

Extreme weather events

RMI is subject to both typhoons and tropical storms, with more intense typhoons affecting the country during El Nino events. Typhoons affect the Marshall Islands between June and November. Typhoons and tropical storms are especially damaging in RMI as almost all of its population lives on low-lying atolls.

4.4. Observed climate change in RMI.

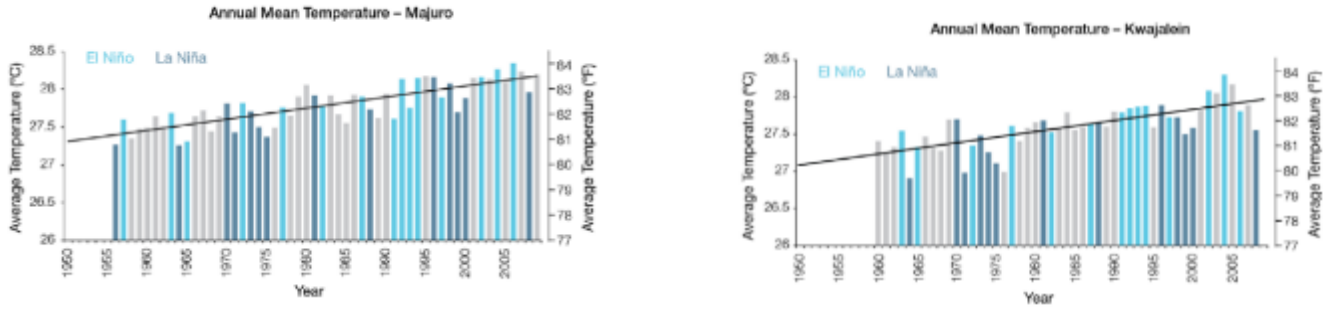
Figure 24: Observed changes in RMI (Source: PACCSAP)

[115] Chapter 7- Marshall Islands", *Climate Change in the Pacific- Scientific Assessment and New Research- Volume 2: Country Reports* (PACCSAP, 2011) <https://www.pacificclimatechangescience.org/wp-content/uploads/2013/09/Marshall-Islands.pdf> accessed 2022

Temperature

Since the beginning of weather monitoring in the RMI (1956 in Majuro and 1960 in Kwajalein), climate trends have been observed for both temperature and rainfall at both atolls. There have been observed increases in the annual and half-year mean temperatures at Majuro (southern Marshall Islands) since 1955 and at Kwajalein (northern Marshall Islands) since 1952, which are statistically significant at the 5% level. Maximum and minimum temperature trends at Kwajalein are much stronger compared to Majuro, although it seems that the rate of change has been faster at Majuro. Additionally, the frequency of Warm Days for the region has increased while the number of Cool Nights has decreased at both Majuro and Kwajalein. Average air temperature has increased by 0.3°C/decade in Kwajalein since 1960 and by 0.12°C/decade in Majuro since 1956 and the number of hot days and nights have increased at both locations.

Figure 25- Graphs showing annual mean temperatures in Majuro and Kwajalein. Light blue bars indicate El Niño years and dark blue bars indicate El Niño years.[116]



Precipitation

As for other PICs, there is little consensus on how climate change will impact precipitation patterns in RMI. Based on the RMI's Second National Communication to the UNFCCC, there is evidence of a decreasing trend in annual rainfall at Majuro (southern Marshall Islands), statistically significant at the 5% level, since 1954. Rainfall has decreased by 30mm/decade in Kwajalein since 1960 and by 77.4 mm/decade in Majuro since 1956. Analysis by PACCSAP shows that the decrease in rainfall in Kwajalein is not statistically significant.[117]

The main driver of rainfall in the RMI is the El-Nino Southern Oscillation (ENSO). Seasonal analysis by PACCSAP shows that decrease is statistically significant for dry seasons during the 1954-2009 period, but not for the wet seasons.

Following severe El Niño events, rainfall can be reduced by as much as 80% with the dry season beginning earlier and lasting longer. As a result, drought remains a common hazard in the RMI, particularly in the northern atolls.

[116] Chapter 7- Marshall Islands", *Climate Change in the Pacific- Scientific Assessment and New Research- Volume 2: Country Reports* (PACCSAP, 2011) <https://www.pacificclimatechangescience.org/wp-content/uploads/2013/09/Marshall-Islands.pdf> accessed 2022

[117] PACCSAP 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports'

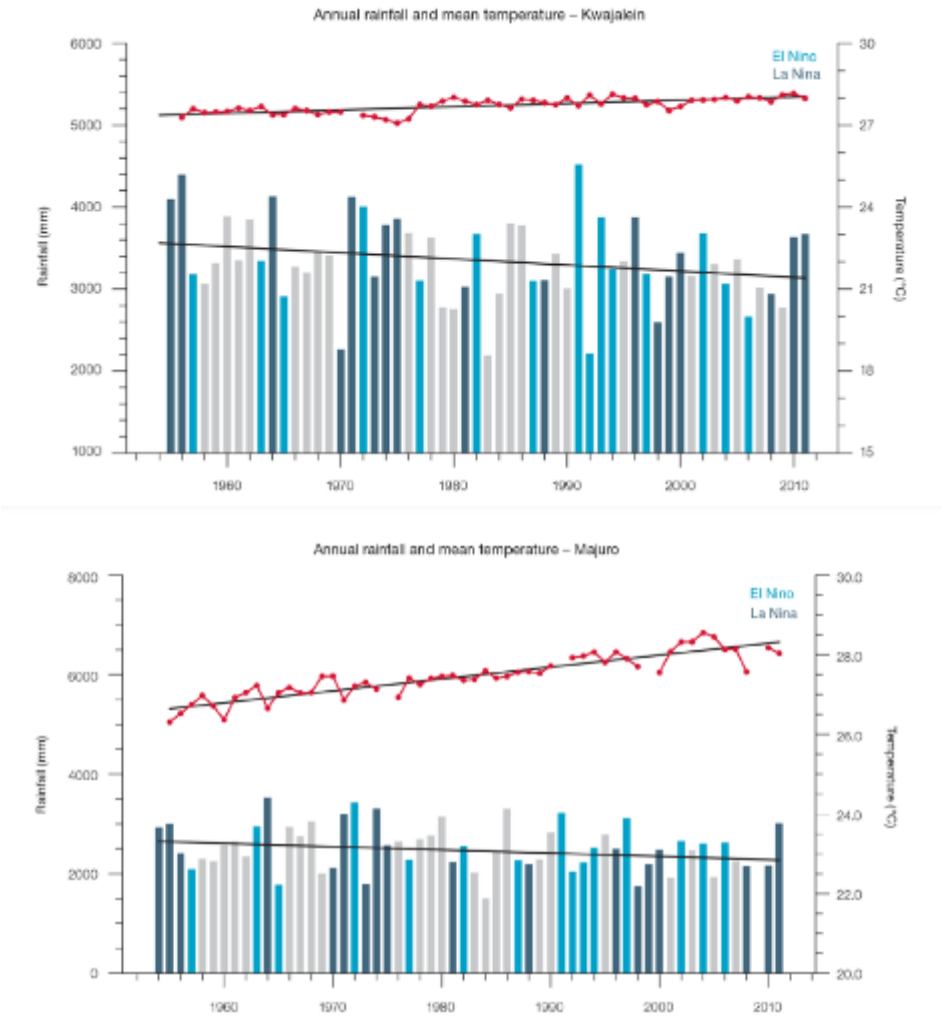


Figure 26- Annual rainfall and mean temperatures in Kwajalein and Majuro, RMI.

Extreme weather

Regarding rapid onset natural hazards, the RMI can be affected by typhoons, however these are relatively infrequent, with an average of 22 cyclones per decade being recorded between 1977 and 2011 and with 18% of these typhoons developing into severe events. Long term trends in frequency and intensity have not been presented as country scale assessment is not recommended in PACCSAP reporting.[118]

Sea-level rise

Because of the low-level topography of all RMI atolls (less than 3m in height), sea level rise (SLR) remains one of the most important climate change impacts facing the country and this is increasing in its acceleration. SLR is measured by one tide gauge location on Majuro atoll. Measured SLR increases in Majuro were 35 mm per decade for the period 1968–2018 and4.82mm, increasing to 49.2 mm per decade over the period 1993-2018 (RMI Climate Science Task Force 2022).

[118] PACCSAP 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports'

Similarly, PACCSAP's analysis since 1993 shows that sea level in the Marshall Island's region has increased by 7mm per year, which is more than the global average of 3.2 mm per year. This rise, however, is also partially linked to climate variability in the region.

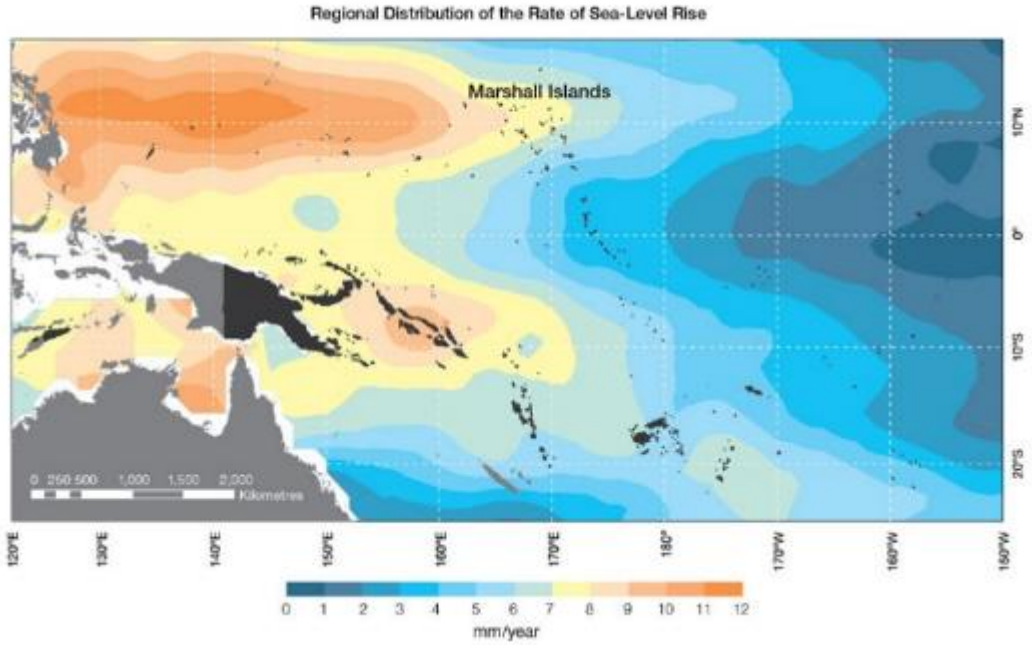


Figure 27- Distribution of sea level rise rates in the region, from 1993-2010[119]

Ocean acidification

Similarly to Palau and FSM, aragonite saturation levels near RMI have decreased from 4.5 in the late 1^{8t}h century to an observed value of about 3.9 ± 0.1 by 2000, favouring marginal coral growth. This threatens reef ecosystems.

4.5. Projected climate change in RMI

Changes to climate that are projected for RMI include an increase in annual mean ambient temperatures and extreme high daily temperatures, an increase in average annual rainfall and extreme rain events, decrease in the frequency but not in the duration or intensity of droughts, increase in sea level rise, increase in ocean acidification and coral bleaching, decrease in wave height during the dry season and an increase in typhoon intensity (decrease in overall frequency) (RMI Climate). Typhoons and tropical storms are especially damaging in RMI as the majority of its population live on low-lying atolls.

Key predicted impacts of climate change are summarised opposite (taken from Pacific-Australia Climate Change Science and Adaptation Planning (PACCSAP) Program. Information on projected climate change is taken from PACCSAP, the IPCC Atlas and the WMO, WCRP and GCF site-specific reports and summarise below.

[119] Chapter 7- Marshall Islands", *Climate Change in the Pacific- Scientific Assessment and New Research- Volume 2: Country Reports* (PACCSAP, 2011) <https://www.pacificclimatechangescience.org/wp-content/uploads/2013/09/Marshall-Islands.pdf> accessed 2022

Temperature

All models predict a temperature increase in RMI. For an RCP 4.5 scenario, there is a projected 1°C increase for 2041-2070, and the same for 2071-2100, using a reference period of 1981-2010. Under an RCP 8.5 scenario, a 2°C increase is projected for 2041-2070, and a 3°C increase is predicted for 2071-2100, using the same baseline period.

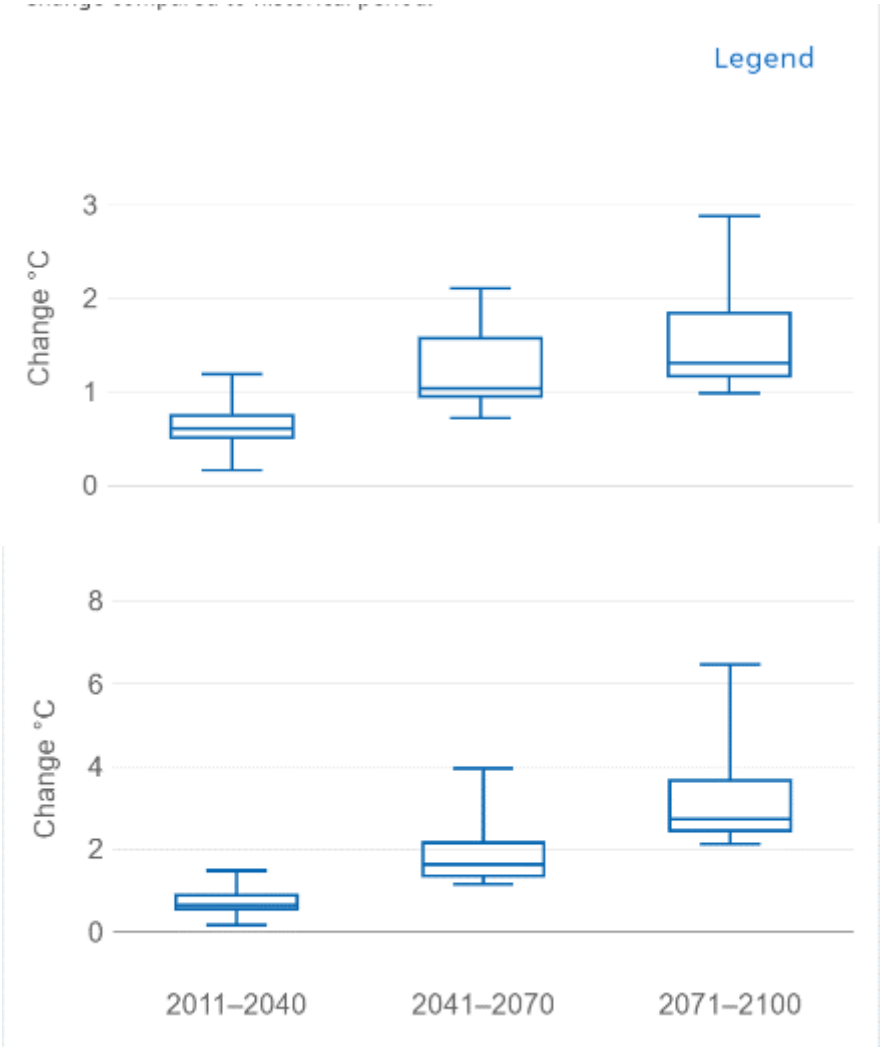


Figure 28- Annual mean temperature change projections based on the means of models collected by SHMRI for an RCP 4.5 scenario.

Figure 29- Annual mean temperature change projections based on the means of models collected by SHMRI for an RCP 8.5 scenario.[120]

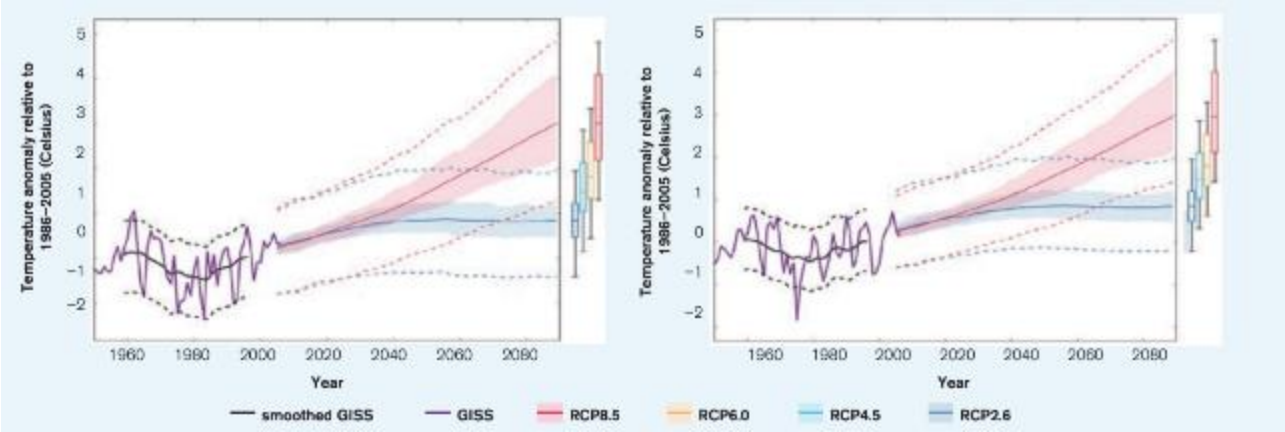
Similarly, PACCSAP predicts a warming of 2.2°C to 4.2°C under an RCP8.5 (very high emissions) scenario by 2090 using a 1986-2005 baseline. There is high confidence that the temperatures will rise, and this fits IPCC 6AR findings that in the Equatorial Pacific region, there will be an increase of 3.5 °C by 2100, using the same baseline as PACCSAP.[121]

The implication for RMI is that climate change is accelerating. The new projections indicate that 1.5°C global warming can be reached as early as 2030, as the figure shows below.

[120] [120] SMHI, Climate Information, https://climateinformation.org/, last accessed: 30 September 2022

[121] PACCSAP 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports'

Figure 30: Historical and simulated surface air temperature time series for the region surrounding the northern (left) and southern (right) Marshall Islands



Precipitation

Most models predict a precipitation increase in both wet and dry seasons, and an increase in average precipitation. This is especially true for high emission scenarios by 2090, whereas the impact of climate change on precipitation is not so clear in the short and medium-term, according to PACCSAP.[122]

Similarly, SMHI and the WMO's models project a 5% increase in annual mean precipitation by 2041-2070 for an RCP 4.5 scenario. In the longer term (2071-2100), the same increase is projected, using a 1986-2010 baseline. For a higher emissions scenario, (RCP 8.5) a 5% increase is projected for both medium (2041-2070) and the long term (2071-2100) using the same reference period.[123]

[122] PACCSAP 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports'

[123] SMHI, Climate Information, https://climateinformation.org/, last accessed: 30 September 2022

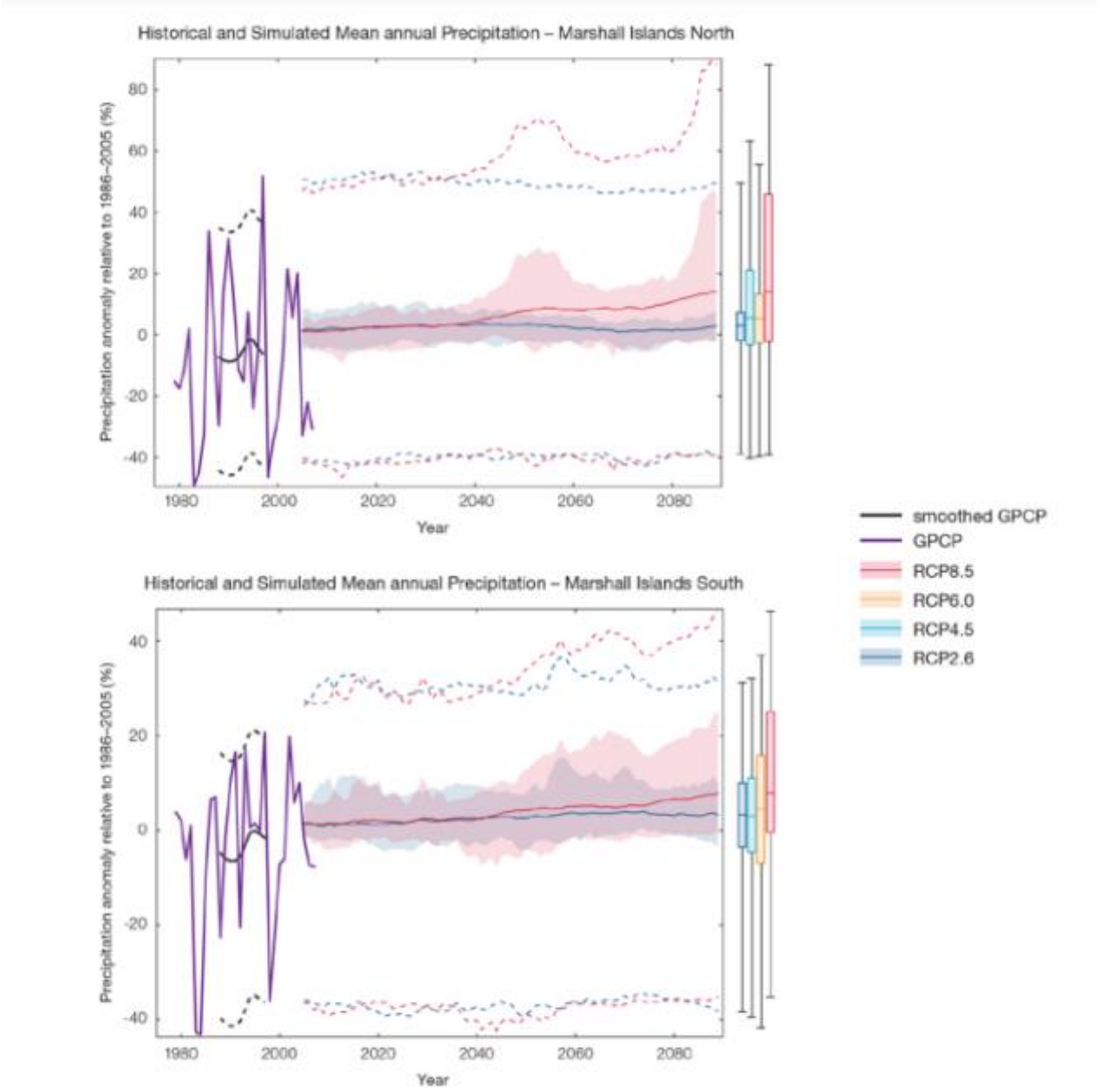


Figure 31- Mean annual precipitation under different RCP scenarios for the south and north islands[124]

Extreme weather

PACCSAP analysis shows that the frequency and intensity of extreme rainfall will increase. Under an RCP 8.5 emission scenario, the northern Marshall Islands will see 1-in-20-year daily rainfall event become, on average, a 1-in-5-year event by 2090. For the same conditions, the southern islands will see 1-in-20-year rainfall events become 1-in-6-year events by 2090. There is high confidence in the fact that these events will become more frequent and intense due to the fact that a warmer atmosphere can hold more moisture, but only low confidence in the magnitude of these rainfall events due to modelling biases and inconsistent models.[125]

[124] PACCSAP 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports'

[125] PACCSAP 'Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports'

The formation and frequency of typhoons are expected to decrease in the region. However, there is low confidence in this projection.

For both northern and southern islands, the proportion of time spent in droughts will increase with climate change, especially under RCP 8.5 scenarios. However, due to the uncertainties in precipitation projection associated with ENSO, there is low confidence in duration and frequency of drought durations.[141]

Sea level rise

PACCSAP models predict an increase of 41–92 cm by 2090 under the RCP8.5 scenario. There is medium confidence in this projection because of uncertainty of the extent of Antarctic sheet melting.

Although some of the projections are not significantly different between the present IPCC AR6 report and the previous IPCC AR5 report published in 2013 – 2014, for example, the high range for sea level rise under the very high emission scenario by 2100, these values are still higher than the previous one and indicate increased risks, and the acceleration of some climate processes such as the Greenland ice sheet is worrying. Despite these uncertainties, there is a clear mention of the possibility for extreme sea level rise due to ice sheet instability. This is considered a low likelihood, but high impact event, and it is not possible yet to provide more precise quantification regarding its likelihood due to deep uncertainties regarding the ice sheet instability. Sea level rise will therefore continue after 2100, even if global warming is limited to 1.5°C and under the low emission scenario so it is essential for RMI to plan for adaptation for higher sea level and more frequent and intense coastal inundation events.

Ocean acidification

There is high confidence that increasing carbon dioxide concentrations in the ocean will mean that aragonite saturation levels are low. By 2030, both RCP 8.5 and RCP 4.5 scenarios show that saturation states will be 3.5, which are marginal conditions for coral growth. Under RCP 8.5, after 2030, aragonite saturation rates will decline to below 3, which puts the entire marine ecosystem dependent on reefs at danger.

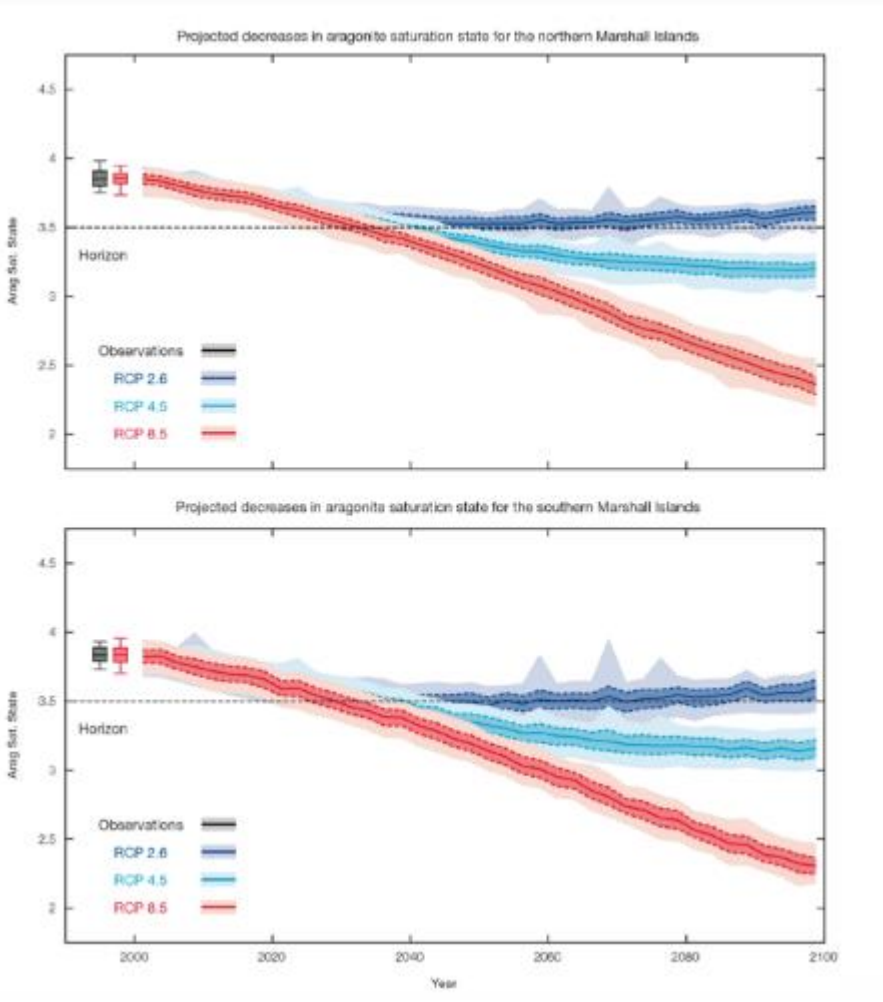


Figure 32- Projected aragonite saturation levels in the RMI region under different scenarios.[141]

Figure 33: Historical and simulated surface air temperature time series for the region surrounding the northern (left) and southern (right) Marshall Islands

4.6. Climate-induced vulnerabilities in RMI

Climate change will create different environmental, economic and societal issues for the RMI. The major issues will be caused by sea level rise and resulting saline intrusion that threaten the quality of groundwater conditions and hence the habitability of the RMI as a country. Likewise, temperature increase and changes in precipitation may also have consequences on health, food and water security and changes in the ocean may impact economic development and food security related matters.

Projected changes to RMI's climate will impact both terrestrial and marine ecosystems throughout the country, where citizens depend on natural ecosystems for subsistence and their livelihoods. As of 2014, approximately 19% of the population were involved in agricultural practices. Sea level rise is expected to result in salt-water inundation within RMI, which will result in contamination of the freshwater lens on numerous atolls/islands, and subsequently reduced food and water security. Protected coastal areas within RMI act as a buffer between saltwater intrusion and potable groundwater used for agriculture and drinking purposes. RMI and its citizens also rely heavily on reef and open-ocean fisheries for both subsistence and economic purposes. Reef and fishery health and biodiversity determine how these systems respond to climatic changes that are projected for RMI, including rising ocean temperatures and ocean acidification. In some places, coastal erosion induced by sea level rise may destroy coastal terrestrial habitats and reduce the services they provide to the population.

The urban communities of Majuro and Ebeye are characterised by high population density and the presence of essential infrastructures for public services and economic development. All these are threatened by more frequent and intense coastal inundation due to sea level rise. Although it is more difficult to measure and attribute to climate change, coastal erosion is also a very important issue in these urban communities where housing and infrastructure can be located very close to the coastline. Sea level rise is also expected to affect harbours, jetties and thus have an impact on trade from and to the RMI.

In addition to sea level rise, the high density of buildings and population in these urban communities may generate urban heat island effect where temperature is higher in the dense neighbourhood compared to the surrounding, less urbanised areas. When added to the general global warming, this may have impacts on health, energy demand and water demand. Finally, high density population may increase the risk of dissemination of diseases influenced by climate change such as respiratory illness, vector-borne or water-borne diseases. The urban community of Majuro is also the centre of processing of the offshore fishery sector and change in the ocean is projected to affect the distribution of tuna in the Pacific and thus the revenues from this activity for the RMI Government.

In the more rural neighbouring atoll communities, the issues mostly focus on food security and water security. More frequent and intense coastal inundation will lead to salinization of the groundwater reserve and the soil, limiting the yield of crops, an impact already observed in very low areas on Likiep. In addition, change in the rainfall patterns may also affect agriculture yields, in particular in the northern atolls that are already prone to drought. Changes in the ocean, in particular ocean warming, and ocean acidification is projected to have an impact on fish and other marine organism distribution affecting coastal fisheries. Both expected reduction of food supply from the agriculture and fisheries in the neighbouring atolls, making community members more dependent on imported food with health and financial consequences for the households.

Another issue for the rural neighbouring atolls is the perspective of the atolls becoming uninhabitable due to sea level rise. In this case, relocation to other, protected and elevated atolls are projected to

be one potential adaptation measure available and the consequences of this measure in terms of loss of land, loss of livelihood and community will need to be addressed.

4.7. Impacts of climate change in PAs

Marine ecosystems

For marine PAs in RMI, any change in biodiversity is linked to the degradation of coral reefs and their associated ecosystems due to ocean warming and ocean acidification. The frequency of intense coral bleaching events is projected to increase and globally most reefs will disappear if global warming reaches or exceeds 2°C. Ocean warming and acidification is expected to reduce the biodiversity in surviving reefs to the more resilient species and, as a result, to reduce the habitat of reef dwellers. Warmer coastal waters are also often associated with outbreak of fish poisoning (*ciguatera*).[126]

Three major impacts of climate change on MPA development of the RMI are foreseen. The changes in the ocean are expected to influence the distribution of tuna in the Pacific, leading to a decrease of tuna catch in the Marshallese water, resulting in a decrease of revenues from the selling of fishing licences and a limitation of the development of tuna handling and preparation in the RMI. The fisheries sector, and in particular the tuna fishery of the EEZ of the RMI, is the mainstay of the nation's economy. Fisheries represented 6.1% in GDP growth, and contributed 23% of the total growth, between 2003 and 2017, 41 and the sale of fishing rights generally represents about 14% of the RMI economy, according to the World Bank.

Terrestrial ecosystems:

The terrestrial environment in RMI is also projected to be affected with threats to tree's health, favourable environment for invasive species and difficulties for species to thrive. In the more rural atolls of the RMI, issues associated with pollution and overexploitation of resources make the ecosystem surrounding the urban settlements more vulnerable to the impacts of climate change.

For terrestrial PAs in particular, temperature increase due to climate change is expected to exacerbate water demand in the future. Climate change projections regarding rainfall indicate an increase in rainfall but with a very large uncertainty, some projections corresponding to a decrease in rainfall. In addition, the distribution of rainfall during the year is projected to change with a higher number of wet and very wet days. Heavy rain in the RMI is beneficial since it replenishes the water tanks and the groundwater lenses that people rely on for their drinking water and their crops and livestock; however, excessive rain may exceed the storage capacity in communities and lead to flood and decreased water quality. Increased sea level and seawater over wash may lead to the salinization of the groundwater resources rendering the water unsafe to use for drinking or agriculture. Once salinized, it takes time for the water lens to recover and become drinkable again, especially in the case of increased water demand, and it is expected that this recovery time may exceed the time between two over wash events leading to the destruction of this resource.

[126] Republic of the Marshall Islands (2016). *State of the Environment Report.*

5. National baseline: status of PAs, by country

These profiles were established using a combination of desk-based research and stakeholder consultations. A Climate Vulnerability Assessment and Climate Vulnerability Index exercise (CVA-CVI) was conducted with stakeholders to gain a better understanding of what EbA interventions would be appropriate. The findings of these exercises (Sections 5.1.6-5.1.9 and sections 5.2.6. and 5.3.6) showcase what was discussed during these consultations with local consultants. For information on the methodology of this exercise, refer to Appendix III. Some of the sections are incomplete due to time constraints during these sessions.

5.1. Federated States of Micronesia

5.1.1. Protected Area Overview

According to data collected in February and March 2023, the data available for PAs in FSM varies wildly across the 4 states due to their autonomy and the decentralised nature of PA management. A complete list of PAs per state can be found in Appendix IV of this Annex. According to the UNEP-WCMC database, FSM's protected areas total 491.25km^2, although from stakeholder consultations it is understood that this data is inaccurate.[127] The 2018 State of the Environment Report states that at least 15% of FSM's land mass is protected, and about 39% of nearshore marine area is under some form of management.[128] In terms of governance, 2 protected areas have unreported governance, 2 protected areas are reported to be "jointly governed", and 1 of them is under the responsibility of a sub-national ministry or agency.[129]

FSM's warm water coral reefs cover 3171.836 km^2. Out of these, only 1.8% are protected, that is 55.661 km^2.[130] FSM's mangrove habitat covers 8794.42 hectares as of 2020. This represents 31.93% of its coastline (1248.15km). 27% of these mangrove forests are in terrestrial protected areas as of 2018.[131,132] Strengthening PAs in FSM is essential in the light of the impact of climate change that the four States will experience (summarised in section 1.3 regionally, and in section 2), as well as the compounding effect of anthropogenic pressures ecosystems in FSM nationwide already face. For example, freshwater wetlands across the

[127] UNEP-WCMC (2021), SPREP Pacific Islands Protected Area Portal. *Federated States of Micronesia Protection Coverage.* Available at: https://pipap.sprep.org/country/fm

[128] Federated States of Micronesia (2018). *State of the Environment Report.*

[129] UNEP-WCMC (2021), SPREP Pacific Islands Protected Area Portal. *Federated States of Micronesia Protection Coverage.* Available at: https://pipap.sprep.org/country/fm

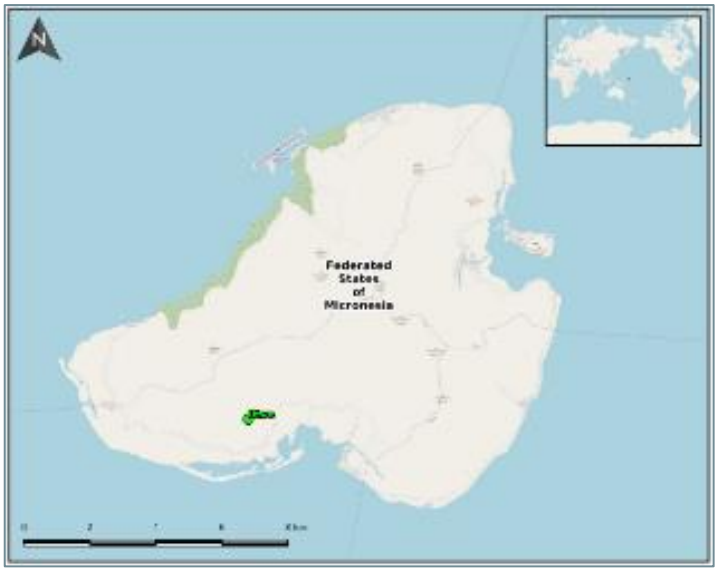
[130] UNEP-WCMC (2021), SPREP Pacific Islands Protected Area Portal. *Federated States of Micronesia Protection Coverage.* Available at: https://pipap.sprep.org/country/fm

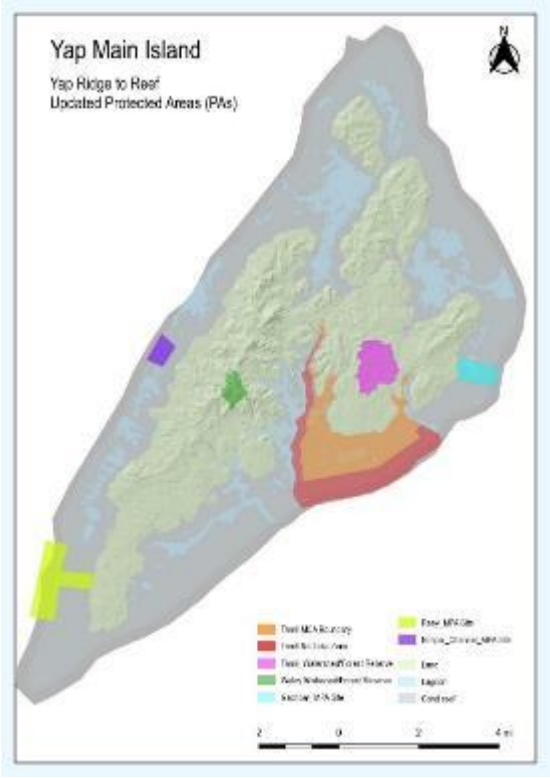
[131] Bunting P, Rosenqvist A, Hilarides L, Lucas RM, Thomas N, Tadono T, Worthington TA, Spalding M, Murray NJ, Rebelo L-M. Global Mangrove Extent Change 1996–2020: Global Mangrove Watch Version 3.0. *Remote Sensing*. 2022; 14(15):3657. https://doi.org/10.3390/rs14153657

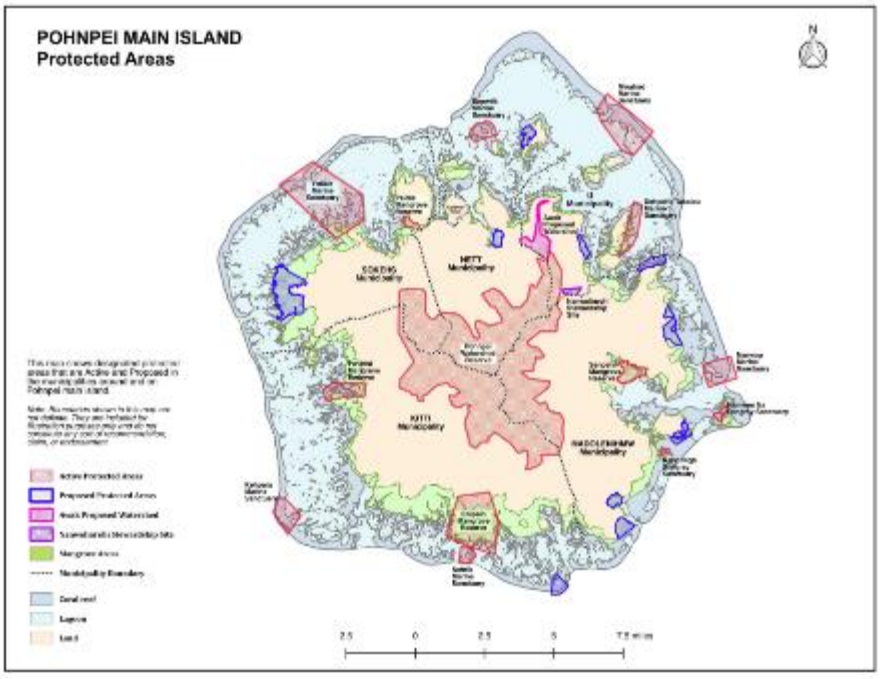
[132] Federated States of Micronesia (2018). *State of the Environment Report.*

States have suffered from saline intrusion due to deforestation and unsustainable land use, which will be worsened by sea-level rise and extreme weather events.[133]

Map 34-Left to right, top to bottom: PAs in Chuuk, Pohnpei, Yap and Kosrae according to the most updated information available.[134]







[133] GEF Project Identification Form. "Implementing an integrated "Ridge to Reef" approach to enhance ecosystem services, to conserve globally important biodiversity and to sustain local livelihoods in the FSM", 2013.

[134] Maps for Chuuk, Yap and Pohnpei were obtained through in-person visits to these States. Kosrae map is taken from UNEP-WCMC (2021), SPREP Pacific Islands Protected Area Portal. *Federated States of Micronesia Protection Coverage.* Available at: https://pipap.sprep.org/country/fm

5.1.2. Policy and legislation

Ownership of land and marine areas varies between the States. Land is state-owned and private owned in Kosrae and Pohnpei, while in Chuuk, it is privately owned. In Yap, almost all land is managed by individual estates and usage is subject to customary control. Marine areas, meanwhile, are managed by the respective States through public trusts in Kosrae and Pohnpei, while in Yap and Chuuk iy is almost entirely privately managed. The Four States are responsible for the establishment of Protected Area Networks (PANs), which are the projects' potential intervention sites.[135] In states where terrestrial or marine areas are public, the PA process should go through a legislative review and approval to be gazetted and officially recognised. To promote the inclusion of existing and new PA sites to the PAN, projects such as the Pacific Ridge to Reef project have provided assistance to the states in updating or developing their PAN legislation and/or regulations.[136]

Previously, the national government established a National Protected Areas Network Policy Framework (NPANPF) in 2015, in cooperation with MCT and partners. This framework outlines a transparent and efficient system governing the designation and operation of a nationwide protected areas network, inclusive of state-level protected areas networks in Yap, Chuuk, Pohnpei, and Kosrae. This nationwide network is designed to facilitate the national government's delivery of assistance to its states in the protection of significant areas of biodiversity, key habitats, and other valuable resources. The NPANPF establishes procedures[137] for the management entities of PA sites to apply to join the protected area management network and outlines the benefits of membership in the national network, including access to long-term and sustained technical and financial assistance.

The NPANPF is designed to augment efforts at the state, municipal, and community levels throughout the country to achieve conservation and climate change adaptation goals, which broadly reflect the country's participation in the Micronesia Challenge, the United Nations Convention on Biological Diversity, and the United Nations Framework Convention on Climate Change. Funding for the operation of the NPANPF will come from a combination of national government allocations, state financial and in-kind support, and investment earnings from the FSM's Micronesia Challenge Endowment Fund. Across FSM, MCT, the national government, NGO and community partners have worked closely together (through participatory processes and consultation) to establish more than 50 state, municipal, and community legislated and/or traditionally declared protected areas covering a wide range of marine, terrestrial, and atoll ecosystems. The National Biodiversity Strategy and Action Plan (NBSAP) sets a clear conservation objective under the major theme of ecosystem management: *A full representation of the FSM's marine, freshwater, and terrestrial ecosystems are protected, conserved, and sustainably managed, including selected areas designated for total protection.*

[135] GEF Project Identification Form. "Implementing an integrated "Ridge to Reef" approach to enhance ecosystem services, to conserve globally important biodiversity and to sustain local livelihoods in the FSM", 2013.

[136] Citation: Franco C., Yatilman R., Nash R. and Bruton-Adams, M. 2022. Strengthening Protected Area Management through effective community participation in the Federated States of Micronesia

[137] The PAN Operations Manual is currently under development. Each state is working on their own state chapters, which will outline the process and the requirements for being part of the PAN and receiving funding through the network.

The table below summarises existing legislation, strategies and policy at a national level, keeping in mind that Chuuk, Yap, Pohnpei and Kosrae each also have related legislation.

Table 4–- Legislation, strategies and policies relating to PAs in FSM.

Legislation	**Federated States of Micronesia Climate Change Act (2013)** The Climate Change Act mandated key departments and agencies to prepare plans and policies on climate change that are consistent with the provisions of the Climate Change Policy by 1st October 2014.
	Congressional Act #19-176 (2017) Amends Title 24 of the FSM Code by inserting a new section that declares the 12-mile area seaward of the territorial sea as a closed area to commercial fishing and exploitation of natural resources. The newly demarcated area shall not extend beyond 24 miles from the baseline from which the breadth of the territorial sea is measured. This new zoning of the FSM's EEZ sets aside approximately 10% of its 200-mile EEZ under conservation measures.
Strategies	**Nationally Determined Contribution** Focuses on FSM's pledges to reduce emissions as a contribution to global efforts to address climate change and sets out an ambitious agenda for usage of renewable energy to achieve FSM's carbon emission reduction targets. The updated National Determined Contribution (2022) describes the adaptation co-benefits of managing marine, terrestrial and coastal ecosystems, and aims to "*expand the number of Protected Areas and their coordination through Protected Area Networks"* [138]
	National Adaptation Plan (is in early design formulation stage)
	Joint State Action Plans (JSAPs) At the state level, Joint State Action Plans (JSAPs) for disaster risk management and climate change adaptation have been developed and adaptation has been addressed in varying degrees of detail in sectoral plans and strategies, although the implementation of these plans is still at an early stage. The JSAPs identify specific adaptation measures related to the protection and management of coastal ecosystems and biodiversity for each state. For example, the Yap JSAP includes an adaptation objective of, *"more effective management of natural resources through understanding of integrated approaches such as ecosystem based or whole of island/state approaches"*.
	Federated States of Micronesia's Infrastructure Development Plan (2016-2025) Although it is not purely focused on climate change, the IDP is a costed comprehensive and costed infrastructure plan that includes both mitigation and adaptation investments (although the costs of adapting to climate change have not been costed consistently).
Policy	**Nationwide Integrated Disaster Risk Management and Climate Change Policy (2013)** Identifies the "holistic, integrated, community and ecosystem based 'ridge to reef' approach to risk reduction and natural resources management to ensure that

[138] FSM NDC 2022, p.6

	adaptation measures are socially and ecologically sound" as one of its guiding principles. Additionally, the Policy cites the utilization of natural systems in response to climate change impacts as one of its strategic objectives.
	National Protected Areas Network Policy Framework– NPANPF (2015) This enabled FSM to formulate a nationwide Protected Areas Network (PAN), which allows for the federal government to assist and coordinate with states and local communities for the protection of areas within FSM with high biodiversity, critical habitat and other valuable natural resources. This nationwide network is designed to facilitate the national government's delivery of assistance to its states in the protection of significant areas of biodiversity, key habitats, and other valuable resources. The NPANPF establishes procedures for the management entities of protected area sites to apply to join the protected area management network and outlines the benefits of membership in the nation-wide network, including access to long-term and sustained technical and financial assistance. It is administered by the federal government with close collaboration with state focal points and in coordination with local NGOs.

Pohnpei State

Pohnpei is the state with the highest number of established PAs (See Appendix IV for a full list). Historically, there has been little national involvement in protected area establishment and management. However, the establishment of a PAN is a high priority under the NBSAP.

Kosrae State

In 2010, the Kosrae State Protected Areas Act of 2010 was signed into law. The law provides legal protection to marine and terrestrial areas designated into the Protected Areas System through a process authorised by the Act. The law specifically requires each community-declared protected area to have a conservation management plan for the site to be considered for legal protection and status by the government. The law also mandates the KIRMA Administrator to administer the Kosrae Protected Areas System in consultation with the mayors of the municipalities of Kosrae.

Over the past several years, Kosrae has started to develop an MPA program that involves co-management of coastal resources between local communities and state resource management agencies. Currently, Kosrae has five conservation areas that are managed by government agencies and/or local communities. These are:

- Utwe-Walung Marine Park.
- Utwe Biosphere Reserve.
- Awane Marine Park.
- Areas of Special Concern, such as the Trochus Sanctuary and the Okat-Yela Mangrove Reserve.[139]

After completing the community consultation for planning and establishment of Utwe Biosphere Reserve, KCSO also launched a community consultation with the community of Tafunsak for planning and establishing a marine protected area there. There is also a

proposed marine park in Malem. The Utwe Biosphere Reserve[140] is a community-based project established in 2002 and is the FSM's first biosphere reserve. Utwe Biosphere Reserve is located within the Utwe-Walung Marine Park. The Utwe Biosphere Reserve was created to protect and conserve the resources within the area and to provide opportunities for public education and scientific research. The Utwe-Walung Marine Park was created in 1996 to protect extensive mangrove and coral reef ecosystems along the undeveloped southern shore of Kosrae. The Marine Park is also a community-based project managed by a board of directors, a park manager, and landowners, with assistance from conservation agencies and organisations in Kosrae.

The Marine Resources Act of 2000 (Kosrae State Code, Title 19) is enforced by the public safety department and the Kosrae Island Resource Management Authority as the Kosrae State government regulatory agency. Environmental awareness activities have been carried out within the community and the schools to help support and strengthen the conservation effort in Kosrae. KCSO also developed and implemented an environmental awareness program entitled the Friday Radio Spots. This program airs important information about different ecosystems, the threats they face, and the solutions to reverse negative impacts. Kosrae also has an extensive system of 54 mooring buoys around the island designed to minimize anchor damage to corals at popular dive sites. The Technical Study presents further details on the terrestrial PAs in Kosrae.

Chuuk State

The Chuuk PAN Bill was passed in 2017. Chuuk communities have begun conservation work in several Areas of Biodiversity Significance (ABS) sites, including the Parem Totiw Marine Area, the Wichap-Epinup-Peidiu-Nukanap Mangrove and Marine area, and the Polle Piannu Pass Grouper spawning area. These sites are at different stages in management planning, but all need reliable scientific monitoring data to help determine the status of the resources and the effectiveness of current management activities. The data gathered will be disseminated to communities through awareness programs and school presentations to promote interest in marine PA management, specifically for coral reefs, and the expansion of the marine PA network.

Because life in Chuuk remains very traditional, several chiefs have implemented protective measures for specific conservation purposes, such as the protection of a turtle nesting site at Nomun Weito and implementation of a no-take area in the Halls region. The effectiveness of traditional management strategies in Chuuk encourages other communities to adopt such measures.

Yap State

The Yap PAN bill has been reviewed by the Governor's Office and all relevant departments and was passed in September 2017. In Yap State, there is currently one MPA set up on Wa'ab, a Locally Managed Marine Area (LMMA) with 25.9 hectares of reef set aside by the Riken community. In addition, YapCAP is working with the communities of Qokaaw and Kadaay on the Nimpal Channel LMMA and Maaq and Lebinaw on the Peelaek Channel LMMA.

[140] UNESCO-MAB Biosphere Reserve.

5.1.3. Community-based management

As a result of the decentralised government structure of FSM and the prevalence of mixed land tenure systems (customary, private and public), combined with the remoteness and isolation of some of these PA sites, local communities and land/reef owners are central to the management of these areas.

In FSM, protected areas are jointly managed between local communities, NGOs, state agencies, the FSM national government and international donors and technical assistance organisations. This requires input and buy-in from the communities that own and steward the land and marine areas in question, with consistent technical support from local and international NGOs and government agencies.[141] In fact, at State level, the conditions for a PA site to be recognized is for the site to be officially recognised through (i) the legal system for those states where terrestrial or marine areas are set on public areas, such as Pohnpei and Kosrae; (ii) require the endorsement from the community and/or in same cases through an ordinance from the local municipal government for states where land and marine areas are owned by communities (i.e., clans, land owners).[142] Appendix I of this pre-feasibility study contains examples of community-based organisations and non-governmental organisations involved in resource management in PAs in FSM, as well as further information on their role.

Moreover, in FSM, the management of PAs build upon traditional enforcement and management practices. The R2R project acknowledged these systems in the development of community plans and state legislations, as communities already have high familiarity with these practices and governance structures already exist (for e.g., Traditional councils in Yap). For example, in Chuuk, traditional fisheries management systems called *mechen* maintain their value, especially in terms of community compliance. Science-based zoning, regulations and fishing closures also co-exist.[143]

Previous programmes and projects in FSM, such as the Micronesia Challenge and the Pacific R2R project have adopted participatory approaches to develop community management plans, establish PAs and build capacity to effectively manage these PAs.

5.1.4. Financing

The FSM sustainable finance plan identified that a fully realized Protected Area Network (PAN)of 30% marine and 20% terrestrial areas (based on the previous goals identified under the Micronesia Challenge) under effective conservation would cost 29 M USD. This cost is based on estimates for protected area management activities in each of the States and National level coordination and identifies funding needs, gaps, and fundraising sources and target, according to Micronesia Challenge Evaluation Report.[144] Individually, the estimated annual budget to achieve the MC conservation goals of 4.4M USD per year; Chuuk (1.5M

[141] Kostka W., Briones L., Cottrill H. 2014. Protected Areas Situation Analysis. Implementing an integrated “Ridge to Reef” approach to enhance ecosystem services, to conserve globally important biodiversity and to sustain local livelihoods in the FSM (GEF Project ID: 5517). Micronesia Conservation Trust, Pohnpei, FM.

[142] Franco C., Yatilman R., Nash R. and Bruton-Adams, M. 2022. Strengthening Protected Area Management through effective community participation in the Federated States of Micronesia

[143] Franco C., Yatilman R., Nash R. and Bruton-Adams, M. 2022. Strengthening Protected Area Management through effective community participation in the Federated States of Micronesia

[144] Terminal Evaluation of the UNEP GEF Project: “Micronesia Challenge: Sustainable Finance Systems for Island Protected Area Management” (2017) available at: https://wedocs.unep.org/handle/20.500.11822/22414.

USD), Kosrae (0.5M USD), Pohnpei (1.3M USD) and Yap (0.7M USD) in addition to 0.4M USD per year for national coordination costs.[145]

Existing funds through recurring allocations were estimated to be 962,975 USD from a variety of sources. However, in 2019 the FSM States lost a large portion of the Compact Agreement Environment Sector funds 2019 when the management agency experienced changes in funding priorities, which did not cover most recurring costs (i.e., staff and overhead) and required most funds support on the ground projects.[146]

5.1.5. Relevant past and ongoing projects for EbA in PAs in FSM

Project	Organization / donor	Overview	Opportunities to be leveraged for the proposed GCF EDA programme
Practical Solutions for Reducing Community Vulnerability to Climate Change in the Federated States of Micronesia	Adaptation Fund Micronesia Conservation Trust	This multi-sector adaptation project has an overall goal to build/increase the ecological, social, and economic resilience of communities by reducing vulnerability to stressors from climate change.[147] The project has a focus on protecting marine ecosystems and increasing their resilience to impacts from climate change. Expected outcomes include: 1. Natural assets or ecosystems under protected area management are adequately protected/rehabilitated through effective legislative, institutional, and financial arrangements and support. 2. Natural assets or ecosystems under protected area management are adequately protected/rehabilitated through effective State-level enforcement of MPA and nearshore fisheries legislation regulations. 3. Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level. 4. Improved Knowledge Management for Protected Areas and Ecosystem based adaptation Solutions	Increased understanding of climate change threats and adaptive capacity. Complementarity on EbA solutions in the FSM.
Enhancing the Climate Resilience of	Adaptation Fund SPREP	This project has an overall goal to build social, ecological, and economic resilience of island communities in FSM and reduce their	Increased understanding of climate change

[145] Gombos (2020) MC Final Evaluation Report.

[146] Gombos (2020) MC Final Evaluation Report.

[147] Adaptation Fund – Practical Solutions for Reducing Community Vulnerability to Climate Change in FSM.

Vulnerable Island Communities in Federated States of Micronesia		vulnerabilities to extreme drought, sea level rise, and other risks from climate change. The project focuses on water resource management, coastal resource and development planning, the promotion of gender perspectives, and ecologically sound, climate resilient livelihoods. Expected outcomes include: 1. Strengthened policy and institutional capacity of government to integrate climate risk and resilience into its water and coastal management legislative, regulatory, and policy frameworks. 2. (a) Water conservation and management technology & practices adopted, responding to drought, sea level rise, and early recovery from cyclones; and (b) Increased awareness of climate change through formal climate education. 3. Increased resilience of coastal communities and environment to adapt to coastal hazards and risks induced by climate change. 4. Capacity and knowledge enhanced and developed to improve management of water and coastal sectors to adapt to climate change.	threats and adaptive capacity.
Climate-resilient Food Security for Farming Households across the Federated States of Micronesia	Green Climate Fund Micronesian Conservation Trust	The project is a comprehensive national effort to focus on increasing the resilience of FS''s most vulnerable communities to climate change-induced food insecurity. Planned measures include introducing sustainable agricultural practices and developing climate-resilient agriculture value chains. It is being implemented by the Micronesian Conservation Trust (MCT).	Increased understanding of climate change threats and adaptive capacity. Complementarity on climate-resilient food security and livelihood measures in the FSM.
Climate Change Adaptation Solutions for Local Authorities in the Federated States of Micronesia	Green Climate Fund The Pacific Community	This EDA programme seeks to increase the capacity of local authorities, namely municipalities and state governments, throughout FSM in their ability to deliver climate change services to their populations and enable these local authorities to design, implement, and manage priority adaptation projects through the grant facility. Priority adaptation projects include those related to disaster risk management and coastal protection, food security and water security.	Increased understanding of climate change threats and adaptive capacity.

		It is being implemented by the Pacific Community (SPC).	
R2R Implementing an Integrated Ridge to Reef Approach to Enhance Ecosystem Services, to Conserve Globally Important Biodiversity and to Sustain Local Livelihoods in the FSM	Global Environmental Facility (GEF 5)	The project objective is to safeguard biodiversity in terrestrial and marine ecosystems and in agricultural and fisheries production systems from the impacts of invasive alien species in the FSM. The expected outcomes include: • National biosecurity governance framework strengthened, institutionalized, sustainably financed and aligned with relevant Pacific initiatives. • Enhanced biosecurity awareness and capacity to safeguard terrestrial and marine ecosystems and agricultural and fishery production systems from IAS impacts. • Biosecurity protocols operational and enhanced to prevent IAS introductions via ports of entry/exit and to safeguard natural production and terrestrial and marine systems from impacts of established IAS. • Effectiveness of IAS interventions improved by enhanced digital access to and management of information, including IAS distribution data, at state, national and Pacific levels.	Increased understanding of IAS impacts and related initiatives at the state, national and Pacific levels
Meeting the goals of the Micronesia Communities and Governments: 2020 milestone and beyond	The Margaret A. Cargill Philanthropies – 2019 and 2021	The Micronesia Conservation Trust (MCT), through a grant from the Margaret A. Cargill Philanthropies (MACP), created a sub-grant programme towards achieving the goals of the Micronesia Challenge. MCT awarded subgrants to 15 organizations and communities in all five jurisdictions of the Micronesia Challenge (MC). The project 'Meeting the goals of the Micronesia Challenge: 2020 milestone and beyond' is working with technical partners to provide support to communities and governments, building on progress already achieved, to meet the goals of the MC and to lay a strong foundation as the region approaches the 2020 milestone and beyond.[148]	Experience in awarding sub-grants and funding sub-projects through a grant mechanism. Available, potential list of institutions.

5.1.6. Findings of the CVA-CVI exercise for Pohnpei

Exercise 1: Understanding key community "values" for all PA networks.

[148] See: http://www.ourmicronesia.org/uploads/1/2/6/9/126956881/mct_macp_small_grants_press_release.pdf

Findings from the participants of Pohnpei State presented the following as being the core "values" of PAs in Pohnpei State (individual PA scores are amalgamated[149]). Overall, the findings show that for all PAs assessed, the core value "headers" of relevance are "subsistence", "cultural/spiritual" and "environmental". Economic and political values appear to be less important for PAs in Pohnpei State.

Exercise 2: Agreeing on terms to describe CC drivers.

Findings from the participants presented the following as being the core "climate change drivers" (stressors) affecting PAs in Pohnpei State (in order of preference).

- Extreme temperature events (heat).
- Sea level rise (including storm surge).
- Precipitation change (drought frequency and severity).

Of interest, participants listed a range of other non-climate "stressors" that are affecting PAs in Pohnpei. These included the following:

- Dredging; Invasive species such as "Crown of Thorns" (*Acanthasta planci*) infestations onto reefs.
- Deforestation.
- Pollution.
- Soil erosion.
- Coastal development.
- Over harvesting.

Exercise 3: Possible EbA Measures for adoption

Findings from the participants presented the following as being the possible EbA measures for adoption within the State with specific reference to PAs within Pohnpei, the likely support needed (donor) plus the intended target for the activity. Key findings suggest that the key EbA measures of interest for the State are:

- Mangrove rehabilitation.
- Fisheries Management.
- Watershed Management.
- Agroforestry.

The key reasons for the above selection are as follows:

- Low-income families more often depend on natural resources for subsistence and income (fisherfolk and farmers).
- All Pohnpeians would benefit from the successful introduction of EbA measures (PWDs/children/women etc).

Key issues facing the successful implementation of EbA measures in Pohnpei include:

- Dredging.
- Deforestation.

[149] PAs assessed include Natitik MPA, CSP, Palikir Pass MPA, Sapwitik MPA

- Coastal development.
- Commercialisation of resources.
- Invasive species.
- Commercial monoculture.
- Inadequate policies and regulations.
- Change in political administrations.
- Enforcement if any regulation (buffer zone etc).

Based on general discussion and awareness of existing practices in the State, the following EbA measures are deemed most viable for consideration within the GCF proposal (key focus of discussion was on the Pakin MPA where watershed management, sustainable forest and agro-forestry measures plus improved enforcement of the MPA and dry litter piggery EbA measures were outlined).

The table below represents the options suggested by the stakeholders during the consultation process of the CVA-CVI exercise. This will inform the EbA options appraisal done for the GCF proposed GCF programme – but depending on applicability – the final options will be chosen.

EbA Measure	Supporting Activity	Target for Activity	Additional Comments
Mangrove replanting	Mangrove Replanting	Storm protection and habitat for marine species. Part of the activities listed in the SOU Forest Stewardship Plan.	N/A
Sustainable forest and agro-forest management and climate smart agriculture	Agroforestry	An activity through R2R Project. They planted macadamia, bananas, cassava, and other plants.	N/A
Sustainable forest and agro-forest management and climate smart agriculture	Forest Stewardship Project	This activity had two parts: 1) Invasive species clearing and coconut replanting; 2) Planting of big trees in the savannah to decrease the likelihood of landslides.	N/A
Watershed Management and Soil Conservation Measure	Tree planting around riparian zone	Minimize soil loss/erosion and the reduction of contaminants entering water source	N/A
Watershed Management and Soil Conservation Measure	Re-vegetate Watershed	Re-vegetate watershed, invasive species management, forest fire management	N/A

Indicative costs for EbA measure implementation are taken from work by Brander et al (2017)[150] as demonstrated below.

EbA solutions	**Enforcement of MPA**		**Dry litter piggery**	
Area (ha)	300 ha (3 km²)		9 pen units	
Time horizon	2017-2050		2017-2050	
Costs (US$)	Training Operation* Opportunity	25,855 0 6,245	Set-up O & M	11,174 75,761
Total costs (US$)		***32,100***		***86,935***
Benefits	Fishery (catch increase)	14,717	Improvement of freshwater availability Pig revenue	56,213 157,836
Total benefits (US$)		***14,717***		***214,049***
NPV at 5% discount rate		**-17,383**		**127,113**
Co-benefits not included in CBA	Medicinal resources, raw material, genetic diversity; primary production; carbon sequestration; cultural heritage (charismatic species as turtles, rays, sharks), recreation, tourism, education		Food, genetic diversity	
Key messages	• The MPA results in net costs, indicating that costs for the community are higher than gains. The option may become viable if training costs are reduced. • Overall, the ecological benefits of enforcing the MPA areas are high, but from an economic point of view this strategy presents net costs to community welfare, suggesting that financing mechanisms should be investigate (e.g. through green fees) to support this option in the long-term. It is important highlight that it may be possible to reduce training costs, if local experts are used. • Alternative funding from the dive industry should also be investigated as an opportunity to cover some of the operating costs.		• The piggery management option represents the better return on investment. Net benefits in terms of households' income and water quality are high, but operating costs are high as well in terms of time invested in managing the animals (prepare litter, source water during droughts, etc.). • The process and time required for managing pigs should be clearly presented to community hence allowing for an informed decision. • If households do not commit their time in managing caged animals the effectiveness of the dry litter piggery may be reduced. • Additional benefit is the potential production of compost for plant/crops nutrition	

5.1.7. Findings of the CVA-CVI exercise for Kosrae

Exercise 1: Understanding key community 'values' for all PA networks.

Findings from the participants of Kosrae State presented the following as being the core "values" of PAs in Kosrae State (individual PA scores are presented). Scores relate as follows:

Key:	
1	important value
2	usually only a minor value
3	not a value of relevance/or considered

[150] Franco, C., Brander, L., et al. (2017). Application of Cost-Benefit Analysis to Ecosystem based Adaptation (EbA) solutions for climate change: final results. The Nature Conservancy https://panorama.solutions/sites/default/files/cba_summary_micronesia_melanesia_sites-2017_0.pdf

Value	Poverty Dimensions	Beneficiaries
Fisheries and spawning areas	1,1,3,1,2	Households, private sector, social groups
Cultural and historical value	2,2,1,2,3	Tourist industry
Sacred sites and landscapes	3,2,1,1,3	Tourist industry
Ancestor's daily routes	3,2,1,2,3	Tourist industry, hikers
Medicinal herbs	1,1,1,1,1	Households
Recreation and Tourism	2,1,1,1,2	Tourist industry
Research & Trad Knowledge	1,1,1,1,1	Government
Education	1,1,1,1,1	Government, Social Groups
Climate change mitigation	2,1,3,1,1	Everyone
Coastal protection	2,1,3,1,1	Everyone

Overall, the findings show that for all PAs assessed, the core value "headers" of relevance are "subsistence", "cultural/spiritual" and "environmental". Economic and political values appear to be less important for PAs in Kosrae State. Beneficiaries of these values include private sector and households. In Kosrae, both men and women can harvest from mangrove areas depending on the type of resource harvested. Several MPAs are located near mangrove areas of Kosrae.

Exercise 2: Agreeing on terms to describe CC drivers.

Even though precipitation (rainfall change) has been identified as the most frequently occurring stressor on the island, it still causes less damage on the surrounding environment (i.e., land & crops), unlike sea level. Sea level is considered more severe and presents more damage (e.g., coastal erosion, flooding, loss of wetlands, increased salinity, inundation, etc.) to the environment.

The priority climate stressors in terms of Frequency are:

1. Precipitation: Rainfall Change.
2. Sea Level Rise.
3. Air Temperature.

However, the findings from the participants presented the following as being the core "climate change drivers" (stressors) affecting PAs in Kosrae State:

1. Sea Level.
2. Precipitation.
3. Air Temperature.

Of interest, participants listed a range of other non-climate "stressors" that are affecting PAs in Kosrae. These included the following:

- Dredging.
- Invasive species such as "Crown of Thorns" (*Acanthasta planci*) infestations onto reefs.
- Deforestation
- Pollution.
- Soil erosion.
- Coastal development.
- Over harvesting.

Exercise 3: Possible EbA Measures for adoption

The group agreed with EbA measures 1 to 10 (see Appendix C) and noted that certain assessments must be made to identify suitable sites for such measures. Some designs may not be suitable for some PAs as it is with others.

Based on general discussion and awareness of existing practices in the State, the following EbA measures are deemed most viable for consideration within the GCF proposal (key focus of discussion was on Malem MPA where the creation of the MPA and watershed protection is the key EbA measure to support coastal/soil protection (re-vegetation) and waste management to better offer water security):

- Waste Management: The benefits of the waste management comprise of two categories:
  - 1. Reduced risk of storm damage: Waste management is likely to represents an improvement in coastal protection relative to the baseline. It is assumed that waste management will help improving the structure of the reef resulting in a 4% local reduction in storm damage.[151]
  - 2. Increased harvest of marine resources: It is assumed that harvest rates are 5% higher than the baseline after implementation of waste management (Kerwath et al., 2013). Total quantities harvested continue to decline over time due to other pressures (e.g., warming, ocean acidification) but are higher than the baseline case without implementing waste management. It is assumed that implementing waste management will result in a 1% improvement of freshwater quality.[152] The costs to manage waste in Malem were i) initial costs, ii) land clearing and clean-up, iii) equipment and tools, iv) operating and v) maintenance.
- Coastal re-vegetation: Coastal re-vegetation benefits are due to the role that coastal vegetation plays as first barrier from storms, protecting infrastructures and persons and limiting storms damages. It is assumed that revegetating the strip of coastline between the shore and the road will result in 8% local reduction in storm damage (Barbier et al., 2011).
- Establishment and improved management of the MPA: The benefits of the MPA comprise two categories:
  - 1. Increased harvest of marine resources: It is assumed that harvest rates are 30% higher than the baseline after the 10-year no-take restriction is relaxed in 2027.[153] Total quantities harvested continue to decline over time due to other pressures that are not controlled by the MPA (e.g., warming, ocean acidification) but are higher than the baseline case without MPA protection.
  - 2. Reduced risk of storm damage: The effectiveness of the MPA in reducing storm damage is likely to represent an improvement relative to the baseline. It is assumed that

[151] Kench, P. S., Brander, R. W., Parnell, K. E., and McLean, R. F. (2006a). Wave energy gradients across a Maldivian atoll: implications for island geomorphology. *Geomorphology* 81, 1–17. doi: 10.1016/j.geomorph.2006.03.003

[152] Norman E. Peters & Michel Meybeck (2000) Water Quality Degradation Effects on Freshwater Availability: *Impacts of Human Activities*, Water International, 25:2, 185-193, DOI: 10.1080/02508060008686817

[153] Kerwath, S., Winker, H., Götz, A. *et al.* Marine protected area improves yield without disadvantaging fishers. *Nat Commun* **4**, 2347 (2013). https://doi.org/10.1038/ncomms3347

the improved structure of the reef with MPA protection results in a 20% local reduction in storm damage.[154]

Indicative costs for these EbA measure implementations are taken from work by Brander et al (2017[155]) as demonstrated in the table below.

EbA solutions	Establishment of MPA		Waste management		Coastal revegetation	
	22.26 ha (0.22 km^2)		Not available		Not available	
Time horizon	2017-2050		2017-2050		2017-2050	
Costs (US$)	Set-up Operation Opportunity	2,850 102,666 446,441	Set-up Operation	12,395 31,813	Set-up Operation	5,700 2,946
Total costs (US$)		***551,957***		***44,208***		***8,646***
Benefits (US$)	Fishery (catch increase)	526,053	Fishery (catch increase)	95,598	Coastal protection (reduction in damage)	37,607
	Coastal protection (reduction in damage)	94,018	Coastal protection (reduction in damage)	18,804		
			Improvement of freshwater availability	50,931		
Total benefits (US$)		***620,071***		***165,332***		***37,607***
NPV at 5% discount rate		**68,114**		**121,124**		**28,961**
Co-benefits not included in CBA	Medicinal resources, raw material, genetic diversity; primary production; carbon sequestration; cultural heritage (charismatic species as turtles, rays, sharks), recreation, tourism, education		Aesthetic, soil fertility (through composting of green and food waste), tourism, improved health		Control soil erosion, aesthetic	
Key messages	• MPA is a viable option, but benefits will be seen in the long-term • Requires long-term commitment of the community to comply with rules and regulations		• Community can expect to observe rapid benefits from this option if implemented appropriately and there are changes in present behaviours. • Requires long-term commitment to gain the full range of benefits		• Represents a positive improvement to community welfare, but absolute benefit is low because it is not expected that additional trees along the coastline will result in substantial reductions in flood damage	

Exercise 4: Adaptive Capacity for EbA adoption

Findings from the participants presented the following as being the likely adaptive capacity "scores" with regards to the adoption challenges facing EbA implementation with PAs in the State. (NB: 4 = high capacity and 1 = low capacity).

	Air Temperature	Storm Intensity and frequency	Sea Level Rise
Time frame	Chronic	Acute	Chronic

[154] Kench, P. S., Brander, R. W., Parnell, K. E., and McLean, R. F. (2006a). Wave energy gradients across a Maldivian atoll: implications for island geomorphology. *Geomorphology* 81, 1–17. doi: 10.1016/j.geomorph.2006.03.003

[155] Franco, C., Brander, L., et al. (2017). Application of Cost-Benefit Analysis to Ecosystem based Adaptation (EbA) solutions for climate change: final results. The Nature Conservancy https://panorama.solutions/sites/default/files/cba_summary_micronesia_melanesia_sites-2017_0.pdf

Local management response	2	2	2
Scientific/technical support	3	1	3
Effectiveness to address the climate stressor	2	1	2
Adaptive capacity	**LOW**	**VERY LOW**	**LOW**

Indicative CVI Score

Based on the information gathered from stakeholders at the workshop, coupled with some professional judgement, and indicative CVI score is presented for Kosrae State (in general, not a PA specific assessment) to help inform the GCF Proposal to support decision making with regards to EbA measure implementation for PAs to help support climate change adaptation.

	Air Temperature	**Storm Intensity and frequency**	**Sea Level Rise**
Time frame	Chronic	Acute	Chronic
Modified risk	**EXTREME**	**EXTREME**	**EXTREME**
Adaptive capacity	**LOW**	**VERY LOW**	**LOW**
Vulnerability (climate stressor)	**HIGH**	**VERY HIGH**	**HIGH**
Vulnerability (to PAs)	**HIGH**		

5.1.8. Findings of the CVA-CVI exercise for Chuuk

Exercise 1: Understanding key community "values" for all PA networks.

Findings from the participants of Chuuk State presented the following as being the core "values" of PAs in Chuuk State (individual PA scores are presented). Scores relate as follows:

Key:	
1	important value
2	usually only a minor value
3	not a value of relevance/or considered

Kuop Marine PA

Values:	Subsistence:	Economic:	Cultural/Spiritual:	Environmental services:	Political:
Kuop (Marine PA)					
Fisheries & Spawning Areas	1	2	1	1	3
Traditional agriculture	1	2	1	1	3
Cultural/historic values	1	1	1	1	1
Recreation & tourism	1	1	1	1	2
Climate change mitigation	1	1	1	1	1
Water quality/quantity control	1	3	1	1	3
Research, traditional knowledge	1	1	1	1	2
Coastal protection	1	1	1	1	2
Home for local communities	1	2	1	2	3
Food security	1	1	1	1	1
Biodiversity	1	1	1	1	2
Non-commercial water use	1	3	1	1	2
Health	1	1	1	1	1
Education	1	1	1	1	1
Aquaculture	1	1	1	1	1
Livelihoods	1	1	1	1	1

Beneficiaries
Women
Youth
Men
Community of Uman
Resource Managers & Owners

Sopwonoch Marine PA

Values:	Subsistence:	Economic:	Cultural/Spiritual:	Environmental services:	Political:
Sopwonoch (Marine PA)					
Fisheries	1	2	1	1	3
Non-commercial water use	1	3	1	1	3
Cultural/historic values	1	1	1	1	2
Health	1	1	1	1	1
Education	1	1	1	1	1
Water quality/quantity control	1	3	1	1	2
Coastal protection	1	3	1	1	2
Recreation & tourism	1	1	1	1	1
Aquaculture	1	1	1	1	1
Biodiversity	1	1	1	1	2
Food security	1	1	1	1	2
Climate change mitigation	1	1	1	1	1
Livelihoods	1	1	1	1	2

Beneficiaries
Youth
Men and Women
Resource Owners
Community

Witipwon Terrestrial PA

Values:	Subsistence:	Economic:	Cultural/Spiritual:	Environmental services:	Political:
Witipwon (Terrestrial PA)					
Food Secutiry	1	1	1	1	2
Water Security	1	2	1	1	3
Biodivserity	1	1	1	1	2
Health & Education	1	1	1	1	1
Cultural/Historical Heritage	1	1	1	1	2
Natural Heritage	1	1	1	1	2
Livelihoods (subsistence/commercial)	1	1	1	1	2
Endemic/Native Species	1	1	1	1	2
Agroforestry	1	1	1	1	2
Climate Change Mitigation	1	1	1	1	1
Recreation & Tourism	1	1	1	1	1

Beneficiaries
Community (Inclusive of youth, children, men and women)
Akoyikoyi Chartered School
Students
Resource Owners/Mangers

Oneisomew Marine PA

Values:	Subsistence:	Economic:	Cultural/Spiritual:	Environmental services:	Political:
Oneisomw Environmental Conservation Management Association (OECMA) Oneisomw (Marine PA)					
Fisheries	1	1	1	1	1
Climate Change	1	1	1	1	1
Water Quality	1	1	1	1	1
Food Security	1	1	1	1	2
Health	1	1	1	1	1

Beneficiaries
OECMA
OWA (Oneisomw Women's Association)
Resource Managers
Oneisomw Municipal

Overall, the findings show that for all PAs assessed, the core value “headers” of relevance are “subsistence”, “cultural/spiritual” and “environmental”. Economic and political values appear to be less important for PAs in Chuuk State.

Exercise 2: Agreeing on terms to describe CC drivers.

Findings from the participants presented the following as being the core “climate change drivers” (stressors) affecting PAs in Chuuk State (in order of preference).

- Extreme temperature events (heat).
- Sea level rise (including storm surge).
- Precipitation changes (drought frequency and severity).

Exercise 3: Possible EbA Measures for adoption

Findings from the participants presented the following as being the possible EbA measures for adoption within the State with specific reference to PAs within Chuuk, the likely support

needed (donor) plus the intended target for the activity. Participants in Chuuk listed activities that are ongoing in Chuuk, and assessed the EbA measure as well as its target that could be further funded/explored through this GCF programme.

EbA Measures Practiced in Chuuk				
PA Site	**EbA Measure**	**Activity**	**Support**	**Target for Activity**
OECM	Mangrove replanting	Mangrove Replanting	TNC	Storm protection and habitat for marine species
SOU	Mangrove Replanting	Mangrove rehabilitation	Ridge to Reef Project	Part of the activities listed in the SOU Forest Stewardship Plan.
Witipwon	Sustainable forest and agro-forest management and climate smart agriculture	Agroforestry	Ridge to Reef Project	An activity through R2R Project, implemented by Chuuk Conservation Society. They planted macadamia, bananas, cassava, and other plants.
SOU	Sustainable forest and agro-forest management and climate smart agriculture	Forest Stewardship Project	Ridge to Reef Project	This activity had two parts: 1) Invasive species clearing and coconut replanting; 2) Planting of big trees in the savannah to decrease the likelihood of landslides.
SOU	Watershed Management and Soil Conservation Measure	Tree planting around riparian zone	Ridge to Reef Project	Minimize soil loss/erosion and the reduction of contaminants entering water source
Witipwon	Watershed Management and Soil Conservation Measure	Re-vegetate Watershed	Ridge to Reef Project	Re-vegetate watershed, invasive species management, forest fire management
Oneisomw	Vegetated buffers/strips and slope stabilisation	Labour costs for stabilising 0.3 hectares of slopes area and preparing and planting approximately 300m of lemongrass.	Derived from consultations with USDA-NRCS personnel that conducted similar projects in other areas., funded by MCT and TNC	Benefits of lemongrass strips comprised two. categories: (1) We assumed that stabilization of slopes and re-vegetation will result in a 20% improvement of freshwater quality due to reduced runoff and sedimentation (Helmers et al., 2008). (2) We assumed that improved water quality will help reducing water medical costs of water related diseases by 30%.
Oneisomw	Reviving traditional	Labour costs for relining 8	Derived from	Benefits of wells restoration and lemongrass strips comprised

EbA Measures Practiced in Chuuk				
PA Site	**EbA Measure**	**Activity**	**Support**	**Target for Activity**
	wells while establishing green buffers/strips	open dug wells, stabilising 0.3. hectares of slopes area and preparing and planting approximately 300m of lemongrass.	consultations with USDA-NRCS personnel that conducted. similar projects in other areas, funded by MCT and TNC.	two categories: (1) We assumed that reviving wells, stabilizing slopes and re-vegetating will result in a 50% improvement of freshwater quality due. to reduced runoff and sedimentation (Helmers et al., 2008). (2) We assumed that improved water quality will help reducing water medical costs of water related diseases by 30%.

Indicative costs for EbA measure implementations are taken from work by Brander et al (2017)[156] as demonstrated in the table below.

EbA solutions	**Vegetated buffers/strips and slopes stabilisation**		**Reviving traditional wells whilst establishing green buffers/strips**	
Area (ha)	0.28 ha (0.0028 km^2)		8 wells and 30.5 m of lemongrass	
Time horizon	2017-2050		2017-2050	
Costs (US$)	Set-up Operation	11,756 1,473	Set-up Operation	12,445 5,891
Total costs (US$)		***13,229***		***18,336***
Benefits (US$)	Improved freshwater availability	23,306	Improved freshwater availability	90,049
	Avoided health costs	4,243	Avoided health costs	5,492
Total benefits (US$)		***32,549***		***95,541***
NPV at 5% discount rate		**19,320**		**77,204**
Co-benefits not included in CBA	Regulate soil erosion and fertility, raw material, regulate runoff, habitat for species		Regulate soil erosion and fertility, raw material, regulate runoff, habitat for species	
Key messages	• Green buffers/green strips and stabilisation of unconsolidated slopes, are effective answer in the face of climate uncertainty. • Benefits from these solutions will not be immediate and will not cover for the full water need of the community.		• Reviving wells and spring structures represent an important improvement for water preservation. • Preserving the actual water resources can help community to preserve water resources in the long-term. • These resources will partially cover for water needs and they become extremely relevant during emergencies	

Exercise 4: Adaptive Capacity for EbA adoption

Findings from the participants presented the following as being the likely adaptive capacity "scores" with regards to the adoption challenges facing EbA implementation with PAs in the

[156] Franco, C., Brander, L., et al. (2017). Application of Cost-Benefit Analysis to Ecosystem based Adaptation (EbA) solutions for climate change: final results. The Nature Conservancy https://panorama.solutions/sites/default/files/cba_summary_micronesia_melanesia_sites-2017_0.pdf

State. The results are based on a gender disaggregated approach to garner results based on male and female attendees. (NB: 4 = high capacity and 1 = low capacity).

Group 1: Women

Score	4	3	2	1
Local Management Response Capacity (i.e. resources, budget, knowledge) for management to respond at local levelt				
Scientific/technical support Level of technical support for management at the local level				
Effectiveness to address the climate stressor Extent to which local management will effectively address the climate stressor				

Group 2: Men

Score	4	3	2	1
Local Management Response Capacity (i.e. resources, budget, knowledge) for management to respond at local levelt				
Scientific/technical support Level of technical support for management at the local level				
Effectiveness to address the climate stressor Extent to which local management will effectively address the climate stressor				

The following table represents the Adaptive Capacity "score" for the 3 climate stressors identified for Chuuk State.

	Precipitation changes	**Storm Intensity and frequency**	**Sea level rise (including storm surge)**
Time frame	Chronic	Acute	Chronic
Local management response	2	2	1
Scientific/technical support	3	2	1
Effectiveness to address the climate stressor	2	1	1
Adaptive capacity	**LOW**	**VERY LOW**	**VERY LOW**

Indicative CVI Score

Based on the information gathered from stakeholders at the workshop, coupled with some professional judgement, an indicative CVI score is presented for Chuuk State (in general, not

a PA specific assessment) to help inform the GCF Proposal to support decision making with regards to EbA measure implementation for PAs to help support climate change adaptation.

	Precipitation changes	**Storm Intensity and frequency**	**Sea level rise (including storm surge)**
Time frame	Chronic	Acute	Acute
Modified risk	**EXTREME**	**EXTREME**	**HIGH**
Adaptive capacity	**LOW**	**VERY LOW**	**VERY LOW**
Vulnerability (climate stressor)	**HIGH**	**VERY HIGH**	**HIGH**
Vulnerability (to PAs)	**HIGH**		

5.1.9. Findings for the CVA-CVI exercise for Yap

Exercise 1: Understanding key community 'values' for all PA networks.

Findings from the participants presented the following as being the core "values" of PAs in Yap State[157] (in order of preference):

- Fisheries and spawning Values (environmental).
- Cultural & Historical Values (cultural).
- Recreation & Tourism (socio-economic).
- Research, traditional knowledge.
- Climate change mitigation.
- Coastal protection.
- Management/removal of timber (socio-economic).

Exercise 2: Agreeing on terms to describe CC drivers.

Findings from the participants presented the following as being the core "climate change drivers" (stressors) affecting PAs in Yap State (in order of preference):

- Storm intensity and frequency.
- Sea level rise (including storm surge).
- Precipitation changes (drought frequency and severity).

Exercise 3: Possible EbA Measures for adoption

The Workshop did not focus in detail on the appropriate types of EbA measures of relevance to Yap State (as identified in Appendix C). Based on general discussion and awareness of

[157] Collective scores based on results and findings for Weley Forest PA, Gochpat PA,

existing practices in the State, the following EbA measures were mentioned for consideration within the GCF programme – it included both the inventory of ongoing work, where opportunities for additionality can be explored, as well other options that can be scaled up:

- Tamil Watershed Protected Area: Support EbA work is needed to help regulate soil erosion and fertility, to support genetic diversity, provide raw materials, enhance pollination and secure habitat for a range of species. Establishment costs were provided by the local NGOs TRCT and YAPCAP, at $7150. Operational costs of the WPA, included meeting, awareness and training. It is assumed that the community activity costs are incurred in each year over the period 2018-2050. Opportunity cost was based on the value of savannah land ($1.30 per square meter) and size of the WPA assuming over the period 2018-2050 each year 2% of the area will be converted for development or other purposes.
- Community nursery: The costs for the community nursery comprised three categories: -1. Construction;
  - 2. Operation costs for a nursery producing and selling an average of 400 seedlings per month occur every year:
  - 3. Maintenance costs assumed that equipment and tools have an average life expectancy of 6.5 years, and the main structure (roof and wooden poles) has a life expectancy of 5-6 years (based on information derived from operating tree and vegetable nurseries in Yap).
- Reviving traditional wells: The costs to revive the traditional wells were i) construction of engineered barrier, ii) operation and iii) maintenance. Costs of managing and reducing pollution in the waterways were included as costs for outreach material. Costs were estimated for the five community wells.

Indicative costs for EbA measure implementation are taken from work by Brander et al (2017[158]) as demonstrated in the table below.

EbA solutions	Watershed Protected Area		Community nursery		Reviving traditional wells	
	271 ha (2.7 km^2)		3 ha (0.03 km^2)		5 wells	
Time horizon	2017-2050		2017-2050		2017-2050	
Costs (US$)	Set-up	6,610	Set-up	31,485	Set-up	6,465
	Operation	3,536	Operation	94,171	Operation	1,209
	Opportunity	1,753,622				
Total costs (US$)		***1,763,622***		***125,656***		***7,673***
Benefits (US$)	Avoided water costs	2,271,140	Alternative food for households	342,110	Improved freshwater availability	51,932
	Avoided medicinal costs	20,336				
Total benefits (US$)		***2,291,476***		***342,110***		***51,932***
NPV at 5% discount rate		**527,854**		**216,453**		**44,258**
Co-benefits not included in CBA	Regulates soil erosion and fertility, genetic diversity, raw material, pollination, habitat for species,					

Based on: Franco, C., Brander, L. (2016). Cost-benefit analysis for Tamil (Yap, FSM) climate change adaptation strategies. The Nature Conservancy.

[158] Franco, C., Brander, L., et al. (2017). Application of Cost-Benefit Analysis to Ecosystem based Adaptation (EbA) solutions for climate change: final results. The Nature Conservancy https://panorama.solutions/sites/default/files/cba_summary_micronesia_melanesia_sites-2017_0.pdf

Exercise 4: Adaptive Capacity for EbA adoption

	Precipitation change	Storm Intensity and frequency	Sea level rise (including storm surge)
Time frame	Chronic	Acute	Chronic
Local management response	2	3	2
Scientific/technical support	3	3	2
Effectiveness to address the climate stressor	2	2	1
Adaptive capacity	**LOW**	**LOW**	**VERY LOW**

Indicative CVI Score

Based on the information gathered from stakeholders at the workshop, coupled with some professional judgement, an indicative CVI score is presented for Yap State (in general, not a PA specific assessment) to help inform the GCF Proposal to support decision making with regards to EbA measure implementation for PAs to help support climate change adaptation.

	Precipitation change	Storm Intensity and frequency	Sea level rise (including storm surge)
Time frame	Chronic	Acute	Chronic
Modified risk		**EXTREME**	**EXTREME**
Adaptive capacity	**LOW**	**LOW**	**VERY LOW**
Vulnerability (climate stressor)	**HIGH**	**HIGH**	**HIGH**
Vulnerability (to PAs)	**HIGH**		

5.2. Republic of Palau

5.2.1. Protected Area Overview

The Republic of Palau is located in the northern Pacific Ocean in the region of Micronesia. Palau is composed of more than 340 islands that are grouped into 16 states, yet only nine islands are inhabited. The country has a total of 490 km^2 of land area and an EEZ of approximately 616,000 km2. At the time of the last national census (2012), the total population of Palau was 17,501.

The Palau Protected Areas Network (PAN) was established by national law in 2003, establishing a framework for a national system of protected areas.[159] To access PAN funds, PAN member sites must have a management plan that meets strict requirements. In return, states and communities owning PAN member sites agree to effectively conserve the natural resources in the protected areas.[160]

The PAN sites provide a mix of watersheds and coastal/marine areas.[161] Within the PAN, 41% of Palau's nearshore marine areas (defined as out to 100 metres depth; and which includes mangroves) were formally designated PAN Sites.[162] 10% of Palau's terrestrial areas were formally designated PAN Sites. This, however, lags behind global averages. Significant terrestrial area is protected outside of the PAN. There is an additional 53 km of terrestrial protected area in Koror, Sonsorol, and Ngaremlengui that is not yet in the PAN, representing 22% of Palau's total terrestrial area).

As of March 2023, Palau's marine protected areas have a surface area of 702.21km^2 and 32.54km^2 of terrestrial areas. Palau's warm water coral reefs cover 506.399km^2. Out of these, almost 100% are in protected areas (506.253 km^2).[163] As of 2020 Palau has 5687.71 ha of mangroves, representing a 29.55% linear coverage of the 710.72km coastline.[164] For a full list of protected areas, look at Appendix IV. The following are designated as no-take zones:

Table 4- No-take zones in Palau as of March 2023

No-take zones:	**IUCN Category**	**Total km2**
Ngelukes Conservation Area	IV	1.04
Medal Ngediull Conservation Area	Ia	0.00

[159] Includes State, community, and private protected areas may apply for membership, which enables access to technical resources, participation in a national monitoring system, and eligibility for national funding.
[160] https://pipap.sprep.org/content/protected-areas-network-pan
[161] In 2014 approximately 15% of global terrestrial and inland waters (such as freshwater streams and lakes) were protected. The global Aichi Target 11 calls for the values of 17% terrestrial protection and 10% marine protection; however, square area coverage alone does not satisfy the Aichi Target requirements.
[162] A Palauan site must be part of the PAN in order to count towards the Micronesia Challenge.
[163] UNEP-WCMC (2021), SPREP Pacific Islands Protected Area Portal. *Palau Protection Coverage.* Available at: https://pipap.sprep.org/country/pw
[164] Bunting P, Rosenqvist A, Hilarides L, Lucas RM, Thomas N, Tadono T, Worthington TA, Spalding M, Murray NJ, Rebelo L-M. Global Mangrove Extent Change 1996–2020: Global Mangrove Watch Version 3.0. *Remote Sensing*. 2022; 14(15):3657. https://doi.org/10.3390/rs14153657

Olterukl Conservation Area	IV	0.70
Oruaol Ibuchel Conservation Area	IV	0.31
Ngermedellim Marine Sanctuary	IV	0.44
Ngermasech Conservation Area	VI	2.93
Angaur Permanent Protected Area	VI	1.12
Teluleu Conservation Area	IV	0.77
Mesekelat Conservation Area	Ib	1.87
Ngardok Nature Reserve	IV	6.45
Medal a Ieychad Waterfall	III	6.13
Ngerkall Lake Conservation Area	IV	2.23
Diong ra Ngerchokl Conservation Area	III	0.91
Ungellel Conservation Area	Ia	0.01
Ebiil Channel Conservation Zone	IV	17.81
Helen Reef Conservation Area	II	106.41
Chiul Conservation Area	IV	0.35
Ngermeskang Bird Sanctuary	III	0.34
Ngerderrar Watershed Conservation Area	V	3.81
Ngerchelchuus Conservation Area	III	0.20
Ngkesol Barrier Reef	IV	109.67
Olsolkesol Waterfall Conservation Area	II	2.33
Ngemai Conservation Area	Ia	2.33
Ngerukewid Island Wildlife Preserve**	Ia	10.60

**Not all of this Conservation Area is a no-take zone. According to most recent data, the whole Wildlife Preserve is 21.21km^2.

The following protected areas fall under IUCN category Ia and Ib, which are “strictly protected areas, generally with only limited human visitation.” In areas under category Ia, there aren’t any inhabitants. Meanwhile, in category Ib, indigenous peoples and local communities can use protected areas.[165]

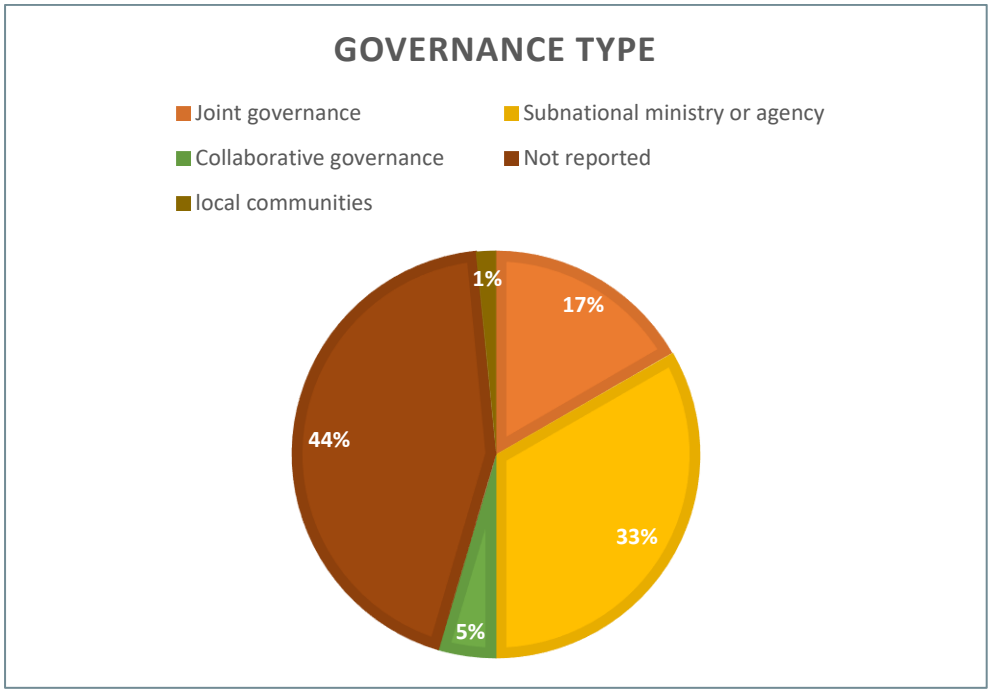
[165] Dudley, Nigel (2008) *Guidelines for Applying Protected Area Management Categories.* IUCN- Best Practice Protected Area Guidelines Series No.21 https://portals.iucn.org/library/sites/library/files/documents/pag-021.pdf

Table 5- Palau PAs under IUCN category Ia and Ib as of March 2023.

Palau protected areas	**IUCN Category**
Medal Ngediull Conservation Area	Ia
Ileyaklbeluu Conservation Area	Ia
Mesekelat Conservation Area	Ib
Ungellel Conservation Area	Ia
Ngemai Conservation Area	Ia
Chermall Forest Preserve	Ib
Ngerusebek Forest Preserve	Ib
Ngerukewid Island Wildlife Preserve	Ia

In terms of self- reported governance, according to UNEP-WCMC a third of these protected areas are managed by a government agency or ministry, and only one is fully managed by local communities.

Figure 35- Self-reported governance types of PAs in Palau[166]



[166] UNEP-WCMC (2021), SPREP Pacific Islands Protected Area Portal. *Palau Protection Coverage.* Available at: https://pipap.sprep.org/country/pw

Figure 36: Palau PAN sites, April 2022.

5.2.3. Policy and legislation regarding PAs

The Palau Protected Areas Network (PAN) was initiated as a way to institutionalize national-level support of state conservation areas, so that they can receive local, national, and global benefits. It was also through the PAN that Palau national government also aimed to meet international obligations to environmental conventions (e.g., the Aichi targets) and the impetus for President Remengesau to inspire other Micronesia States to do the same, sparking the MC in 2005. The PAN is a network of protected areas in Palau, created by Republic of Palau Public Law No 6-39. At the initiative of State governments, traditional leaders, and individuals have independently protected areas within their boundaries that have environmental or ecological significance. The national government of Palau supports the States' efforts to protect their lands and waters and encourages sustainable development of state lands.

The Palauan Constitution gives the power to manage coastal fisheries in the zone up to 12 nautical miles offshore to the 16 states that make up the country. The individual states own most of the land and sea areas in Palau (Public Land). Reefs, mangroves, and other areas below high tide are state-owned.[167] There are also customary and private landowners who lease or buy land; these are usually coastal land areas. All land transactions and development require state permission.

The Palau PAN Act and Green Fee were passed in 2003 to establish the framework for supporting marine, terrestrial (and cultural) conservation areas and providing sustainable financing to do so. The PAN Fund is an independent non-profit organization, serving as a financial trustee and manages, distributes, and evaluates the use of Green Fee collections and other funds raised for the PAN. States with conservation areas apply to "PAN Sites" through a formal nomination process. PAN Regulations layout a standardised process for nomination and acceptance of protected areas into the PAN. States apply for membership, develop a Management, and ratify the national PAN regulations (at the local state level). Once accepted, regulations governing the disbursement and reporting of funds must follow timelines.

The PAN overall is administered at the national level by the Ministry of Natural Resources, Environment & Tourism (MNRET), and administered through the PAN Office by the PAN Manager. The individual Bureaus of MNRET work to promote, protect, and manage the natural resources of Palau in areas of agriculture, marine resources, tourism, and environment. Each Bureau has governing legislations under the constitution of Palau. By design, the Palau National Government administers 0% of PAN Sites. The Palau Conservation Society is responsible for the work of the PAN and partners with national and state governments and communities to strengthen and implement the PAN.[168]

Local/municipal governments administer 100% of PAN Sites. In 2014, sites within the World Database on Protected Areas (WDPA) reported that 82% of protected sites (56% of square area) was governed by national or sub-national government entities and only 1% of sites (5% by square area) was governed by local communities. This indicates that governance of sites in Palau is more diverse and equitable than in other parts of the world. The WDPA defines governance by local governments as governance by indigenous peoples and local

[167] Michael and Rogger (2014).

[168] The Palau Monument and the Micronesia Challenge Regional Office (estimated to sign/start by May 2022).

communities. Thus, Palau far surpasses global goals for local governance, particularly in relation to PA management. Indeed, Palau is regarded as a regional leader for environmental protection and has a variety of national climate strategies and plans.

These efforts are aligned with the Micronesia Challenge, a commitment made by the Chief Executives of the Republic of Palau, the Republic of the Marshall Islands, the Federated States of Micronesia, the Territory of Guam and the Commonwealth of the Northern Mariana Islands and endorsed by The Republic of Palau's National Congress called the Olbiil Era Kelulau in House Joint Resolution No 7-60-10.[169]

The Micronesia Challenge is a challenge to place at least 30% of nearshore marine and 20% of the forest resources across Micronesia under effective conservation by 2020. The Republic of Palau believe that the States' efforts will be strengthened with the creation of a PAN Management Committee, which consults with the Ministers of Natural Resources, Environment and Tourism (MNRET).

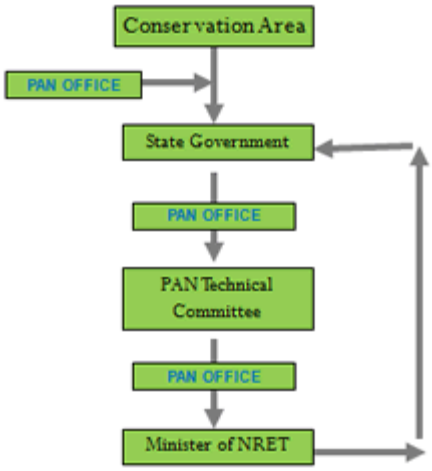


Figure 37- Institutional arrangements for Palau PA management[170]

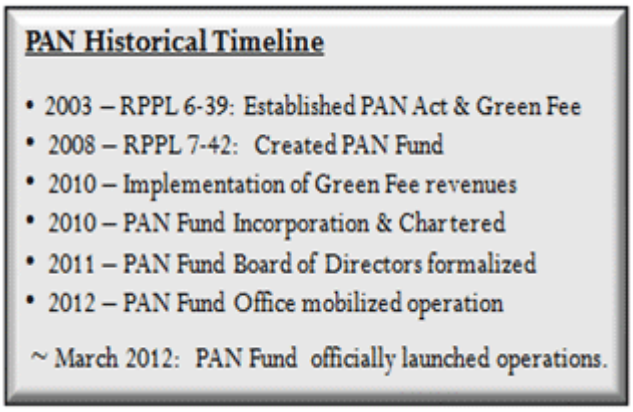
In order to support the efforts of the States to protect their resources and to attain the goal of the Micronesia Challenge, and to facilitate states' ability to access available international financial and technical resources, the Olbiil Era Kelulau believed that it was in the best interest of the Republic of Palau to create a single source of funds to channel international donations to existing and future protected and sustainably developed sites of the Republic.

All sites that join the PAN are eligible to apply for PAN funds, which will be used by each PAN site to manage its own resources in accordance with system wide goals and objectives for conservation and sustainable development. Sites that join the PAN shall not be controlled by the National Government, the state governments will continue to have ownership and governance of the PAN sites within their boundaries.

[169] https://www.palaupanfund.org/

[170] https://www.palaupanfund.org/

The Republic of Palau found that tourists and visitors were willing to contribute to the protection of the natural resources they travel to the Republic to see. An environmental protection fee ("Green Fee") enables the PAN Office through a PAN Fund to provide funds to sites within its network for environmental protection and for sustainable development. This arrival fee does not prevent states from levying separate fees for tourists' visits to sites within state boundaries regardless of whether the site has joined PAN.



Pan Timeline[171]

In March 2012, PAN Fund officially opened its doors for the 1st time to carry out its legislative mandate and mission.

An overview of legislation, strategies, and policies related to protected areas in Palau is given in the following table:

Table 6- Legislation and policy relating to PAs in Palau

Legislation	**RPPL 6-39: Established PAN Act & Green Fee (2003)** The PAN Act established the framework for planning and management of terrestrial (including cultural) and marine 179 protected areas across Palau. It also established the framework for a Green Fee to be a financial mechanism to support PAN sites (see below).
	RPPL 7-42: Created PAN Fund (2008) This law clarifies the intent of the PAN to support “the States’ efforts to protect their lands and waters” and encourages sustainable development. The law implemented the Green Fee as a fee charged to visitors to Palau and established the PAN Fund as trustee of the Green Fee revenues. The law also endorsed the Micronesia Challenge and the role of the PAN and PAN Sites in meeting the commitment.
	OEK Joint Resolution No. 7-60-10 (2010) This resolution endorsed the Micronesia Challenge and further aligned Palau’s PAN with the MC (PAN Status Report, 2015).
	The Environment Quality Protection Act (1981) Works with other acts such as the Endangered Species Act and the Protected Areas Network Act 2003 to ensure sustainable development in the country. It is regarded as the

[171] https://www.palaupanfund.org/

	most important legal policy aimed at safeguarding Palau's unique and aesthetically beautiful environment. The Environmental Quality Protection Board (EQPB) was created under this Act which is a semi-autonomous agency and an executive branch of the government of the Republic of Palau. It is responsible for the protection and proper conservation of quality of the environment and its resources to ensure sustainable economic and social development proceeds in a manner that will not jeopardise Palau's future possibilities or opportunities.
Strategies	**Nationally Determined Contribution (2015)** Palau's NDC focuses on mitigation activities in the energy, transport, and waste sectors.
	2nd National Communication to UNFCCC (2013) identifies seagrass, mangroves, watershed management and coral reefs as measures and interventions to facilitate adequate adaptation to climate change.
Policies	**The Palau Climate Change Policy for Climate and Disaster Resilient Low Emissions Development (2015)** This is a national level policy that includes three pillars: enhanced adaptation to climate change, improved disaster risk management and mitigation of GHG emissions (Palau Policy). The policy identifies the improved management of marine and terrestrial ecosystems as one of its priority interventions.
	Sustainable Land Management Policy (2012) This policy - which has been endorsed by elected and traditional leaders - aims to improve land use practices and reduce land degradation by prioritising comprehensive Land Use Planning. The policy also aims at restructuring the tourism industry from a high-impact mass tourism model to a low-impact, high-value niche tourism model (PINZ 2008).

5.2.4. Community-based management

Palau has a Protected Areas Network (PAN) Act that establishes a nationwide framework for communities to designate and manage marine and terrestrial protected areas. The Act provides standards, criteria, application processes, technical and sustainable financial assistance for management and monitoring of sites. To date, 35 protected areas have been designated, including reefs, lagoons, mangroves and a sardine sanctuary. Palau seeks to protect 30 per cent of its near-shore marine environment and 20 per cent of its terrestrial environment by 2020.[172]

Palau has a strong tradition of community involvement in the management of its protected areas. The Protected Areas Network (PAN) Act involves local communities by enabling them to undertake a scientific and social assessment of their local environment and supports traditional systems of natural resource management.[173] The Act establishes a nationwide

[172] https://www.futurepolicy.org/oceans/palaus-protected-areas-network-act/

[173] https://www.futurepolicy.org/oceans/palaus-protected-areas-network-act/

framework that empowers communities to designate and manage marine and terrestrial protected areas.[174]

The Palau Conservation Society (PCS) has been working with communities since 1994 to set up marine and terrestrial conservation areas around the country. PCS provides assistance with site selection, demarcation, deployment of buoys, sign installation, coral reef or forest monitoring, research and management plan development[175]. This project has helped PCS to improve its marine conservation area program and develop local-level management capacity through activities such as improvement of community-based monitoring and management activities for selected conservation areas; collection and incorporation of culturally appropriate best practices guidelines for community-based coral reef conservation into PCS's work; and economic valuation of coastal resources.[176]

In 2018, the Secretariat of the Pacific Regional Environment Programme (SPREP), under the European Union (EU) funded Biodiversity and Protected Areas Management Programme (BIOPAMA), provided support to Palau by convening a technical workshop on protected areas management. The workshop brought together key stakeholders: state-based protected area managers, the Palau Conservation Society, Palau PAN Office, The Nature Conservancy Palau and Palau National Marine Sanctuary and enabled them to share and discuss common protected area issues and challenges faced at the national level.[177]

Palau's initiatives are aligned with the Micronesia Challenge, a commitment to conserve at least 30% of the near-shore marine resources and 20% of the terrestrial resources across Micronesia.[178] In 2015, Palau's Congress voted to establish the Palau National Marine Sanctuary (PNMS), which covers 80 percent of Palau's national waters. Within the sanctuary, all extractive activities such as fishing and mining are now prohibited.[179]

5.2.5. Financing

Palau has been extremely successful in obtaining a sustainable financing through various sources to support its conservation efforts. One of the primary sources of funding for the Protected Areas Network (PAN) is the Green Fee. The Green Fee is the primary source of PAN funds and varies per year based on the number of visitors to Palau, as it is a departure tax non-Palauan passport holders have to pay. 100% of Green Fees go into PAN efforts, with 80% to support states conservation activities, and the remaining funds to the PAN Office, PAN Fund, and Competitive Grants. 5% of the funds that go to the PAN Fund are for Emergency Fund, Legal Reserve, and Palau's contribution to the Micronesia Challenge Endowment Fund (Palau account). The Palau Protected Areas Network Fund (PANF) is a non-profit organization created by law in 2008 to serve as a separate entity from the National Government that serves

[174] https://www.futurepolicy.org/oceans/palaus-protected-areas-network-act/

[175]https://www.ncei.noaa.gov/data/oceans/coris/library/NOAA/CRCP/project/1226/NA16FZ2961_FinalReport.pdf

[176]https://www.ncei.noaa.gov/data/oceans/coris/library/NOAA/CRCP/project/1226/NA16FZ2961_FinalReport.pdf

[177] https://www.sprep.org/news/conserving-protected-areas-in-palau-through-improving-information

[178] https://www.sprep.org/news/conserving-protected-areas-in-palau-through-improving-information

[179] https://www.pewtrusts.org/en/research-and-analysis/articles/2020/01/01/palau-national-marine-sanctuary-goes-into-effect

as the financial mechanism for the Protected Areas Network.[180] The PANF has been funding and supporting PAN and Palau's efforts in biodiversity and cultural preservation and conservation since its incorporation.[181] The collection and disbursement of Green Fees to the resource managers has enabled the states to begin building capacity in both implementation and reporting of conservation efforts.[182] The development of management plans in collaboration with relevant stakeholders essentially garnered the awareness and support of the communities who are the beneficiaries of the economic, social and environmental development of the PAN sites.[183]

Palau is among the most tourism-driven economies in the Pacific, with annual tourism receipts reaching the equivalent of 36.5%–53.4% of annual gross domestic product (GDP) during FY2010–FY2019, and COVID-19 has impacted this sector, affecting revenue collection for the Green Fee as well.[184]

In addition to the external sources of funding that supported the Micronesia Challenge, innovative sustainable finance sources were developed through One Reef Conservation Agreements to support protected area management in specific Palau communities. When communities agree to conservation, One Reef enters into a Conservation agreement to help provide services and tools needed to manage, monitor, and enforce the areas.

In addition, Palau has also experimented with crowdfunding as a means of supporting its marine protected areas.[185]

The Palau sustainable finance plan identified that a fully realized PAN of 30% marine and 20% terrestrial areas under effective conservation would cost $3.2 million annually (Gombos 2020). This cost was based on estimates from existing designated protected areas, annual conservation budgets for locally managed areas, estimates for locally managed areas using a conservation cost per square kilometre for similar sites in Palau. It also included the current expenses and needs of the PAN Office. The Plan also identifies additional funding needs, existing and potential sources, and the gap in funding that was used to develop the target the endowment.[186]

[180] https://iucn.org/our-union/members/iucn-members/palau-protected-areas-network-fund

[181] https://iucn.org/our-union/members/iucn-members/palau-protected-areas-network-fund

[182] https://www.palaupanfund.org/

[183] https://www.palaupanfund.org/

[184] ADB's Program Impact Assessment – Recovery through Improved Systems and Expenditure Support (RISES): https://www.adb.org/sites/default/files/linked-documents/54284-001-sd-02.pdf

[185] https://www.scientificamerican.com/article/island-nation-sets-up-worlds-first-crowdfunded-marine-protected-area/

[186] Of note, Palau is the only country to have met its endowment funding goal under the Micronesia Challenge and none of the target countries have yet to meet their operational funding gaps for PA management.

5.2.6. Relevant past and ongoing projects for EbA and PA

PROJECT	ORGANIZATION / DONOR	OVERVIEW	OPPORTUNITIES TO BE LEVERAGED FOR THE PROPOSED GCF EDA PROGRAMME
Mainstreaming Global Environmental Priorities into National Policies and Programmes [187]	GEF / UNDP	The goal of this project is to harmonize existing information systems and integrate internationally accepted measurement standards and methodologies, as well as consistent reporting on the status of the environment in Palau. Part of the project will support activities to strengthen the coordination between key sectors in the country to address biodiversity, climate change and land degradation.[188] The first component of the project aims to improve existing management information systems to measure achievements towards global environmental objectives. The second component of the project aims to strengthen technical capacities to monitor and evaluate the state of the environment in Palau to use improved data and information for strategic decision-making in the interest of meeting global environmental obligations. Component three includes enhancing the institutional sustainability of capacities developed under the project.	Information systems and policy frameworks being set up by the project can have complementarity with the programmatic components.
Advancing Sustainable Resource Management to Improve Livelihoods and Protect Biodiversity in Palau	GEF	This project focuses on supporting Palau's two linked national efforts to protect biodiversity and sustainably use natural resources: the Protected Area Network (PAN) and the Sustainable Land Management (SLM) Initiative.[189] Key outcomes include expanding both terrestrial and marine PAN sites, improving monitoring and evaluation tools and protocols, and improving sustainable financing for both PAN and SLM.	Increased understand of integrated ecosystem management within PAs

[187] http://climatechange.palaugov.pw/sites/default/files/documents/5049_CCCD_Palau_ProDoc.pdf

[188] Palau Climate Change.

[189] UNEP/Palau GEF Project.

PROJECT	ORGANIZATION / DONOR	OVERVIEW	OPPORTUNITIES TO BE LEVERAGED FOR THE PROPOSED GCF EDA PROGRAMME
Reviving Traditional Croplands to Improve Community Climate Resilience, Palau	USAID (through PACAM)	The main objective of this project is to strengthen community and ecosystem resilience to climate change through reviving traditional landscapes and associated ecological knowledge to increase food, environmental and economic security of communities.[190] Expected outcomes of the project include: 1. Institutional and human capacity for effective watershed management strengthened in at least two states. 2. Sedimentation reduced by 25 percent in select Babeldaob watersheds. 3. Area of land in test villages devoted to taro production using traditional techniques increased by at least 25 percent. 4. Communities in all 10 states in Babeldaob have access to Palau-specific climate change information and best practices for increasing community adaptive capacity. 5. Soil conservation best practice directory available for state government agencies. A set of resources for implementing watershed management and traditional taro farming available for decision makers and communities.	Increased understand of integrated ecosystem management, ecological systems and community-based interventions.

5.2.7. Findings of the CVA-CVI exercise for Palau

Exercise 1: Understanding key community "values" for all PA networks.

Findings from the participants of Palau presented the following as being the core "values" of PAs within the Palau PA Network (individual PA scores are presented).

[190] Palau PACAM.

Findings from the participants of Palau presented the following as being the core "values" of PAs (individual PA scores are amalgamated[191]). Overall, the findings show that for all PAs assessed, the core value "headers" of relevance are "subsistence", "cultural/spiritual" and "environmental". Economic and political values appear to be less important for PAs in Palau.

Value of PAs to participants differed slightly depending on whether the PA was marine or terrestrial, as shown below:

Marine

- Food Security
- Economy

Terrestrial

- Environmental benefits
- Cultural value
- Water Supply/quality

From the perspective and view of the participants, the key beneficiaries of PAs are presented as follows:

- Communities around the PAs
- Entire Palau
- Students
- Tourists

Exercise 2: Agreeing on terms to describe CC drivers.

Findings from the participants presented the following as being the core "climate change drivers" (stressors) affecting PAs in Palau (in order of preference).

- Increase precipitation.
- Sea level rise.
- Sea surface temperature.

Exercise 3: Possible EbA Measures for adoption

Based on general discussion and awareness of existing practices in Palau, the following EbA measures are deemed most viable for consideration within the GCF proposal (key focus of discussion was on the Melekeok MPA where watershed restoration management, sustainable forest and agro-forestry measures plus improved enforcement of the MPA EbA measures were outlined).

- Watershed restoration with green strips/buffers: Estimated as the value of securing water availability to the community of Melekeok. The results of the household survey were used to estimate mean household willingness to pay to improve water availability (US$ 44 per month to move from a situation with "moderate water availability" to "high water availability"). This is a high amount but reflects the high level of concern in the community regarding water security. The costs for the restoration of Ngerdorch watershed were

[191] PAs assessed include Natitik MPA, CSP, Palikir Pass MPA, Sapwitik MPA

associated with i) labour costs for preparing and planting an area of two hectares with lemon grass are estimated on the basis that one m2 of bare land requires approximately 72 lemon grass stalks: requiring 30 minutes of labour. Using the minimum wage rate of US$ 3.50 per hour, the total cost is US$ 35,000.

Indicative costs for EbA measure implementation are taken from work by Brander et al (2017)[192] as demonstrated in the table below.

EbA solutions	**Establishment of MPA**		**Watershed restoration with green strips/buffers**	
Area (ha)	171 ha (1.7 km^2)		2 ha (0.02 km^2)	
Time horizon	2017-2050		2017-2050	
Costs (US$)	Set-up Operation Opportunity	6,396 62,043 38,869	Planting (labour)	32,419
Total costs (US$)		***107,308***		***32,419***
Benefits	Fishery (catch increase) Coastal protection (reduction in damage)	44,039 68,286	Improvement of freshwater availability	76,670
Total benefits (US$)		***112,326***		***76,670***
NPV at 5% discount rate		**5,017**		**44,251**
Co-benefits not included in CBA	Medicinal resources, raw material, genetic diversity; primary production; carbon sequestration; cultural and spiritual heritage, recreation, tourism, education		Raw material, habitat for species; soil erosion, soil fertility, water flow, water purification	
Key messages	• The MPA option results in positive net benefits, but involves high operating and opportunity costs. This option would be more viable if it is possible to reduce operating costs. • Requires long-term commitment to comply with rules and regulations		•Restoration of Ngerdorch watershed represents the better return on investment. Benefit-cost ratio indicates that each dollar invested yields a return of over two dollars in benefits. This is largely due to the high value that the community places on water security (WTP).	

Exercise 4: Adaptive Capacity for EbA adoption

From the above, collective adaptive capacity "score" findings with regards to the adoption challenges facing EbA implementation with PAs in the State are presented below. (NB: 4 = high capacity; 3= medium capacity; 2 = low capacity and 1 = low capacity).

	Precipitation change	**Sea level rise**	**Sea surface temperature**
Time frame	Chronic	Chronic	Chronic
Local management response	3	1	1

[192] Franco, C., Brander, L., et al. (2017). Application of Cost-Benefit Analysis to Ecosystem based Adaptation (EbA) solutions for climate change: final results. The Nature Conservancy https://panorama.solutions/sites/default/files/cba_summary_micronesia_melanesia_sites-2017_0.pdf

	Precipitation change	Sea level rise	Sea surface temperature
Scientific/technical support	3	1	1
Effectiveness to address the climate stressor	2	1	1
Adaptive capacity	**LOW**	**VERY LOW**	**VERY LOW**

Results from this table suggest that Palau appears to have slightly better ability to adapt to precipitation change impacts (and hence EbA measures such as rainwater collecting systems or watershed management techniques are popular) whereas they have “very low” adaptive capacity to address EbA measures that are focused directly on sea level rise or sea surface temperature changes. This therefore means that any EbA sub-project that is designed to address SLR, or sea surface temperature must have key outputs included to help focus on matters such as “local management response” and “scientific technical support”.

Indicative CVI Score

Based on the information gathered from stakeholders at the workshop, coupled with some professional judgement, and indicative CVI score is presented for Palau (in general, not a PA specific assessment) to help inform the GCF Proposal to support decision making with regards to EbA measure implementation for PAs to help support climate change adaptation.

Indicative CVI scores suggests given the overall vulnerability being “extreme” that Palau really needs EbA projects that contain integrated components that reduce the risk of climate change stressors but also include improved adaptive capacities.

	Precipitation change	Sea level rise	Sea surface temperature
Time frame	Chronic	Acute	Acute
Modified risk	**LOW**	**EXTREME**	**EXTREME**
Adaptive capacity	**LOW**	**VERY LOW**	**VERY LOW**
Vulnerability (climate stressor)	**HIGH**	**HIGH**	**EXTREME**
Vulnerability (for PAs)	**EXTREME**		

5.3. Republic of the Marshall Islands

5.3.3. Protected Areas Overview

The RMI consists of 870 reef systems reaching up to 2.1 million km^2 of the vast deep Central Pacific. Upon these reef systems are 29 coral atolls and 5 low-lying islands, respectively 22 and 4 of which are inhabited. These 1,225 sand cays and vegetated islets all together comprise 182 km^2 of land which remain visible above water level during high tide, although these small islands represent the only potentially habitable land with a mean elevation of fewer than 2 metres. It also has a vast maritime jurisdiction with more than 6,500 km^2 of the lagoon and more than 2 million km^2 of EEZ.

RMI's total marine protected area amounts to 4343.28km^2 and 34.07km^2 terrestrial protected area, according to data collected in March 2023. For a full list of PAs, see Appendix IV. Out of these, 52 conservation areas fall under IUCN Category "Ib", which is reserved for areas with little to no significant human intervention or habitation occurring in these areas.[193] Out of these 52, 46 are designated "no-take" zones, meaning that no extractive activities can take place and there is a high level of biodiversity protection. These correspond to type II on the map shown in Figure 39.

UNEP-WCMC 2021 self-reported data, shows that over half of PAs in RMI are managed by local communities:[194]

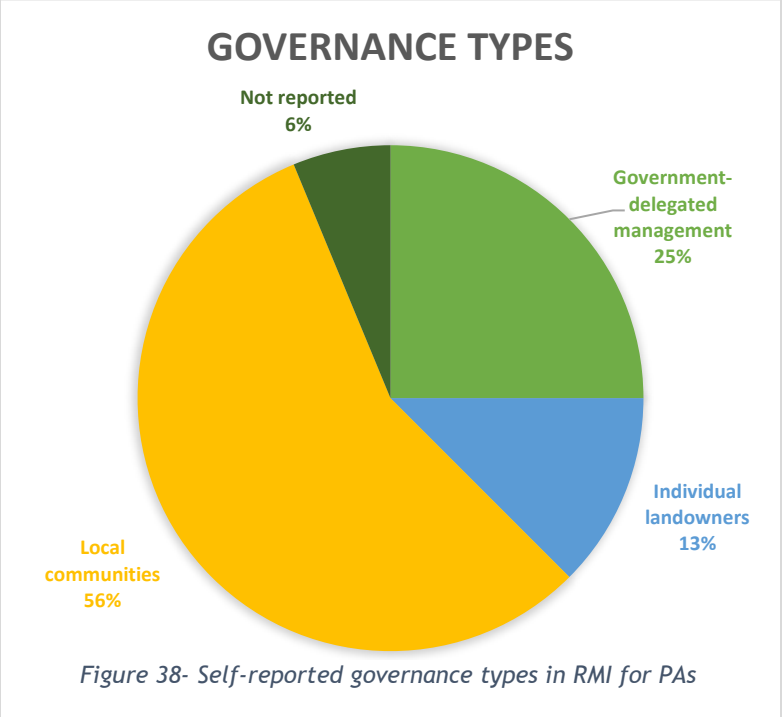


Figure 38- Self-reported governance types in RMI for PAs

[193] Dudley, Nigel (2008) *Guidelines for Applying Protected Area Management Categories.* IUCN- Best Practice Protected Area Guidelines Series No.21 https://portals.iucn.org/library/sites/library/files/documents/pag-021.pdf

[194] UNEP-WCMC (2021), SPREP Pacific Islands Protected Area Portal. *Marshall Islands Protection Coverage.* Available at: https://pipap.sprep.org/country/mh

According to 2022 remote sensing data, RMI's warm water coral reefs cover 1992.452km^2. Out of these, 18% are in protected areas (358.466 km^2).[195] The area of mangrove habitat in the whole of Marshall Islands was 32.54 ha in 2020, representing 0.25% of the 2196.35km of coastline.[196]

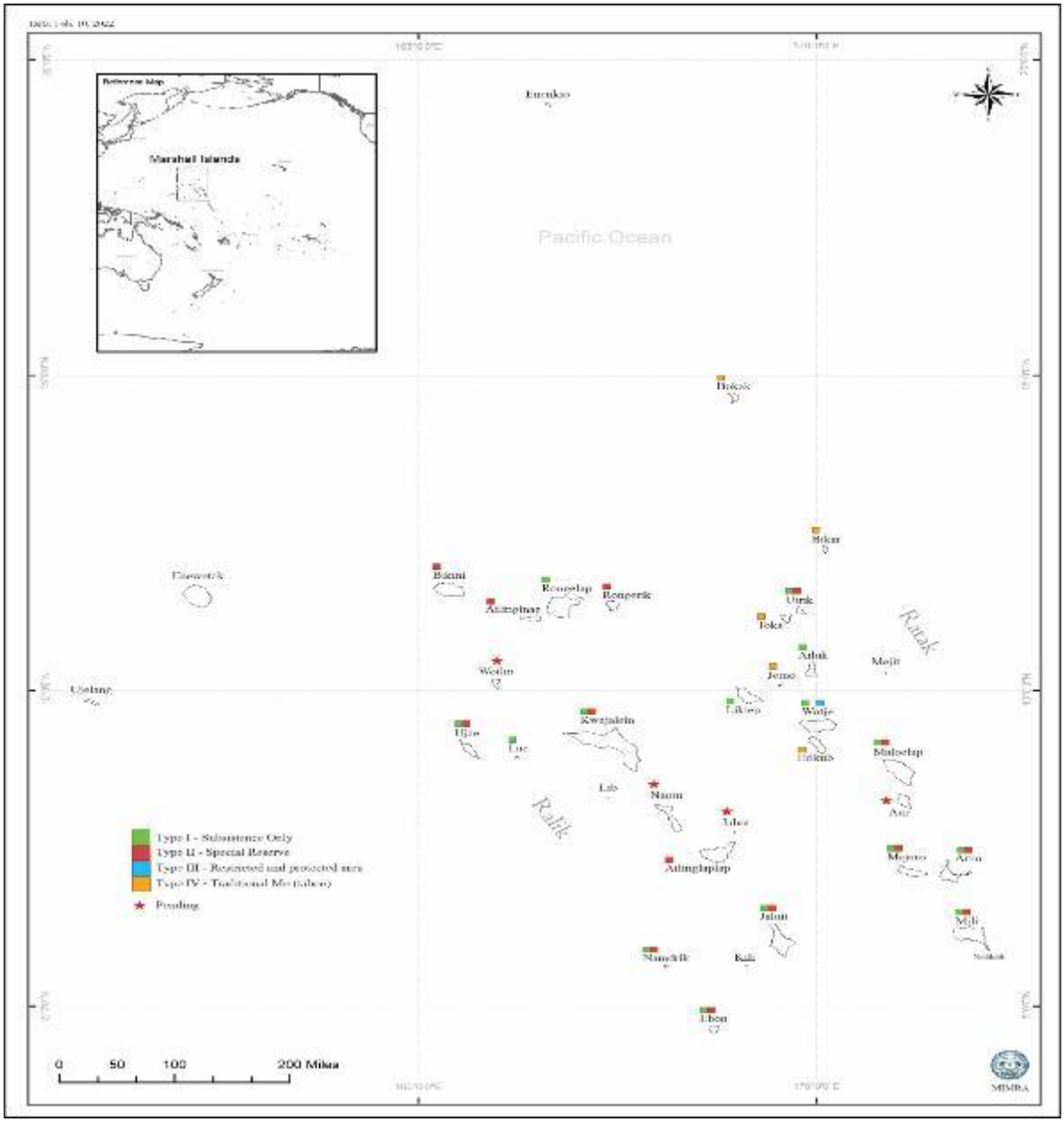


Figure 39- Map of RMI's PAs and their status as of February 2022, collected by the AE.

[195] UNEP-WCMC (2021), SPREP Pacific Islands Protected Area Portal. *Marshall Islands Protection Coverage.* Available at: https://pipap.sprep.org/country/mh

[196] Bunting P, Rosenqvist A, Hilarides L, Lucas RM, Thomas N, Tadono T, Worthington TA, Spalding M, Murray NJ, Rebelo L-M. Global Mangrove Extent Change 1996–2020: Global Mangrove Watch Version 3.0. *Remote Sensing*. 2022; 14(15):3657. https://doi.org/10.3390/rs14153657

5.3.4. Policy and legislation regarding PAs

In support of existing efforts to establish PAs under the Reimaanlok framework (see section below for more information), the Protected Areas Network (PAN) Act of 2015 was enacted to establish a national system of protected areas, a PAN Office to implement the PAN Act, and a sustainable funding mechanism to support the PAN. It was amended in 2018 to allow oversight by the MIMRA (Marshall Islands Marine Resources Authority) Board and to also include traditionally protected areas under the PAN.

The MIMRA works closely with local governments and local communities to help develop resource management plans with the support of the Coastal Management Advisory Council (also known as CMAC).

Legislation	**Protected Areas Network (PAN) Act (2015)** The PAN Act calls for a nationwide Protected Areas Network of the Republic of the Marshall Islands, designated by MIMRA and Development and after inclusion into the PAN will be eligible for assistance and support. The PAN Act identifies the need for outside funding to fund the Protected Area Network and calls for the establishment of a PAN Fund, to administer, manage, invest and disburse funding from all sources (including the Micronesian Conservation Trust), to operate the PAN, and the PAN office related responsibilities.
	The National Environmental Protection Act 1984 Provides for the establishment of a National Environmental Protection Authority for management of the environment. The Act is subject to Title I, Article VI of the Compact of Free Association by and between the governments of the USA and the RMI. The Planning and Zoning Act 1987 provides for the planning of land and water use. In practice the Act is not widely implemented and has been superseded by the Coast Conservation Act 1988 which provides i) survey of the coastal zone and preparation of a coastal zone management plan; ii) regulates and controls development activities within the coastal zone; and iii) provides for the formulation and execution of schemes for coast conservation.
	The Historic Preservation Act 1991 Promotes the preservation of the historic and cultural heritage of the Marshall Islands whilst The Marshall Islands Marine Resources Act 1997 establishes MIMRA with powers to manage and develop all resources in fishery waters (exclusive economic zone, the territorial sea and internal waters, including lagoons) and seabed.
	The RMI Maritime Zones Declaration Act 2016 Provides for all the internal waters, the archipelagic waters, the territorial sea, the contiguous zone, the exclusive economic zone, and the continental shelf of the Marshall Islands.
Strategies	**2050 Climate Change Strategy (2018)** Identifies the “urgent need to expand coastal protection measures and investments”.

	RMI National Adaptation Plan Currently under development and due for completion and adoption by the end of 2022.
	RMI's December 2020 Adaptation Communication to the UNFCCC emphasizes "Ecosystem Management, Protection and Conservation" as a focus area, and highlight the Micronesia Challenge and the Reimaanlok Framework.
	RMI's 2nd National Communication identifies impacts on coastlines, fisheries and agricultural crops in its vulnerability and adaptation assessment.
	Tile Til Eo 2050 Climate Strategy: Lighting the Way (2018) Submitted as a package with its NDC, the 2050 Climate Strategy sets RMI on a path to achieve its 2050 net zero greenhouse gas (GHG) emissions and 100 per cent renewable energy goals. It also aims to accelerate adaptation and resilience measures to achieve sustainable development and a prosperous future for its people. The plan includes numerous initiatives – such as mainstreaming gender and human rights, ensuring due diligence, including health considerations and education outreach – and establishes a requirement for it to be reviewed and updated every five years.
Policies	**National Oceans Policy (NOP) and Implementation Plan (2017)** Has been developed through a National Ocean Symposium, which was stakeholder-led and focused on guiding RMI's national leadership on its participation in international ocean and marine-related meetings. The NOP and Implementation Plan set out a roadmap for the successful management of marine resources. The National Oceans Implementation Plan identifies six priority areas for action on the new NOP, which includes plans to put the PAN legislation into action.

5.3.5. Community-based management

RMI began initiating the establishment of community-based conservation areas nearly a decade before the Micronesia Challenge. Different local and national governments facilitated these efforts through different processes and approaches. After committing to the conservation goals of the Micronesia Challenge these efforts expanded, and so the Marshall Islands recognized a need for a national framework for conservation planning that reflected a unique and locally tailored approach.

To this end, in 2008, the Reimaanlok framework was developed through a locally driven and collaborative approach that guides conservation to this day. "Reimaanlok" is Marshallese for "looking to the future, together." This approach is considered the mechanism in which the RMI sub-branded MC Challenge in Marshallese and with the phrasing "for our perspective instead of toward the rest of the world." The document was developed with a core team made up of members from the Coastal Management Advisory Committee (CMAC). CMAC is a working group represented by a range of organisations involved in conservation, development, and management of coastal resources.

The Reimaanlok framework is an eight- step process that can be initiated by either a local community, local or national government representative. At present the scope of the

framework is primarily focused on marine conservation, rather than coastal adaptation to climate change. The figure below outlines the status of Reimaanlok planned activities undertaken to date as per the Reimaanlok process (as of October 2021). Those atolls at Step 4 and higher will have a Socio-Economic Plan produced whereas those Atolls at Step 5 will have a separate Management Plan produced (that embraces the findings of a vulnerability assessment and Local Early Action Plan – LEAP).

Figure 40: Overall status of Reimaanlok community-based resource management planning, by site

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

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

*Lib marine survey yet to be conducted
**Jaluit Atoll Conservation Area Plan from 1999 needs to be revisited

Inclusive and deliberative processes are already present in natural resource management practices as demonstrated in RMI by the Reimaanlok framework - a national framework for community-based conservation area planning and management in the RMI. A key strength of the framework is its underpinning objective of merging conservation practices from the biophysical sciences with traditional community-based atoll practices and processes to achieve mutually agreed outcomes. Consequently, the Reimaanlok framework (circa 5 years in duration) and associated village/community engagement practices likely contain the necessary processes and practices to support the National Adaptation Plan (NAP) process to determine coastal adaptation to climate change within atoll communities, particularly in the outer islands. Moreover, a “climate lens” dimension has been added to the Reimaanlok process, including the Island Height and Flood Risk Assessment Local Early Action Planning (VA-LEAP) Tool. This has been initiated at a few sites, but the process needs to be mainstreamed across sites.

The Reimaanlok process has accumulated a large amount of natural resource-focused information. Unfortunately, the information is scattered between different agencies and no synthesis and analysis that has been done at this juncture.

Traditional cultural practices in Marshall Islands have always promoted conservation and sustainable resource management. In return, the Marshallese have been nurtured by the islands, atolls, and ocean around them for thousands of years. The Reimaanlok promotes cultural insights held by local leaders and communities and augments them with rigorous scientific studies of the local environment. This approach empowers well-informed, community-led conservation. Women, men and young people representing diverse interest groups across the community form a Local Resource Committee who lead discussions that inform localised resource management plans. This process often takes several months, even

years, to complete, before the plan is eventually signed off by the mayor and traditional leaders and endorsed for implementation.

In this way, the Marshall Islands Marine Resources Authority (MIMRA) has been successfully developing resource management plans across Marshall Islands. To date, sixteen coastal communities are managing their own fisheries areas, and more than 20 coastal fish resource sites have been assessed and are ready to implement their plans. In 2020, in part due to work of the Reimaanlok, Marshall Islands announced that it had achieved its 2020 Micronesia Challenge goal. RMI has met the 30% but there are many more atolls and communities that are waiting to be a part of the Reimaanlok and Protected Areas Network, so the network is likely to expand in the coming years (with donor support).

5.3.6. Financing

According to the Micronesia Challenge Terminal Evaluation, the RMI sustainable finance plan under the MC estimated that conservation of PAs would cost 1.9M USD annually, based on estimates for community-based conservation costs across 25 atolls and network-wide coordination and activities. It also identified an annual funding gap of 0.64M USD for conservation areas.[197]

Under the MC, RMI has obtained significant amounts of grant funding to support MC-related activities in protected areas from the Global Environment Facility, under their Small Grants Program housed by the AE of this project (Micronesia Conservation Trust). As of 2018, RMI's endowment is of 3.95M USD.[198]

5.3.7. Relevant past and ongoing projects for EbA and PA

Project	Organization / donor	Overview	Opportunities to be leveraged for the proposed GCF EDA programme
Pacific Resilience Project Phase II for RMI	GCF / World Bank	This project focuses on enhancing the resilience of coastal infrastructure in the capital Majuro and the island of Ebeye. This includes improving resilience to the increasing risk from sea-level rise and changes in waves and storm surge, strengthening preparedness of its population to disaster	Increased understanding of climate change threats and adaptive capacity increased.

[197] M. Gombos (2020) *Micronesia Challenge Evaluation.* Available at: http://themicronesiachallenge.blogspot.com/p/community.html

[198] Ibid.

Project	Organization / donor	Overview	Opportunities to be leveraged for the proposed GCF EDA programme
		events and providing financial support for climate-related and other disaster responses.[199]	
Addressing climate vulnerability in the water sector (ACWA) in the Marshall Islands (Adaptation) FP112	GCF FP112	This project will increase the resilience of water resources for drinking and hygiene in the Marshall Islands. Planned interventions include improving household and community rainwater harvesting and storage structures and securing groundwater resources from seawater intrusion. The project will also strengthen the technical capacities of national and subnational institutions and key stakeholders to integrate climate change risks into water governance processes.	Increased understanding of climate change threats and adaptive capacity increased.
RMI Aquaculture Fisheries Project, Marshall Islands	USAID (through PACAM)	The main objective of this project is to improve economic resiliency and food security on Majuro atoll through developing the local aquaculture sector.[200] Expected outcomes of the project include: 1. An operational feed mill will produce up to 1,450,000 pounds of feed over the life of the project. 2. Twelve open ocean cages in Majuro producing 380,000 pounds of fish over	Increased understanding of climate change threats and adaptive capacity increased. Experience implementing land-use management projects.

[199] GCF RMI.

[200] RMI PACAM.

Project	Organization / donor	Overview	Opportunities to be leveraged for the proposed GCF EDA programme
		the life of the project. 3. A replicable model of feed and fish production in a limited resource environment. 4. Trained Marshallese with capacity to apply their higher-level skills at aquaculture organizations, and to share new knowledge with other Marshallese. 5. Improved livelihoods and sustainably managed small and midsized farms.	
Namdrik Atoll Pearl Farming: Linking Adaptation and Livelihoods, Marshall Islands	USAID (through PACAM)	The main objective of this project is to reduce the vulnerabilities associated with climate change faced by the Namdrik Atoll's coastal community through income-generating, sustainable small-scale aquaculture ventures, lagoon management capacity building and resiliency improvement.[201] Expected outcomes of the project include: 1. Increased the pearl farm's operational efficiency and sustainability. 2. Strengthened livelihoods and increased capacity	Increased understanding of climate change threats and adaptive capacity.

[201] RMI PACAM.

Project	Organization / donor	Overview	Opportunities to be leveraged for the proposed GCF EDA programme
		of local community to adapt to the impacts of climate change. 3. Improved the technical and governance capacity of the community. 4. Lagoon resource management plan that more fully encompasses pearl farming activities.	

5.3.8. Findings of the CVA-CVI exercise for RMI

Exercise 1: Understanding key community "values" for all PA networks.

Findings from the participants of RMI[202] presented the following as being the core "values" of Pas within the RMI PA Network (individual PA scores are presented). Scores relate as follows:

Key:	
1	important value
2	usually only a minor value
3	not a value of relevance/or considered

Exercise 2: Agreeing on terms to describe CC drivers.

Findings from the participants presented the following as being the core "climate change drivers" (stressors) affecting Pas in RMI[203] (in order of preference).

- Increase precipitation.
- Sea level rise.
- Sea surface temperature.

Exercise 3: Possible EbA Measures for adoption

In this exercise, participants were presented potential EbA opportunities, and they discussed the relevance of each, as well as ongoing work on each opportunity in the RMI.

[202] Notes taken by Dua Rudolph and Leimomie Masumoto (RMI National Support team).

[203] Based on an assessment of PAs for Wotto, Namdrik, Ajeltake (Majuro) and Likiep

EBA opportunity 1: Mangrove replanting/restoration to improve coastal community resilience.

- Namdrik stated that the community had conducted a mangrove replanting project in the past. The project halted due to the organizers being incapable of purchasing mangrove seedlings from the community members.
- Ajeltake stated that the community conducted a coastal vegetation replanting project that supplied community members with pandanus seedlings. This is an MCT sub-project.

EBA opportunity 2: Sustainable Forest and agro-forest management and climate-smart agriculture

- Ajeltake stated that the community is currently undergoing a project to supply households with food trees for food security and coastal trees for shoreline protection. This is an MCT sub-project.

Likiep stated that the community has recently initiated a project to produce tar pits for food security and they now have a plant nursery.

EBA opportunity 5: Ecosystem Based Fisheries Management (EBFM)

- All participants agreed that as they've established MPAs, and they have taken part in EBFM.

EBA opportunity 6: Coastal wetland conservation and restoration

- Ajeltake and Namdrik are undertaking coastal replanting projects.

EBA opportunity 7: Coral reef restoration and restoration

- Ajeltake mentioned that the clam farm organizers have conducted a coral replanting project and have a positive outcome as the replanted corals have grown significantly, however the community has no part in the initiative.
- All participants recognize the value of coral restoration however their communities do not have the required capacity to conduct coral restoration projects.

Exercise 4: Adaptive Capacity for EbA adoption

From the above, collective adaptive capacity "score" findings with regards to the adoption challenges facing EbA implementation with PAs in the State are presented below. (NB: 4 = high capacity; 3= medium capacity; 2 = low capacity and 1 = low capacity).

	Precipitation change	**Sea level rise**	**Sea surface temperature**
Time frame	Chronic	Chronic	Chronic
Local management response	1	1	1
Scientific/technical support	2	2	2

Effectiveness to address the climate stressor	3	2	2
Adaptive capacity	**LOW**	**VERY LOW**	**VERY LOW**

Results from this table suggest that RMI appears to have slightly better ability to adapt to "precipitation change" impacts (and hence EbA measures such as rainwater collecting systems or watershed Management techniques" whereas they have "very low" adaptive capacity to address EbA measures that are focused directly on sea level rise or sea surface temperature changes. This therefore means that any EbA Project that is designed to address SLR or Sea surface temperature MUST have key components included within the Project to help focus on matters such as "local Management response" and "scientific technical support".

Indicative CVI Score

Based on the information gathered from stakeholders at the workshop, coupled with some professional judgement, an indicative CVI score is presented for RMI (in general, not a PA specific assessment) to help inform the GCF Proposal to support decision making with regards to EbA measure implementation for PAs to help support climate change adaptation.

	Precipitation change	**Sea level rise**	**Sea surface temperature**
Time frame	Chronic	Acute	Acute
Modified risk	**HIGH**	**VERY HIGH**	**HIGH**
Adaptive capacity	**LOW**	**VERY LOW**	**VERY LOW**
Vulnerability (climate stressor)	**VERY HIGH**	**EXTREME**	**VERY HIGH**
Vulnerability (OUV or "value")	**HIGH**		

6. Proposed programmatic design for northern Pacific SIDS

6.2. Stakeholder consultations for programme preparation

Given that the programme was co-developed with national-level stakeholders and will focus on delivering ecosystem-based adaptation activities at the community level, stakeholder engagement has been prioritized to inform the design of this proposed EDA SAP programme. Annex 7 of the SAP FP– Stakeholder Consultations and Stakeholder Engagement Plan documents the stakeholder consultations undertaken in June 2022, and presents the Stakeholder Engagement Plan which will be operationalised in the implementation stage.

Stakeholder consultations were undertaken with municipal and national representatives of municipal and national institutions, and with in-country NGOs and CSOs representatives involved in protected areas and coastal and marine resources management – in all three countries of the programme – i.e., Federated States of Micronesia, Palau and the Republic of Marshall Islands. Here the findings are presented according to the chronology of the consultations.

The data and information collected as part of this exercise has allowed for assessment of the current extent of community-based adaptation projects and initiatives implemented by the involved stakeholders within the protected areas of each target country.

The consultations also collected information on capacity and technical support needed by the involved NGOs and CSOs to properly implement the localised grants through the projects under the EDA programme. Additionally, stakeholder consultations at the national, provincial and community level were conducted to define priorities, understand key barriers, refine proposed interventions, engage key partners and improve the project's design and strategy.

These consultations included a specific focus on gendered aspects of vulnerability to climate change as well as entry points and opportunities for ensuring equitable participation in and benefit from project activities. This section summarises the main findings – as they pertain to programme design.

6.2.3. Palau (8 June 2022)

The Palau Stakeholder Consultation was held on June 8th and was well represented by representatives from the government, both national and state levels, non-government organizations, and international organizations such as The Nature Conservancy and RARE, who are currently working in Palau. In total, 27 participants were present.

6.2.4. Republic of Marshall Islands (9 June 2021)

The Republic of the Marshall Islands held their stakeholder consultations on June 9th, 2022, at the Marshall Islands Resort. The attendance was low due to change of government Cabinet members and last-minute meetings called by the new Ministers, which took away many of the government stakeholders. However, the group of participants that were able to meet where ones that directly work with communities of Protected Areas and were knowledgeable enough to provide quality information for the working groups. The meeting was facilitated by the Director of the Marshall Islands Conservation Society and attendees included staff from the Ministry of Culture and Internal Affairs, the Ministry of Environment, the Climate Change Directorate, and the Office of the Chief Secretary. In total, nine people attended the meeting, including the main conservation NGOs, IOM and a representative from the University of the South Pacific Campus in Majuro.

6.2.5. Federated States of Micronesia (10 June 2021)

The FSM held four state level consultations as well as a national government consultation concurrently on July 10th, 2022. 81 participants joined in the meetings with high level government officials joined by NGOs, community members and representatives from international organizations working in the FSM. Each jurisdiction joined in for a formal presentation and then broke into groups to answer the stakeholder questions.

Annex 14 documents the findings of the stakeholder consultations and presents the Stakeholder Engagement Plan.

6.3. Programme rationale: Simplified Approval Process and Enhanced Direct Access

During the preparation of this programme – on World Environment Day 2021 – the United Nations General Assembly declared this crucial decade (2021 – 2030) to be the United Nations Decade on Ecosystem Restoration. Restoration of Micronesian ecosystems – on which large sections of the Micronesian populations are reliant – responds to both the regional needs and global momentum, and therefore, is the core rationale of the programme.

This was reiterated during the design phase of this programme. As the stakeholder engagements conducted for this programme revealed: natural resource-reliant communities are highly vulnerable to the compounding effects of climate change and environmental degradation. Alongside anthropogenic factors, climate change is impacting ecosystem goods and services, inducing hazards through intensifying natural disasters, and exhibiting overall trends such as: sea-level rise, changing temperature and rainfall patterns. Yet, these communities, in varying amount, have also become hubs in implementing localized climate coping mechanisms while dealing with compounding and disproportionate effects of climate change on ecosystems and protected areas.

Further, the consultations identified both the limited human resources involved in addition to limited communication as well as coordination that plague actions towards ecosystem

restoration and protected areas. There is a need to strengthen facilitation between existing programme, coordinate more locally led projects, with involvement of existing *de facto* systems at the community level.

Rationale 1: This programme will have wide-ranging benefits and address a funding gap in the expenditure *status quo* of ecosystem restoration and PA management.

PAs and other natural areas are a public good in Micronesia that provide a variety of ecosystem services that add socioeconomic and environmental benefits. SIDS rely heavily on the ecosystem services provided by their protected areas and biodiversity hotpots. **Although these benefits are quantifiable, due to the public nature of the good, private entities and financial institutions are unlikely to finance programs that support and improve these areas to assist in their adaptation to ongoing and future impacts from climate change.**

Currently, **in FSM, Palau and RMI:** a majority of ecosystem restoration and PA management is funded by the public sector, with the exception of other donor-funded projects in the region with similar targets. However, funding for these areas is limited due to fiscal constraints of the SIDS: the governments have limited sources of revenue due to small and internalized market size; limited regional and global connectivity to supply chains as well as a restricted pool of resources.

For example: **Palau is the only country** to have met its endowment funding goal under the Micronesia Challenge, and none of the target countries have yet to meet their operational funding gaps for PA management. Additionally, the donor funded projects that have been completed and are ongoing do not allocate funding for an overall increase in capacity for the regions' PAs. Therefore, there is a distinct need for funding to increase the capacity of PA management and implement priority adaptation projects to effectively respond to the threats posed by climate change. GCF's investment of approximately USD 9 million is therefore filling in the gaps of an existing system of regional PA management that requires outside financing to implement measures and priority sub-projects that will enable these areas to effectively adapt to climate change.

Further, spending on climate change in all three countries has thus far been tilted towards mitigation as opposed to adaptation.

In Palau, the Palau PAN Status Report (2003 – 2015) identified the need for long-term, sustainable financing of PAN sites along with improved capacity building and in-network communication.

In FSM, the Sixth National Report to the Convention on Biological Diversity cites a lack of available financial resources to complete monitoring efforts of protected terrestrial areas in FSM. Additionally, the report cites a lack of understanding from state-level leaders regarding the need to support conservation efforts. A recent regional study has estimated that over the 2011–2018 period FSM spent around US$8 million per year on climate related projects (IMF 2019). This equated to around 2.7 percent of 2018 GDP. However, over half of this expenditure was aimed at mitigation projects, in particular, in building renewable energy provision. The amount spent on adaptation, around 1.2 percent of GDP annually, appears broadly comparable to current levels observed in the other countries where CCPAs have been conducted (around 1–2 percent of GDP annually).

In RMI, funding to continue monitoring displays paucity. The 2050 Climate Strategy indicates that long-term financing is a major barrier to implementing adaptation measures, which include protected area management. The Reimaanlok process provides an excellent framework to capture baseline data to monitor over time. However, due to the vast geography mentioned prior, funding to monitor progress over time will be significant, and it's unclear how it will be sustained. This also includes tracking what has been implemented where.

This programme is expected to have the following GCF Impacts:

<table>
<tr><td colspan="2">IRMF indicators</td><td>GCF results areas</td></tr>
<tr><td>Core 2</td><td>Direct and indirect beneficiaries reached</td><td>ARA1-4</td></tr>
<tr><td colspan="3">Mid-term:
Direct: 1360 (Male: 6977; Female: 6703)
Indirect: 16865 (Male: 8601; Female: 8264)

Final:
Direct: 34200 (Male:17442; Female: 16758)
Indirect: 42163 (Male: 21503; Female: 20660)

Direct beneficiaries were estimated based on the expected breakdown of the overall grant envelope per EbA and country. (This was acquired through the second round of consultations - see Cover Page sheet of the Excel submission for the results and country pages for details)

For each EbA a ratio of cost/USD was estimated based on secondary data and verified from the EE through consultations.

Based on the figures generated, a methodology with the following assumptions was developed to avoid double-counting:

i. Average number of EbA intervention types proposed per site (FSM and Palau = ~3; RMI = ~2)
ii. Assumptions. Made on #of EbA intervention types carried out per site (FSM and Palau = 50% of sites with 1 intervention; 50% of sites with 2 interventions; RMI = 75% of sites with 1 intervention; 25% of sites with 2 interventions.
iii. In addition, however, sites with 2 interventions will not always have total overlap of beneficiaries; with the assumption that beneficiaries from one intervention are also beneficiaries of the 2nd intervention 75% of the time.

Indirect beneficiaries were estimated based on the population density multiplied by total protected area coverage of each state. Population density of each state was calculated by collating total population per state from secondary sources, divided by the total land area (in hectares). Next, the protected areas were grouped for each state. Lastly, the terrestrial protected areas (where beneficiaries live) were used, as marine protected areas are large and distorted the figures.

By mid-term, due to Y1 focus on programme set up, it is expected that 40% of the direct and indirect beneficiaries will be reached.

By end-term, it is expected that 100% of beneficiaries will be reached.</td></tr>
</table>

Additionally, gender disaggregation was calculated by averaging % of female population in FSM (49.7)[204], Palau (48.0)[205] and RMI (48.9)[206] = 48.8 (rounded off to 49%).

It should be noted that mid-term evaluations may impact upon the estimates as programme realities emerge.

For ARA 1 and ARA 4 specific methodologies, consult Annex 2a, Logical Framework.

Core 4	**Hectares of natural resource areas brought under improved low-emission and/or climate-resilient management practices**	**ARA1-2**

Supplementary indicator 4.1: Hectares of terrestrial forest, terrestrial non-forest, freshwater and coastal-marine areas brought under restoration and/or improved ecosystems. The table below shows only an indicative potential estimated number of sub-projects per EbA measures. Sub-projects will ultimately be driven by the context and needs of the proponents requesting sub-grants as a prescriptive preselection of sub-projects ex-ante weakens the EDA approach of building the capacity of proponents to identify, prioritize and develop the projects.

Measures	**Average Size project**	**Costs/hectare or linear km****	**Average number of ha (or linear km **) per sub-project**	**Estimated number of sub-projects**	**Potential N. of ha**	**Potential N. of linear km**
Mangrove conservation and rehabilitation to improve coastal community resilience	50.000	1.300[207]	38	9	346	
Coastal wetland conservation and restoration	100.000	6.600[208]	15	6	91	
Beach conservation and restoration-hectares and protected beaches**	100.000	22.500[209]	4	9		27
Coral reef conservation and restoration	150.000	30.000[210]	5	6	30	
Seagrass conservation and restoration	150.000	22.000[211]	7	3	20	

[204] https://data.worldbank.org/indicator/SP.POP.TOTL.FE.ZS?locations=FM
https://data.worldbank.org/indicator/SP.POP.TOTL.FE.ZS?locations=FM-PW-MH

[205] Ibid.

[206] Ibid.

[207] https://www.wetlands.org/publications/community-based-ecological-mangrove-restoration/

[208] https://www.thegef.org/projects-operations/projects/9431

[209] https://www.igci.org.nz/dunes/costs

[210] https://www.thegef.org/projects-operations/projects/10535

[211] Brander, L., Hughes, L. Franco, C. (2016) Cost-Benefit Analysis of climate change adaptation options for Ahus Island, Papua New Guinea. The Nature Conservancy

Sustainable forest and agroforest management for climate-resilient agriculture	50.000	500[212]	100	6	600	
Ecosystem based fisheries management	50.000	1.000[213]	50	6	300	
Watershed management and soil conservation and management measures	50.000	500[214]	510	6	600	
Community-based management actions to support PAs and Buffer Zones	50.000	1.000[213]	50	6	300	
Total					**2,288**	**27**

Core 5	**Degree to which GCF projects/programmes contribute to strengthening institutional and regulatory frameworks for low-emission climate-resilient development pathways in a country-driven manner**

Through the EDA programme, the Micronesia Challenge which is a regional initiative aiming to effectively manage at least 50% of marine resources and 30% of terrestrial resources across the region of Micronesia by 2030, will be scaled up. Under this programme, ecosystems and ecosystem services (i.e., improved watershed health, food security, coastal resource protection, etc.) will be made more resilient to climate change through improved management and the implementation of priority EbA measures in protected areas and other natural areas. Additionally, this programme will ensure that EbA and PA sub-projects, funded through the SGFs, are in coherence and consistent with the NDCs, climate change policies and other frameworks and will result in increased climate resilience and adaptation in each country.

Core 8	**Degree to which GCF projects/programmes contribute to effective knowledge generation and learning processes, and use of good practices, methodologies, and standards**

The programme envisages the implementation of a knowledge management and applied learning system (KMAL) for EbA and PA, which is consistent with the PAN programs for FSM, Palau and RMI. Further, the implementation arrangement lays out a robust MEL system. Through this programme, the dissemination, usage and harmonization of data relating to EbA, PA and climate change will be improved in the target countries, as well as the overall region, leading to better project/programme design and implementation in later phases. The programme will anchor the knowledge, best practices and lessons learnt and information generated from the programme into existing, accessible platforms and promote their usage, as opposed to establishing parallel systems. GCF funding will, therefore, contribute to not only establishing a KMAL system but also towards improving the distribution and interlinking strategies to ensure that current levels of data paucity and information gaps are addressed.

Rationale 2: This programme has been designed in an Enhanced Direct Access format, as well as being proposed through the Simplified Approval Process

[212] https://www.fs.usda.gov/psw/publications/documents/psw_gtr140/psw_gtr140_manner2.pdf
[213] https://panorama.solutions/sites/default/files/cba_summary_micronesia_melanesia_sites-2017_0.pdf
[214] https://www.fao.org/3/a0270e/A0270E06.pdf

As stated by IPCC (2022), safeguarding biodiversity and ecosystems (within PAs) is fundamental to support climate resilient development, in light of the threats that climate change poses to them and their roles in adaptation and mitigation. Recent analysis drawing on a range of lines of evidence, suggest that maintaining the resilience of biodiversity and ecosystem services at a global scale depends on effective and equitable conservation of approximately 30% to 50% of Earth's land, freshwater and ocean areas, including currently near-natural ecosystems.

Climate change has already had major impacts on each country's environment, society, and economies. As highlighted in the 2019 IPCC Special Report on the Oceans and Cryosphere, the largest climate threats for Micronesian countries include:

- Sea level rise.
- Ocean warming.
- Ocean acidification and deoxygenation.
- Changes to climate systems that are forecasted to cause increased floods and droughts.
- More intense tropical cyclones.

Section 4 demonstrates the climate impacts on PAs – and this SAP and EDA programme will have a significant potential by reorienting the current pathway towards a locally led, climate-resilient development pathway. The advantages of this design are:

- As an SAP, this programme will be ready for scaling up, and by channelling funds towards ecosystem restoration into priority areas of each country, it will boost the limited resources available to local communities to effectively manage natural assets and ecosystem towards adaptation outcomes. As an EDA, this programme will hinge the design of the Small Grants Facility based on the MCT's existing grant mechanism. Section 10 elaborates on how this will be laid out through a detailed implementation and institutional arrangements.

- This proposed programme also takes cognizance of the heterogeneity of the northern SIDS and of the gamut of actors, who are currently active in EbA and PA management, spanning different scales and issues. The EDA and SAP design of the programme will lend itself to move quicker by directing funds to eligible institutions (a provisional list is available in Appendix X) and ensure these community-based and locally based organizations are taking the lead in addressing emerging and observed climate issues.

- This programme will increase regional cooperation, communication and future scaling-up and replication of effective protected area management and community-led, ecosystem-based adaptation. The programme will build on and upscale successful interventions from other projects in the region including the Micronesia Challenge, the Pacific Ridge to Reef (R2R) Programme and Adaptation Fund project Enhancing the climate resilience of vulnerable island communities in the Federated States of Micronesia.

6.4. Programme approach: the Landscape and Blue Economy Approaches to support EbA

The previous section presents the programmatic rationale and demonstrates why this intervention has been designed to be proposed through the GCF's Simplified Approval Process (SAP) as an Enhanced Direct Access (EDA) Programme. This section elaborates the different approaches that feed into this programme design.

Locating this programme in the three-target northern SIDS – FSM, Palau and RMI, in an EDA format, ensures that local communities which play a leading and integral role in managing coastal and marine resources in cooperation with government agencies – are at the epicentre of proposing, prioritizing and delivering EbA solutions (Section 9 presents prototypes that are relevant for the target countries).

Micronesian communities have been involved in multivariate efforts and processes over many years to adapt to the surrounding environment and benefit from the ecosystem goods and services for the long term. These landscapes and seascapes vary widely due to their unique local climatic, geographic, cultural, and socio-economic conditions. However, they are commonly characterized as dynamic bio-cultural mosaics of habitats and land and sea uses where the interaction between people and the landscape maintains or enhances biodiversity while providing humans with the goods and services needed for their wellbeing.[215]

Demonstrably, in Micronesian archipelagos and beyond, these so-called socio-ecological production landscapes and seascapes (SEPLS) are coupled systems – dependent for their production on both their social and ecological components.[216] Such production landscapes have historically provided the backbone to rural economies in the islands and play an important role in the cultural and spiritual well-being of the communities that live and work in them. For example, the large terrestrial as well marine areas this programme aims to cover have historically had unique and sustainable landscapes and seascapes that have provided communities with goods such as food and fuel, and services such as water purification and rich soil, while hosting a diversity of animal and plant species.[217] They also comprise a globally significant repository of biodiversity. However, the resilience and productivity of many of these landscapes has declined as economic, social, and demographic changes in nearby communities have eroded traditional landscape management systems, as well as with compounding effects of climate change that are being driven by global emissions.

Therefore, this programme aims to mobilize a Landscape/Seascape Approach. By definition this approach will provide a framework for the programme to: to integrate policy and practice for multiple land uses, within a given area, to ensure equitable and sustainable use of land while strengthening measures to mitigate and adapt to climate change.[218] The landscape

[215] UNU-IAS, Bioversity International, IGES and UNDP (2014) Toolkit for the Indicators of Resilience in Socio-ecological Production Landscapes and Seascapes (SEPLS).

[216] United Nations Development Programme. 2017. *Community Action to Achieve the Aichi Biodiversity Targets: The COMDEKS Programme.* UNDP, New York.

[217] UNU-IAS, Bioversity International, IGES and UNDP (2014) – Ibid.

[218] State of Sustainability Initiatives (2016). The Landscape Approach – moving towards sustainable land use patterns. https://www.iisd.org/ssi/wp-content/uploads/2019/09/Landscape-Approach.pdf

approach is a natural ally of ecosystem services (and therefore – ecosystem-based adaptation methodologies), which emphasizes that the natural systems upon which humans depend (e.g., pollination, filtration, photosynthesis) require the proper functioning of the overall ecosystems of which these services are a part. Through the integration of these approaches, the programme will aim to promote “systems-level” thinking, and nudging the current practices away from the narrow, sector-specific approaches.

These approaches are particularly congruent with the community-based ecosystem-based adaptation that this programme aims to accelerate and fund in the three target countries. The sub-projects that will be identified in the implementation will involve stakeholders throughout Micronesia and must be consistent with the traditional community values prominent in Micronesian culture. This is vital to the success of the overall ability of the region to adapt to the effects of climate change. Climate risk management across Palau, FSM, and RMI is likely to be most successful if planned and designed with a motivated community, as well as eligible institutions/organizations with the capacity to absorb the funding and deliver on the project goals identified. Therefore, the programme has been designed to ensure that time, capacity and resources are invested with local communities and their leaders, forming partnerships with local stakeholders and non-governmental organizations.

6.4.3. Regional-level mechanisms

At the regional level, the mechanisms set up by the Micronesia Challenge (which are the existing facilities that this programme will rely on, in line with EDA guidance provided by the GCF) are pivotal to mobilise the programmatic approach. For example, the MC measures groups and databases that are housed at the University of Guam Marine Laboratory and at the Palau International Coral Reef Centre. This includes the MC Steering Committee, the MC Regional Office, the MC Support Team of regional and international organizations and the Micronesia Islands Forum amongst others. These are all mechanisms represent an important, regionally owned framework, on which improvements can be made (with the principles of the above-described Landscape/Seascape approach) to provide future success and are key to the present GCF programme under design.

6.4.4. National-level mechanisms

Federated States of Micronesia

In the FSM, a key strength towards implementing EbA draws from the 4 States, which have the constitutional mandate to enact their own laws and legislations to address issues relating to natural resources within the state jurisdiction. State governments hold jurisdiction over coastal waters up to 12 nautical miles from land. Beyond this, the national government has jurisdiction over the remainder of the EEZ, i.e., from 12 nautical miles to 200 nautical miles from land. The States take the lead role in ensuring that development is avoided in vulnerable areas and ensuring that critical natural systems are protected. The national government provides guidance and technical assistance to the states when needed and requested on matters related to planning, economic development, natural resources, fisheries, and the environment. In Kosrae, for example, the Kosrae Island Resource Management Authority (KIRMA) has autonomous responsibility for State Environmental Impact Assessment (EIA) Regulations and other environment-related legislation. Activities undertaken by the national

government, or its agencies, are assessed under the National Act. Otherwise, activities are assessed under the state-level legislation and regulations.

FSM has also made significant progress towards articulating a policy framework and sectoral strategies for resilience-building but there are a number of gaps and barriers (see Sections 6.2 and 6.3). Climate change adaptation is a priority for the Government of FSM, as a signatory to the United Nations Framework Convention on Climate Change and having endorsed the Framework for Resilient Development in the Pacific.[219]

Palau

Palau's culture which possesses a genuine respect for the environment, as well as traditional knowledge of how to treat the land and the sea, so that both can continue to provide for the people's needs, as well as an appreciation for the beauty of these tropical islands. This respect is reflected in the national and state governments, as well as the private sector and Palau's numerous environmental non-governmental organizations. Given Palau's population and size, it has many organizations tasked with environmental protection which help to support actions that are in line with linking to the Rio Convention. Given this status quo, this country is ready for an EDA programme, which integrates a Landscape as well as an EbA approach.

Despite numerous ecological issues, the country has maintained a pristine natural environment. While there is much work to be done to ensure that Palau's ecosystems are not degraded, there is little rehabilitation work required. Palau's work should primarily be focused on prevention, if it can quickly enact and enforce appropriate laws and regulations. The results of the assessment show that from 2008 to 2015[220] that every single PAN site has improved in effective conservation in one or more categories of the assessment tool. Particularly strong areas include: the categories of inclusion of traditional Knowledge and growth of partnerships. It also showed improvements in financial and technical resources to States, resulting in improved management factors, particularly in compliance and enforcement. However, a clear impact on the biophysical conditions of any PAN Site is not yet demonstrated (PAN Status Report, 2015).

Finally, Palau's PAN and associated Green Fee represent a model for the region, showcasing a successful approach to integrating conservation efforts with sustainable financing. The PAN model also demonstrates a highly coordinated and multilevel (local, national, regional, and international) collaboration that enables local communities to support and benefit from national goals and initiatives. In addition to the formal government PAN process and administration, there are several NGOs in Palau that have provided instrumental support. NGO's have provided key support for design and ratification of PAN law, capacity development to States for PAN site status (e.g., management planning) and management activities once PAN sites have been established; and ongoing monitoring to measure PAN progress and success. The variety of stakeholders meaningfully engaged in Palau's PAN development and

[219] http://tep-a.org/wp-content/uploads/2017/05/FRDP_2016_finalResilient_Dev_pacific.pdf

[220] The PAN Office in Palau conducted the first system-wide Protected Areas Management Effectiveness (PAME) Assessments in 2014-2015. This involved a total of 26 sites that had been in the PAN for at least a year and had a management plan.

implementation, coupled with a source of financing that provides ongoing resources to fund management activities, has pushed Palau to the forefront of conservation globally.[221]

Republic of the Marshall Islands

A good model of collaborative partnerships on conservation-focused actions in RMI includes the role of the CMAC who help to bring together a broad range of agencies and people involved atoll resource management, including fisheries, marine resource management, water quality, and climate programs. CMAC for instance plays an advisory and coordination role for all activities carried out under the authority of the member organizations and has become essential in ensuring the coordination and collaboration of national efforts in conservation. While CMAC has been a relatively informal group since its inception, the passing of the PAN Act (2015) institutionalized its role as an essential advisory body.

The Reimaanlok is an important and bespoke process that represents a key strength of RMI and links directly to its commitment to the Micronesia Challenge (MC). This includes standardised monitoring methods, which include but are not limited to the MC indicators for marine measures and more recently terrestrial and socio-economic measures. One of these steps includes collecting baseline information on marine resources, terrestrial resources, and socio-economic indicators, which demonstrates that efforts in the RMI are already adjacent to the Landscape approach as well as towards mobilizing EbA solutions. Due to the remoteness of the various atolls and limited resources (human and financial) in getting to all the active atolls, baseline assessments are still underway, except for Majuro, where ongoing monitoring has regularly been occurring for several years. Follow up monitoring will begin after baseline assessments are complete. Approximately half of the sites have 50% have baseline assessments for marine indicators. Only a small number of sites have included the SEM indicators that were recently integrated into the Reimaanlok monitoring protocols. The Reimaanlok Plan and process were recently reviewed and updated by the CMAC in 2018. The update included a more explicit climate change component and a gender focus.

6.5. Barriers of the programme

6.5.3. Insufficient financial resources to support the management of ecosystem-based adaptation measures in protected areas.

Although FSM, Palau and RMI have numerous designated protected areas throughout the three countries, there are often limited resources at the local and national level to effectively manage the natural assets and ecosystems within these areas for climate change adaptation purposes.

In FSM, the Sixth National Report to the Convention on Biological Diversity (CBD) cites a lack of available financial resources to complete monitoring efforts of protected terrestrial areas in FSM. Additionally, the report cites a lack of understanding from state-level leaders regarding the need to support conservation efforts.

[221] Micronesia Challenge Evaluation Final Report 2020.

In Palau, the Palau PAN Status Report (2003 – 2015) identified the need for long-term, sustainable financing of PAN sites along with improved capacity building and in-network communication.

Whilst in RMI, the 2050 Climate Strategy indicates that long-term financing is a major barrier to implementing adaptation measures, which include protected area management.

Whilst the updated Sustainable Finance Plan (SFP) is to be available from August 2022, the most recent Micronesia Challenge Business Plan indicates that all three countries are subject to yearly operational funding gaps for conservation areas of between 25 and 70%. Although there are projects and programs that seek to increase funding and capacity of protected area management at the regional and national levels (such as the proposed GEF project *Strengthening and Enabling the Micronesia Challenge 2030*), the lack of sufficient local and community-level resources to effectively manage protected areas to adapt to climate change stressors has not been fully addressed.

All 3 participating nations need to increase their financial capacities to address climate risks. FSM and RMI have some elements of an effective risk financing strategy in place, but these are currently not well prepared for the post-2023 context, for which provision of support through the Compact Agreement is currently unclear. While some contingency funds have been established, indemnity and catastrophe insurance are under-used, and the government relies on the provision of disaster funding from the United States through the Compact Agreement (IMF 2019), which is a form of on-going support although there is limited clarity on the envelope sizes and whether these are adequate for broader investment in EbA and PA management.

6.5.4. Constrained technical capacity at the national and local level for climate adaptation investments and EbA solutions.

The three countries face a number of capacity constraints in terms of project management, climate modelling and spatial analysis, surveillance of ecosystem and biodiversity status, and infrastructure maintenance.

Although nationwide sectoral policies and plans are quite well-developed in all three nations, implementation is often slow due to human resource constraints. Where sectors have outlined clear climate change adaptation policies or strategies, the main hurdle to implementation lies in the technical capacities necessary to implement the identified activities. Communities are therefore key in this context and need to undergo training to expand the nation's capacity and develop pools of skilled workers and qualified experts. These trainings are needed to ensure that men, women, youth are equally addressed, and that capacity is built and strengthened at all levels of government and private sector and communities.

In FSM, the GCF Country Programme further discusses the low availability of technical capacity at various levels of government and NGOs as a major barrier. The programme concluded that presently none of the FSM States have a high level of adaptive capacity required to ensure adaptation to the effects of climate change. Additionally, it was found that institutional capacity to secure sufficient funds and implement coordinated adaptation projects is also lacking. Building adaptive capacity would mean fostering the transfer, receipt and integration of knowledge across entities and stakeholders, and ultimately building long-term

collaborative problem-solving capacity. Additionally, capacity building empowers entities to address critical climate risks themselves and not solely rely on national and donor assistance.

These institutional barriers are compounded by FSM's relative geographic remoteness and the vast extent to which the hundreds of islands that make up the country are spread across the Western Pacific.[222] The State JSAPs identify the need for additional coordination between federal, State and local level adaptation policies and projects.[223,224,225,226] These State-level documents additionally highlight the lack of community-level action, which they cite as needed to effectively implement adaptation projects, but which also requires significant capacity building at the local level.

In RMI, one of the key principles of the Reimaanlok approach is to empower local communities in quantifying and managing their ecosystem goods and services. Presently the PAN operates exclusively through the capital atoll of Majuro, with site visits to the outer islands by CMAC facilitators. As the PAN grows and expands to achieve the Micronesia Challenge goals of 30% terrestrial and 50% marine conservation, it will require additional resources to cover growing network management costs increasingly in the northern atolls of the RMI, and in some cases it will be increasing important for outer island communities to take a leading role in sustainable natural resource management. Strengthening local technical capacities is imperative in order to overcome the limited support rendered to these remote communities due to poor communication infrastructure, expensive transportation options, etc.

The communities participating in the Reimaanlok process have made great strides in becoming more active stewards in the management of their terrestrial and nearshore resources, but there is a general lack of local-level capacities and demonstrable sustainable use models. Realisation of the Reimaanlok approach in the long run will depend on devolving natural resource management to the outer island communities and developing cross-sectoral enabling conditions at the national level to support the process. Currently, the supply of qualified professionals in RMI is insufficient to meet these needs.

In Palau, accordingly, for example, the Palau National Congress (Olbiil Era Kelulau) signed and ratified United Nations Conventions to showcase the country's commitments to conservation efforts. However, the challenge in implementing commitments, which normally require sustainable resources, remains. This results in a situation of unfunded mandates, unmet expectations, and incomplete implementation. Failure to coordinate the actual implementation of the various conventions results in a variety of agencies performing duplicative work in some areas which in turn lead to no work done and completed and nothing to report back as required under the relevant conventions.

The lesson is to prepare and submit policy analysis and options to inform political decisions particularly if the benefits outweigh the costs. It is also always necessary to have sufficient funding to deliver on the obligations and commitments and ensure that the funds reach the people who will be carrying out the implementation.

[222] GCF – Federated State of Micronesia Country Programme.
[223] FSM. Pohnpei Joint State Action Plan for Disaster Risk Management and Climate Change.
[224] FSM. Kosrae Joint State Action Plan for Disaster Risk Management and Climate Change.
[225] FSM. Yap Joint State Action Plan for Disaster Risk Management and Climate Change.
[226] FSM. Chuuk Joint State Action Plan for Disaster Risk Management and Climate Change.

Sustained capacity in the local NGOs also is a challenge throughout the three SIDS: as personnel through the ranks of conservation programs, they are often recruited into higher-paying government or private sector jobs or seek opportunities abroad. Such staff turnover problems hinder long-term conservation projects by causing significant portions of funding sources to be repeatedly used toward capacity development. Local adaptation projects supported by external sources of funding (e.g., climate grants) often end when the grant is over, if there is not sufficient local capacity to continue the project.

6.5.5. Limited information and data at the local and grassroots level, related to climate change and EbA measures.

The Pacific region – and the three target countries in this programme – faces the lack of quality data – particularly from some of the region's most remote locations – and this remains a critical roadblock to the region's understanding of climate issues, as well as the status of ecosystems and protected areas.

Currently, the information and data paucity regarding the state of degraded ecosystems and limited inventories present a barrier to implementation and investment which often creates a lack of confidence that EbA measures will achieve desired outcomes. Linked to this, there is a lack of coherent and harmonized data repository system across the region. This lack of data transfer and sharing is a key barrier that needs to be addressed. Improved knowledge management need to be designed and implemented, which supports and complements existing country-specific databases (including the SPREP data portals for Palau, FSM and RMI). Inoperable links are apparent on the SPREP site plus there is an ongoing SPREP project underway to create a sustainability plan for SPREP's regional support for Protected Areas. This is due to be completed by mid-2022.

Steps have been taken to improve data management in FSM, through establishment of the Division of Statistics. Systems for adequate data management for post disaster data could be improved through the use of a standardized approach and templates for collecting, reporting and sharing of weather and post disaster data. A new database in line with the standard damage and loss assessment methodology across departments is recommended, along with guidelines on how and when to enter information.

This would allow line agencies at national and subnational levels, as well as local authorities, to report damage and losses easily. It would also enable the government to access critical information for recovery planning and for reconstruction and retrofitting of existing infrastructure. Such a database would also be useful in backing up financing requests to donors. Although this initiative could be launched in the short term, a comprehensive database would take time to be fully completed.

Additionally, regional organisations such as the MC Regional Office (MCRO) do not hold many MPAME tools (6 on file only for FSM and Palau). Instead, these are housed by NGOs, PAN Coordinators and sometimes communities – and accessibility remains low. The MC Regional Office would benefit from having the functionality to help with this repository/coordinator role (to be developed under the new GEF7 initiative). SPREP – The Secretariat of the Pacific Regional Environment Programme – also has a regional-level data portal: https://pacific-data.sprep.org/, although it requires upgrading and overhaul.

6.5.6. Limited ecosystem and PA monitoring in the three SIDS, alongside insufficient harmonization of data collected on outer islands.

There is a key gap with regards to having common indicators for monitoring PA progress across different ecosystem types, including a lack of robust carbon accounting methods for different ecosystem types. The strong dependence on island communities on their ecosystems for food, livelihoods and traditional practices, provides opportunities for demonstrating how climate adaptation projects can result in direct benefits to both ecosystems and human well-being, and this quantification will also be key to attract more funding as well as design more effective projects. In all three islands, there is limited sharing of knowledge and peer to peer learning between local communities, states and countries managing PAs and current systems provide only partial data and would benefit from standardisation.[227] This hinders the amount of regional cooperation and future scaling-up and replication of effective protected area management and community-led, ecosystem-based adaptation. With reference to regional coordination, there are a number of different (non-standardized approaches) being adopted.

In FSM, Palau and RMI, the key challenges regarding monitoring and evaluation include:

- A lack of communication and transfer of knowledge between core team members that go to regional meetings and training and other agencies/organisations.
- Challenges with getting the terrestrial-monitoring complete on all sites. So far, only 5 sites have been able to be assessed for the funding and capacity challenges.
- Different methods are being used locally and regionally. In the case of terrestrial monitoring, R2R sites are being assessed differently than MC sites due to a lack of transfer and coordination among agencies and approaches.

In FSM, for example, a system for collecting information on damages and losses sustained by different sectors for high-intensity events exists. However, the development of this system was influenced by the sectors that are included for support under the Compact Agreement, rather than the needs for a functioning damage and loss database. Information on high-frequency, low intensity events is not reported in detail across ministries and information sharing across the board continues to be limited.

In RMI, whilst the Reimaanlok Framework derives from a historical emphasis on marine and socioeconomic survey methodologies since it was introduced in 2008, and whilst marine surveys and socio-economic assessments have been made for some islands, there remain a number of gaps. For example, whilst RMI has Forest inventory and analysis (FIA)[228] which reports for the entire RMI and from which analysis is extrapolated, the availability of forestry information for specific neighbouring atolls is more sporadic along with a complete lack of ground water information for the outer islands which is symptomatic of the Reimaanlok Framework's deficient knowledge base and hence capacity to achieve integrated resources

[227] IMF (2019) Federated States of Micronesia: Climate Change Policy Assessment. https://www.imf.org/en/Publications/CR/Issues/2019/09/06/Federated-States-of-Micronesia-Climate-Change-Policy-Assessment-48665

[228] See https://mcterrestrialmeasures.org/#/intro for more information.

management for neighbouring atolls (excluding those atolls currently being targeted through the RMI R2R project). This scarcity of information also impedes development of scientific based climate change adaptation strategies, something that is increasingly a concern for the atoll communities throughout RMI.

In Palau, coral reefs, lagoon, mangroves, and seagrass habitats are represented across multiple sites in the PAN. However, channels (particularly for spawning and aggregation), estuary, and mudflat/sandflats are poorly represented, with only 1 or 2 occurrences. Some marine lakes are protected in non-PAN sites. There are notable gaps in marine area representation, as identified in the 2007 Eco-regional Assessment. These include the East coast's Outer Fringing Reefs, Turtle Nesting Beaches, and Important Insect Areas. Of terrestrial sites, forests and rivers are represented across multiple sites (even though terrestrial coverage is below target across the board). The PAN also includes both (100%) of Palau's freshwater lakes and sites on both (100%) of Palau's sandy atolls. However, beach strand, raised coralline atoll, savannah, and swamp forest are poorly represented, and two birds nesting, and breeding locations (for endangered species or aggregations) are missing from the PAN. There is little limestone forest data represented (PAN Status Report, 2015).

6.5.7. Climate change risks are not sufficiently mainstreamed into environmental management and ecosystem restoration frameworks.

The lack of comprehensive inclusion of climate risks and hazards into environmental and protected areas frameworks, which includes the necessary variety of policies as well as designated implementation and enforcement agencies, is another barrier.

FSM has recognized that climate change is an existential threat and made significant strides to counter it but more action and sustained international support is required. FSM has recognized this by engaging forcefully in international discussions, setting out an ambitious agenda for mitigation and putting in place a wide range of adaptation policies and strategies. However, the Governments are currently working to acquire funding to further develop the National Adaptation Plan for FSM. Enforcement and compliance are also important policy actions that need close attention. Many FSM laws are poorly monitored, with low enforcement and compliance. This possibly has to do with the level of resources to support such work, or possibly due to poor commitment. For example: Regulation 41-97 of the Kosrae State Code specifies the type of pig pen structures to be used throughout the island state. It requires constructed pig pens to have a concrete floor and be equipped with a proper drainage pit constructed of concrete or other material approved in advanced by the Environmental Health and Sanitary Division. However, with poor enforcement and compliance to the regulation, many pig farmers have just been operating their respective pig farms using the wash down method, without having a septic tank for the pens. Without a septic tank, the washed down manure and feed are then leached into the surrounding land and bodies of water, and thereby contributing to the pollution and degradation of terrestrial PAs.

Palau is an outlier in this regard. The Palau PAN was initiated as a way to institutionalize national-level support of state conservation areas, so that they can receive local, national, and global benefits. It was also through the PAN that Palau national government also aimed to meet international obligations to environmental conventions (e.g., the Aichi targets) and the

impetus for President Remengesau to inspire other Micronesia States to do the same, sparking the MC in 2005. However, implementation of these ambitious policies remains an issue, and there is a need to ensure more cross-fertilization between environmental, climate and protected areas policies.

In RMI, inclusive and deliberative processes are already present in natural resource management practices as demonstrated by the Reimaanlok framework - a national framework for community-based conservation area planning and management in the RMI. A key strength of the framework is its underpinning objective of merging conservation practices from the biophysical sciences with traditional community-based atoll practices and processes to achieve mutually agreed outcomes. Consequently, the Reimaanlok framework (circa 5 years in duration) and associated village/community engagement practices likely contain the necessary process and practices to support the NAP process to determine coastal adaptation to climate change within atoll communities, particularly in the outer islands. Although, the Reimaanlok process has accumulated a large amount of natural resource focused information, unfortunately, the information is scattered between different agencies and no synthesis and analysis that has been done at this juncture.

6.6. Logical framework of the EDA SAP programme

6.6.3. Theory of change of the EDA SAP programme

To address the identified barriers, the programme will work towards systematically building the capacity of both the government – but particularly the NGOs, CSOs, local governments (municipal and state governments) and possible project proponents to effectively understand and respond to climate change and empower them to develop localized projects for delivering ecosystem-based adaptation solutions. Under this programme, valuable ecosystems services (e.g., improved watershed health, food security, coastal resource protection, etc.) will be made more resilient to climate change through improved management and the implementation of priority adaptation projects in PAs and other natural areas. Communities throughout FSM, RMI and Palau rely on ecosystem services from PAs and other natural areas, including for water and food resources and coastal protection, and therefore will be strengthened from the improved ecosystem-based goods and services that EbA adaptation interventions will secure.[229] Through the paradigm of the programme, national and sub-national level entities will have improved capacity to propose, design and implement sub-projects, with a focus on tailored EbA solutions.

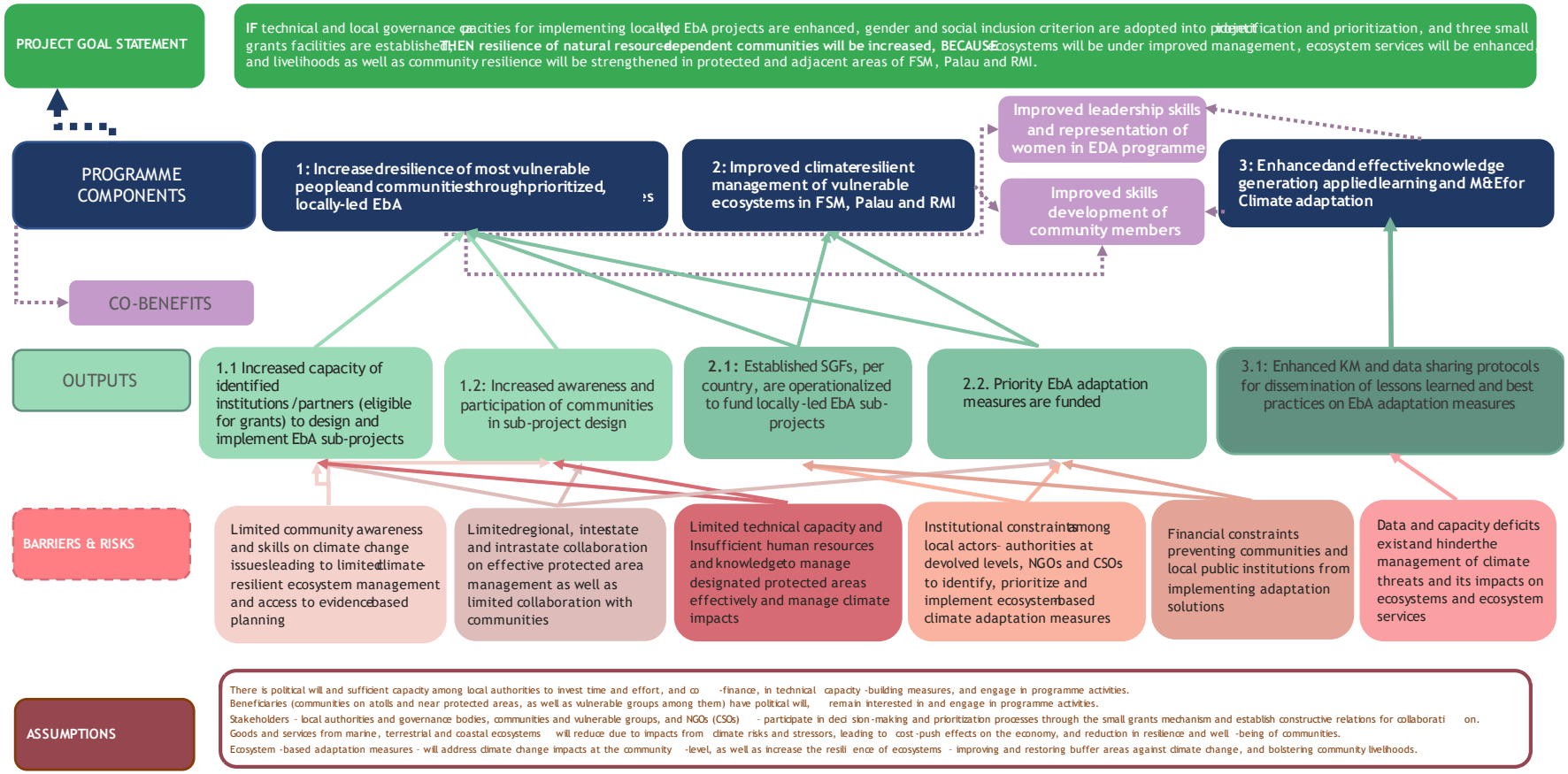
As identified above, FSM, RMI and Palau face a variety of challenges from the impacts of climate change. Specific vulnerabilities to climate change and its effects varies significantly within the broader northern Pacific, and even community to community. By improving the capacity of sub-national proponents to identify, plan for, and design projects to address climate vulnerabilities and opportunities for resilience, the programme is consistent with the broader

[229] Federated States of Micronesia – State of Environment Report 2018. Last Accessed 20 May 2021.

adaptation programs and policies for each participating country and will result in an increase in overall climate resilience of communities as well as ecosystems.

The project goal statement states that: IF technical and local governance capacities for implementing locally-led EbA projects are enhanced (owing to the current portfolio and ongoing practices on conservation, protected area management and grants being funded in the region), gender and social inclusion criteria are adopted into project identification and prioritization (recommendations have been made in the Annex 4:GAAP) and three small granting facilities are established (see the Implementation Arrangement and Operations Manual); THEN resilience of natural resource-dependent communities will be increased, (given the Pacific communities dependence on as well as stewardship of natural resources which provide current levels of resilience and future adaptation opportunities); BECAUSE ecosystems will be under improved management, ecosystem services will be enhanced (through the nine different EbA opportunities); and community resilience will be strengthened in protected and adjacent areas of FSM, Palau and RMI.

See next page for the Theory of Change – diagram.


PROJECT GOAL STATEMENT
IF technical and local governance capacities for implementing locally-led EbA projects are enhanced, gender and social inclusion criterion are adopted into project identification and prioritization, and three small grants facilities are established, THEN resilience of natural resource-dependent communities will be increased, BECAUSE ecosystems will be under improved management, ecosystem services will be enhanced and livelihoods as well as community resilience will be strengthened in protected and adjacent areas of FSM, Palau and RMI.
PROGRAMME COMPONENTS
1: Increased resilience of most vulnerable people and communities through prioritized, locally-led EbA
2: Improved climate-resilient management of vulnerable ecosystems in FSM, Palau and RMI
3: Enhanced and effective knowledge generation, applied learning and M&E for Climate adaptation
Improved leadership skills and representation of women in EDA programme
Improved skills development of community members
CO-BENEFITS
OUTPUTS
1.1 Increased capacity of identified institutions /partners (eligible for grants) to design and implement EbA sub-projects
1.2: Increased awareness and participation of communities in sub-project design
2.1: Established SGFs, per country, are operationalized to fund locally-led EbA sub-projects
2.2. Priority EbA adaptation measures are funded
3.1: Enhanced KM and data sharing protocols for dissemination of lessons learned and best practices on EbA adaptation measures
BARRIERS & RISKS
Limited community awareness and skills on climate change issues leading to limited climate-resilient ecosystem management and access to evidence-based planning
Limited regional, inter-state and intrastate collaboration on effective protected area management as well as limited collaboration with communities
Limited technical capacity and Insufficient human resources and knowledge to manage designated protected areas effectively and manage climate impacts
Institutional constraints among local actors- authorities at devolved levels, NGOs and CSOs to identify, prioritize and implement ecosystem-based climate adaptation measures
Financial constraints preventing communities and local public institutions from implementing adaptation solutions
Data and capacity deficits exist and hinder the management of climate threats and its impacts on ecosystems and ecosystem services
ASSUMPTIONS
There is political will and sufficient capacity among local authorities to invest time and effort, and co-finance, in technical capacity-building measures, and engage in programme activities.
Beneficiaries (communities on atolls and near protected areas, as well as vulnerable groups among them) have political will, remain interested in and engage in programme activities.
Stakeholders - local authorities and governance bodies, communities and vulnerable groups, and NGOs (CSOs) - participate in deci sion-making and prioritization processes through the small grants mechanism and establish constructive relations for collaborati on.
Goods and services from marine, terrestrial and coastal ecosystems will reduce due to impacts from climate risks and stressors, leading to cost-push effects on the economy, and reduction in resilience and well-being of communities.
Ecosystem-based adaptation measures - will address climate change impacts at the community-level, as well as increase the resili ence of ecosystems - improving and restoring buffer areas against climate change, and bolstering community livelihoods.

6.6.4. Programme description (tentative outputs and activities)

The theory of change in the previous section lays out how the proposed programme will link the capacity needs; current financial, technical and management barriers; and the overarching urgency of climate adaptation action in the three countries in an EDA SAP format to deliver strengthened ecosystems and communities through ecosystem-based solutions. The outcomes are listed below:

Component 1: Enhanced capacity of local entities and communities to deliver EbA adaptation measures.

Outcome 1 of the programme will ensure that local entities are empowered to design, develop, prioritize and deliver EbA solutions to climate impacts. Through this component, the programme will conduct a variety of capacity building and capacity assessment activities to ensure that eligible project proponents are well-positioned and well-supported to access EDA resources to develop and implement effective projects tailored to the ecosystem contexts – as well as community priorities – that they are embedded in. It will also provide training and technical assistance to ensure long-term sustainability of sub-project outcomes, and the capacity of sub-national actors to develop robust interventions for ecosystems and protected areas.

Output 1.1: Increased capacity of identified entities (eligible for grants) to design and implement EbA sub-projects.

This output will deliver the requisite methodology to select eligible entities, who can be sub-project proponents for the SGF, and will also build up the capacity assessment framework which will map the baseline capacities of entities and administer the capacity building programme based on this foundational exercise. Tentative activities are listed below.

Activity 1.1.1: Establish SGF rosters in coordination with EEs and NDAs per country	A preliminary list of possible roster-ready institutions, per country, have been presented in the Pre-Feasibility Study as Appendix 1. This activity will establish and utilize an improved methodology, aimed at screening and selecting eligible entities for the SGFs, per country, and use the above preliminary list as a point of departure. The methodology will require consensus and approval from the EDA Programme Board. In doing so, entities that are able to absorb funding – and/or have the scalable capacity to do so – and are involved in EbA as well as PA sectors will be shortlisted.
Activity 1.1.2: Develop and administer capacity assessment framework	This activity will develop and administer a capacity assessment framework for the roster developed during programme preparation. Vetting and identifying entities at the grassroots-level chosen for the roster will be paramount to the success of the sub-projects. This entity capacity assessment framework will be a tool to understand capacity gaps of these entities and address these through this overall Outcome (1) to ensure the entities are able to implement sub-projects. The framework will have a scoring on different parameters, to ensure quantification of different aspects required for project design and delivery.

Activity 1.1.3: Develop ToT capacity building programme based on capacity assessments	This activity will develop a Training of Trainers (ToT) curriculum based on capacity assessments conducted through Activity 1.1.2. The stakeholder consultations identified that barrier for grassroots entities range from technical to financial and administrative capacities. This ToT curriculum will be designed to address these barriers, and build up a comprehensive set of capacities, to ensure that the programme is providing adequate support/capacity development to ensure the success of the sub-projects. This will help rostered entities to originate robust project concepts, that are likelier to succeed. The SGF will be able to drive not only the demand side of sub-projects (localized EbA adaptation measures) but also improve the supply side (i.e. ensure identified entities have the capacity to deliver sub-projects).
Activity 1.1.4: Organise writeshops to deliver ToT modules	This activity will deliver the ToT modules developed as part of Activity 1.1.3. "Writeshops" will be arranged to deliver the tailored ToT curriculum to trainers/project designers within the rostered entities, who are expected to work with their colleagues internally and with communities externally to allow for assimilation of training/skills to a broader audience in a replicable manner. These writeshops will also help prioritize the EbA adaptation measures identified in the programme and ensure that the sub-projects are delivering on either/both of the themes.

Output 1.2: Increased awareness and participation of communities in sub-project design.

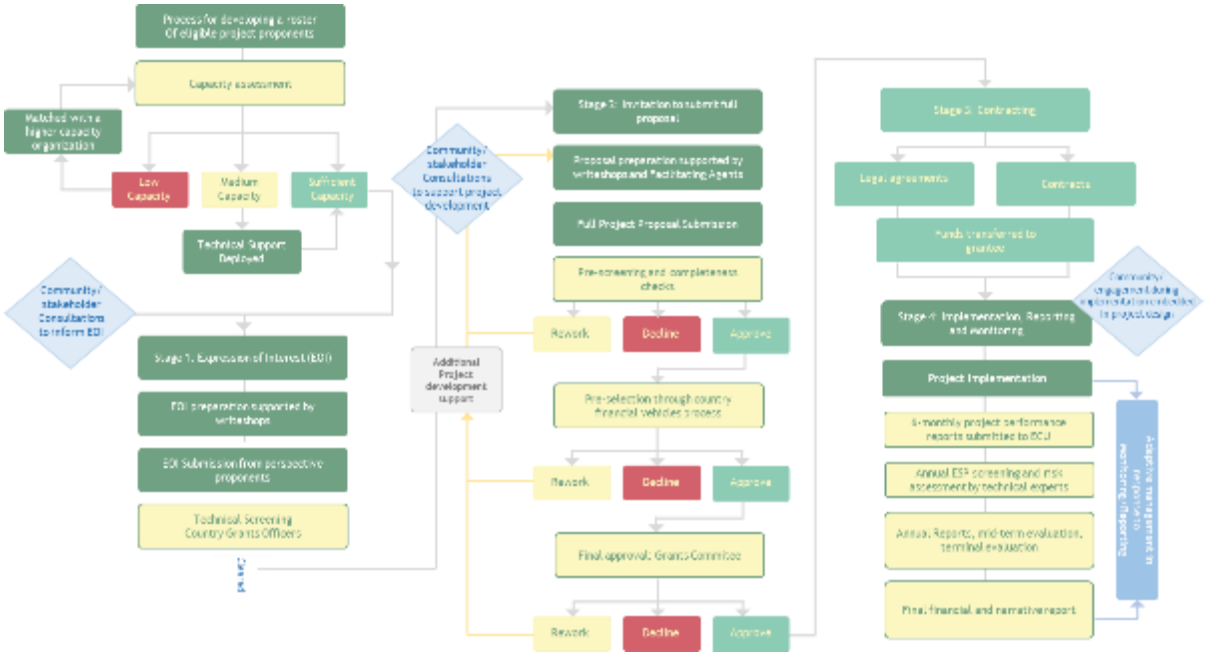
This output will ensure that, once the entities are identified, as well as their capacity assessments have been conducted, awareness and implementation training for entities and communities are organized. Awareness and implementation trainings will be organized to ensure communities – who will be direct and indirect beneficiaries of the programme – are able to implement EbA measures on the ground.

Activity 1.2.1: Organise community advocacy and training modules	This activity will be delivered in collaboration with the rostered entities (identification of priorities through writeshops in Activity 1.1.4 as well as the CVA-CVI exercise conducted for the Pre-Feasibility Study), and in combination with community visits. Awareness and advocacy trainings will be organized to ensure communities – who will be direct and indirect beneficiaries of the programme – provide inputs and consensus on the implementation of EbA adaptation measures – identified during programme preparation – at the subnational level.
Activity 1.2.2: Design and deliver peer-to-peer	This activity will focus on designing and delivering peer learning processes through the paradigm of the SGFs per

learning for communities and rostered entities	country. This activity will strengthen the peer-to-peer learning network, Micronesians in Island Conservation (MIC) which is the region's first peer learning network, established under the umbrella of the Micronesia Challenge and groups the conservation leaders from government and non-government organizations. For more information on MIC, refer to Appendix V of this Pre-feasibility study. This will be a pioneering and initiation activity, so the aim will be to establish communities of practice of varied, grassroots actors active in ecosystem-based climate solutions as well as involved in PA and conservation. Inter-community and identified entity personnel exchanges, as well as site visits will be organized to ensure cross-fertilization and diffusion of ideas as well as paralleled learning processes among the different SIDS. The EDA RPCU will be responsible

<u>Component 2: Improved ecosystem services and community resilience through locally led EbA adaptation measures.</u>

Outcome 2 of the programme will deliver the Small Grants Facility to implement and support locally led EbA sub-projects. Through this component, the programme will establish and formalize the structure and functions of the SGF, lay out step-by-step operationalization of the SGF, per country. See the SGF flowchart below.



Output 2.1: Established SGFs, per country, are operationalized to fund locally led EbA sub-projects.

Through this output, the programme establish and formalize the structure and functions of the SGF, which are detailed in the implementation arrangement (Section 11) as well as

visualize above. This will be done under the strategic guidance of the Regional Programme Board (RPB) and managed by the Regional Programme Coordination Unit (RPCU.

Activity 2.1.1: Establish and formalise regional oversight, governance, protocols and guidelines and redress mechanism for the SGFs to be implemented by each country	Through this activity, the programme will establish and formalize the structure and operationalization procedures of the SGFs, per country. This will be done under the strategic guidance of the EBA Programme Board as well and consulted with each country Advisory Council. The following, key procedures will be established: i. regional oversight and decision making ii. Governance and organizational structure iii. Protocols and guidelines for the SGFs' functions iv. Redress mechanisms embedded into each country SGF The Implementation Arrangements and Operations Manual prepared in the design phase of the programme serve as the blueprint which will be formalized through this activity.

Output 2.2: Priority EbA adaptation measures are funded through identified entities.

With this output, MCT will operationalize the SGF. Calls for expressions of interest (Activity 2.2.1) and full proposals will be launched (activity 2.2.4). Grants for adaptation investments will be screened (activities 2.2.2 and 2.2.3) and awarded (activity 2.2.4). The SGF will also support proponents through technical assistance activities, which will tie up with the Facilitating Agents sourced as part of Output 1.1. A capacity and organizational assessment (2.2.2) will determine whether the applicant has the necessary capacity to implement the proposed sub-grant. Based on the audit and sub grant screening selection, targeted technical assistance will then be provided to a) improve proponent's service delivery of adaptation interventions, and b) prepare subgrants, to ensure sufficient capacity to identify, prioritize and design a range of adaptation investments.

Activity 2.2.1: Call for expression of interest for SGF-funded sub-projects.	These activities lay out step-by-step operationalization of the SGFs, per country. Through Activity 2.2.1, MCT will ensure a transparent and competitive access to the funds provided by the SGFs, per country. The Expression of Interest will be designed with certain specified elements, such as: • geographical area of operations; the provinces/ districts/municipalities that should be covered by the

<table>
<tr><td>Activity 2.2.2: Screen and select sub-projects based on an EbA prioritization framework</td><td rowspan="2">requested subproject/s (based on information in the Pre-Feasibility Study).
• the beneficiaries (including their profiling).
• the sector and activities eligible for funding; and
• the track record, required legal status, or other features and requirements that the bidding organizations/institutions should possess to participate in the call (including roster entry as well as any documentation of training received through Output 1).
Through Activity 2.2.2, sub-projects will be screened and selected for progress to the funding stage. This EbA prioritization framework will be developed through Activity 2.1.3.

Through Activity 2.2.3, grants will be disbursed to the rostered entities proposing the selected sub-projects in each country.</td></tr>
<tr><td>Activity 2.2.3: Award grants to sub-projects, aligned with the theory of change and logframe of the EDA approved proposals.</td></tr>
<tr><td>Activity 2.2.4: Develop a sustainable resource mobilization strategy for the SGFs, by country</td><td>Through this Activity 2.2.4, second-phase planning for the SGFs in each country will be finalized and signed off by the EDA Programme Board. It will include a resource mobilization strategy that takes stock of pre-GCF and during-GCF granting made by the MCT and prepare an approach (for each country) that documents beneficiaries reached, best practices and lessons learned. This will then feed into an analysis of different climate finance mechanisms (other than the GCF), and how successful efforts can be scaled up. Additionally, it will identify the gaps / limits (both geographical and type of EbA) where EbA measures could not be implemented and propose a strategy to address this. This activity will be defined further during implementation and delivered in coordination with the Activities of Outcome 3.</td></tr>
</table>

Component 3: *Enhanced and effective knowledge generation, applied learning and M&E for climate adaptation.*

Component 3 of the programme will establish a sound knowledge management – as well as monitoring, evaluation and applied learning system - to facilitate regional cooperation and replication of effective, community-led EbA actions. The aim will be to anchor the knowledge, learnings and information generated from the programme into existing, accessible platforms and promote their usage as opposed to establishing parallel systems. A robust two, tiered L system is being proposed as well. This will include: 1. an overarching KMAL system to comply with the MCT's M&E (Monitoring & Evaluation) Policy/ MERI (Monitoring, Evaluation and Improvement Framework) as well as comply with the GCF's monitoring and accountability framework required for Accredited Entities; and, 2. a sub-project KMAL system which will be embedded in the design of the EDA SGF in three countries, to ensure that funds are allocated towards these localised interventions, once identified. The aim will be to capture the climate impact of the sub-projects that are being funded, and ensure the enabling of monitoring of

progress, and learning and evaluation, which will help formulate recommendations to improve the effectiveness, efficiency and timeliness of the SGF sub-projects.

Output 3.1: Enhanced KM and data sharing protocols for dissemination of lessons learned and best practices on EbA adaptation measures.

Through this output, KM platforms and data-sharing mechanisms will be selected and utilized for improved knowledge management on sub-projects of the programme.

Activity 3.1.1: Review available data collected by MCT on ongoing and recently closed sub-projects and establish a KMAL strategy.	A key barrier identified during the stakeholder consultation processes is the limited evidence base and KMAL processes around EbA and PA management in the Pacific. This is a part of the broader data paucity challenge in the Pacific. This barrier feeds into the limited consensus – at the national government and local government level – to coordinate and design projects for EbA as well as PA within climate adaptation action. Funding from national budgets (which are outstretched to handle external shocks such as extreme climate events and COVID-19 effects) are limited for regional cooperation, and these efforts are usually donor-led (and often, sporadic). Therefore, improved KMAL and regional coordination, for the broader Pacific and the three participating nations, is key. Through these activities, KM protocols and data sharing will be scaled up, to ensure participating countries (governments, identified entities and other stakeholders) can engage over lessons learned and best practices on EbA and PA management. This will also ensure that siloed approaches are discarded for coordinated and improved efforts for climate change adaptation. Firstly, the KMAL consultant, will stocktake and review available data through MCT granting and SGFs granting. They will also be expected to review available platforms and data sharing protocols. Through the first Activity 3.1.1, an optimized strategy for KMAL will be developed. Usage and reporting protocols to existing knowledge platforms will be codified into a KMAL protocol guideline for the programme. The aim will be to document and disseminate lessons learned, which will increase the chance of the EDA facility to last over time and potentially to initiate scale-ups.
Activity 3.1.2: Integrate data collected through SGF sub-projects and existing MCT sub-projects into regional and national KM platforms.	The Accredited Entity, i.e., MCT, will work with the KMAL consultant to streamline and systematize data collected (and provision for the data to be collected) from existing sub-projects. Executing Entities of each SGF (FSM – MCT; Palau – the Pan Fund; and RMI – the MIMRA-PAN Office) will be responsible for integrating data collected through sub-projects funded through the EDA into regional and national sub-platforms, per country. The actions to be taken – as well as the expected frequency – will

	be codified into a data protocol guideline for the programme, that will be integrated into the KMAL protocol guideline developed through Activity 3.1.1. The primary task will be to: create an inventory of reports (and other documentation, particularly impact evaluations), ToT and awareness-raising materials, lessons learnt, and case studies made available from the SGF-funded sub-projects in each country. This inventory, divided into rubrics such as 'by country' and 'by EbA measure' should be made available across the knowledge platforms shortlisted in Activity 3.1.1.
Activity 3.1.3: Design and implement digital technology for tracking SGFs (a regionally accessible app)	This will be an app for identified entities that are successful in accessing grants, to be able to access the data being generated regionally through the sub-projects. It will also allow for them to share information and data on their sub-projects.

7. Summary - Prototypes of EbA opportunities under the programme[230]

7.2. Approach to implement the EbA measures

The ecosystem-based adaptation measures considered for the project will follow, when applicable, the guidelines and the standard of practices defined by the FAO and other institutions as a contribution to the United Nations Decade on Ecosystem Restoration.[231] The practices indicate that the restoration process should be divided in five components (Figure 41).

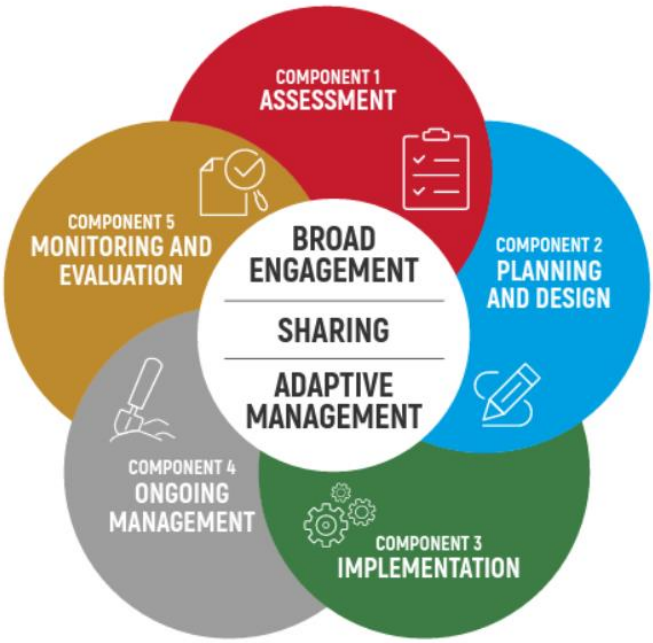


Figure 41. The five components of the restoration process along with cross-cutting subcomponents that apply throughout the restoration process.

The restoration process is not a linear one, therefore, some component and subcomponents and practices may be conducted simultaneously or in a different order than the one presented and may be revisited during the process.

[230] Please refer to separate technical report for further details: EbA Opportunities Technical Report

[231] FAO, SER & IUCN CEM. 2023. Standards of practice to guide ecosystem restoration. A contribution to the United Nations Decade on Ecosystem Restoration. Summary report. Rome, FAO. Available at: https://www.fao.org/3/cc5223en/cc5223en.pdf

Figure 42 below summarizes each component and its subcomponents to assist the restoration community with developing successful projects that will result in restoration benefits.

> *"The assessment component includes the identification and evaluation of the extent and scale of degradation, considering the site and its context within the land- and seascape. Degradation is defined as the cumulative degree to which an ecosystem's physical condition, composition, structure and function have been adversely affected by anthropogenic factors. Planning and design focuses on determining appropriate restoration activities given the ecological, socioeconomic and cultural contexts, as well as financial constraints. Restoration targets are defined, and specific goals and objectives for the restoration project are developed based on consultations with stakeholders, right holders and experts. Planning foreshadows all the onsite work that will be undertaken during the project's implementation, whereas ongoing management considers short- and long-term site needs following the completion of planned implementation activities. Finally, the monitoring and evaluation component focuses on measuring progress towards the recovery of the restoration targets and achievement of the project's goals and objectives, enables adaptive management for possible course corrections, and provides an opportunity to share lessons learned". (FAO, SER & IUCN CEM, 2023), page 2).*[2]

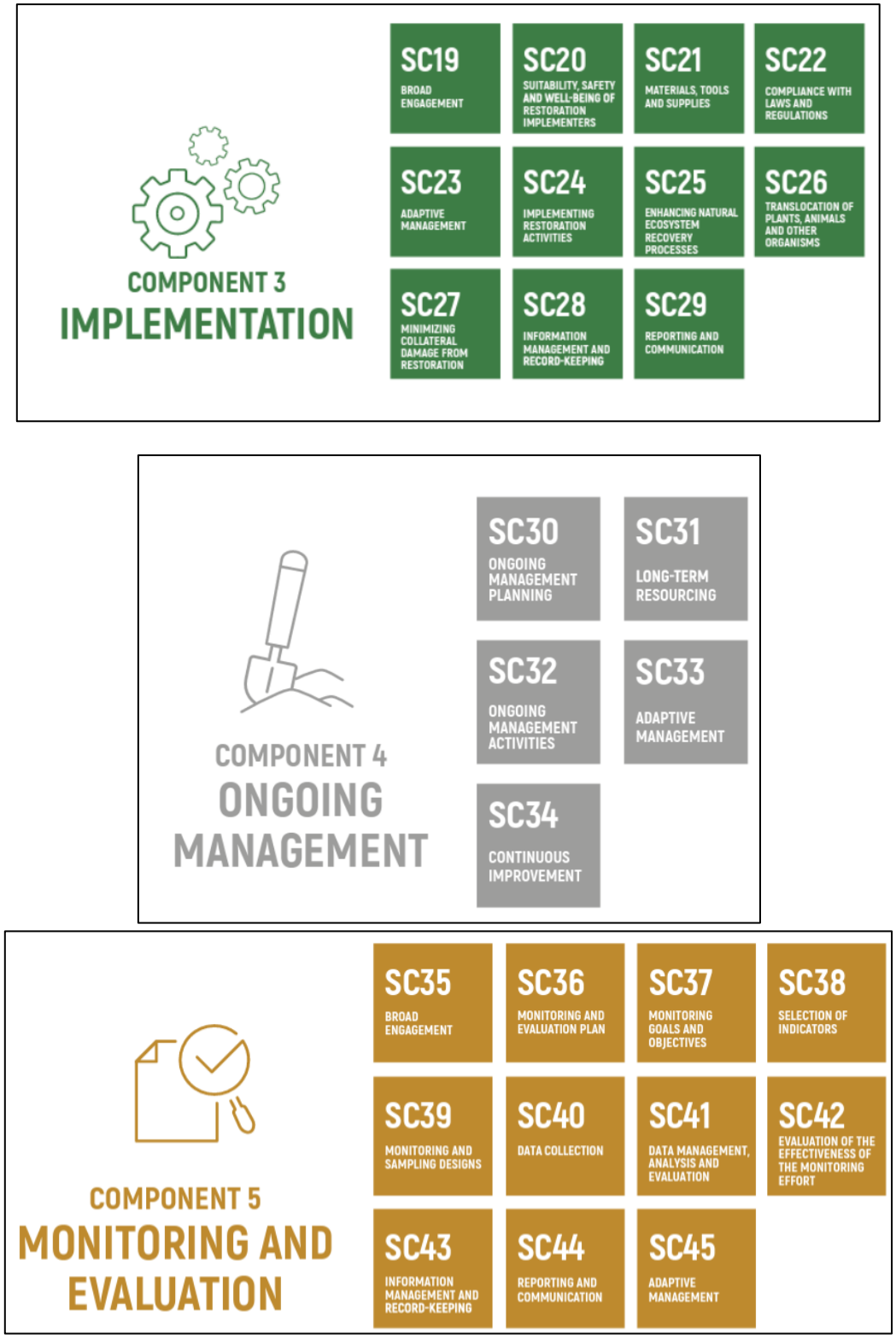


Figure 42. Components and subcomponents from the Standard of Practices to Guide Ecosystem Restoration,[232]

[232] FAO, SER & IUCN CEM. 2023. Standards of practice to guide ecosystem restoration. A contribution to the United Nations Decade on Ecosystem Restoration. Summary report. Rome, FAO. Available at: https://www.fao.org/3/cc5223en/cc5223en.pdf

A series of EbA interventions to strengthen ecosystem services in each participating nation are presented below. These were selected based on technical information as well as on the results of the stakeholder consultation workshops.

EbA Opportunity 1: Mangrove conservation and restoration to improve coastal community resilience	
DESCRIPTION AND PURPOSE:	Mangrove areas in some Pacific Islands are high relative to their coastlines (31.9% of Micronesia and 29.55% of Palau, and 0.25% of RMI's coastline[233]), and they provide significant social, economic, and cultural benefits for the people of the Pacific Islands.[234] On average, the carbon stock of one hectare of mangroves, including soil carbon, is approximately 1,000 tonnes, more than twice the carbon storage of upland forests and five times that of savannah meaning that mangroves are among the most carbon-rich forests in the tropics. The problem to solve relates to reduced mangrove area often increasing the threat to human safety and shoreline development from coastal hazards such as erosion, flooding, and storm waves and surges. Mangrove loss will also contribute to decreased coastal water quality, biodiversity, eliminating fish and crustacean nursery habitat and releasing large quantities of stored carbon. To address the above problem, 'Community-based ecological mangrove restoration (CBEMR)', is a holistic, multi-stage approach that includes local stakeholders and other groups from the outset[235]. The CBEMR approach works to restore underlying hydrological conditions and considers adjustments to a disturbed area's topography, so that mangroves may regenerate naturally. The use of CBEMR leads to more successful restoration efforts, as well as the regeneration of a more natural forest, and proper integration of local communities and necessary stakeholders into a conservation area.

[233] Bunting P, Rosenqvist A, Hilarides L, Lucas RM, Thomas N, Tadono T, Worthington TA, Spalding M, Murray NJ, Rebelo L-M. Global Mangrove Extent Change 1996–2020: Global Mangrove Watch Version 3.0. *Remote Sensing*. 2022; 14(15):3657. https://doi.org/10.3390/rs14153657

[234] https://www.iucn.org/regions/oceania/our-work/deploying-nature-based-solutions/water-and-wetlands/completed-projects/pacific-mangroves-initiative

[235] https://www.wetlands.org/publications/community-based-ecological-mangrove-restoration/

EbA Opportunity 1: Mangrove conservation and restoration to improve coastal community resilience	
	  
CLIMATE RATIONALE:	The restoration of “blue carbon stores” (mangroves, wetlands and seagrass meadows) often provides effective ways to remove carbon dioxide from the atmosphere and at the same time to protect atolls / islands from the impacts of storms and sea-level rise and protect biodiversity and livelihoods. Mangrove forests have commonly been shown to provide multiple provisioning services that increase the economic and food security of local communities such as timber, fuel wood, medicinal, animal feed and human food resources (fish and shellfish provision etc). Fish is the primary food source in the Pacific islands, with reliable fish supplies essential for the regional food security. In Pohnpei, epiphytes grow on mangrove trees as a result of the equatorial climate, where they can obtain regular water from rainfall. In mangrove areas with lower or seasonal rainfall they do not occur, and their abundance in Pohnpei mangroves is an important part of the ecosystem biodiversity and uniqueness. Reduced rainfall would impact

EbA Opportunity 1: Mangrove conservation and restoration to improve coastal community resilience	
	diversity and abundance of these mangrove epiphytes during drier ENSO years particularly on the leeward side, which would impact inland mangrove species that rely on freshwater outflow, such as inland mangrove zones. Epiphytes play a key role in the rainforest ecosystem. They provide nectar, pollen, fruit and seed for harvest, and their moisture and nutrient retaining properties are essential to many of the terrestrial invertebrates and lower vertebrates. Regulating services such as wave attenuation, erosion control, sediment accretion and, more recently, carbon sequestration and storage have become very important as these regulating services are critical at very large scales (across the Pacific). This is particularly important for the destructive winds and storm surge associated with cyclones in the Pacific. Mangrove forests also provide a broad suite of cultural ecosystem services to coastal populations living close to mangrove forests, ranging from the tangible (tourism, recreation, education) to the intangible (cultural heritage, aesthetics, sense of place). There are strong spiritual links between mangrove forests and local communities in the Pacific in particular, often with deities and legends associated with different components of the mangrove ecosystem.
BENEFITS:	▪ Increased biodiversity and water quality ▪ Increases nutrient transfers to other habitats affecting adjacent ecosystem health ▪ Increased resilience to disease and climate change ▪ More protection for coastlines ▪ More sustainable, long-lasting restoration efforts.
SCOPE:	▪ Intervention Areas: Biodiversity management, mangrove restoration and restoration of “blue carbon stores” (mangroves, wetlands and seagrass meadows); protection of islands from the impacts of storms and sea-level rise and protection of biodiversity and livelihoods. ▪ Impact spheres: environmental, adaptation and economic ▪ Grant sizes: regular grants: between USD 10,000 – 50,000 and large grants: between USD 50,000 – 200,000 ▪ Duration: 2-5 years

EbA Opportunity 1: Mangrove conservation and restoration to improve coastal community resilience	
KEY ISSUES THAT AFFECT SUCCESS:	▪ Anthropogenic pressures (coastal development/pollution etc) ▪ Climate change pressures (increased storm frequency and severity etc) ▪ Site and ecosystem characteristics (mangrove forest width, tidal hydrology, poor supply of natural seedlings etc) ▪ Socio-economic pressures such as high incidence of poverty in many areas. E.g., in Pohnpei, high levels of poverty could lead to the potential reliance on subsistence economy and required use of natural resources such as mangroves ▪ Maximum biophysical thresholds (burial by sediment/uprooting by high winds etc) ▪ Timeframes ▪ Ongoing management (weak regulations in place or absence of important legislation for increased mangrove resilience etc). Local studies highlight that mangrove protection legislation needs to be more effective at local levels ▪ On the ground implementation capacity (local community involvement)
ELIGIBILITY CRITERIA	▪ Grant should include more than one community-based organization within a mangrove landscape ▪ Interventions must comply with local level and regional land-use plans ▪ Grantee must have the capacity to implement the full scope of the grant
COMPLEMENTARY PRACTICES:	▪ Awareness-raising and capacity building at the local level ▪ Training of local people and long-term community management and monitoring plans to ensure project sustainability
COST AND MATERIALS:	CBEMR requires both lower-cost biophysical approaches and greater attention to socio-cultural-political approaches common in sustainable development and coastal resource management programs. Biophysical adaptations include use of low-cost biophysical assessment methods, reliance on manual labour, strategic breaching of aquaculture ponds and dike walls, manual construction of tidal channels, and human assisted propagule dispersal. Socio-political adaptations include land tenure settlement, increased use of training of trainers programmes, gender

EbA Opportunity 1: Mangrove conservation and restoration to improve coastal community resilience	
	assessments and sensitisation, enhanced community organising, coordination with numerous government agencies and participatory monitoring.[236] For comparison purposes, a CBEMR project in Indonesia had a total cost of USD 1388/ha and in Asia, the cost varies between $1,000 and $67,670 per hectare. ▪ Small scale infrastructure and equipment ▪ Mangrove ecosystem service for planning and adaptation, implementation and management ▪ Training/capacity building, research and monitoring ▪ Operational costs ▪ Consumables (seedlings etc) The cost of mangrove restoration varies widely due to the techniques used, costs of material and labour, site accessibility, training and monitoring of activities.
METHODOLOGY/APPROACH	Ecological restoration of mangroves requires a prior assessment of on-site conditions, and the activities are selected considering the local context and mangrove species. Degraded mangrove locations needing rehabilitation can be identified through forest survey assessment, spatial analysis evidence of forest decline, citizen science monitoring and consultation with local community knowledge. The strategy must focus on planning restoration actions specific to each site according to the local and regional conditions. The approach's components include: • Convening a technical workgroup and delimiting the site to be restored • Conducting a diagnostic and ecological analyses of the site • Formulating the restoration plan and actions • Monitoring the progress and success of the actions. Monitoring is repeat checking of the condition of mangroves, to allow any degradation or adaptation needs to be identified. Community volunteers in citizen science programmes could provide an

236 https://journals.openedition.org/sapiens/1589#:~:text=The%20total%20cost%20of%20425,USD%20590%2C000%20or%20%241388%2Fha.

EbA Opportunity 1: Mangrove conservation and restoration to improve coastal community resilience	
	extensive workforce for the collection of data on greater spatial and temporal scales than otherwise achievable • Establishing linkages and socialization Five critical steps are necessary to achieve successful mangrove restoration: 1. Understanding the mangrove species at the site; in particular the patterns of reproduction, propagule distribution, and successful seedling establishment. 2. Understanding the normal hydrologic patterns that control the distribution and successful establishment and growth of targeted mangrove species. 3. Assessing modifications of the original mangrove environment that currently prevent natural secondary succession (recovery after damage). 4. Designing the restoration programme with communities This approach involves a more methodological ecosystem approach than the usual monoculture restoration efforts, incorporating natural mangrove dispersal and ecological recovery. Here, it is important to consider delegating power to local communities to make mangrove legislation effective, and make management decisions.
PROVEN METHODS/LESSONS LEARNT	A successful mangrove ecological restoration is based on understanding the ecology of this ecosystem, which means knowing the interplay between geomorphology, hydrology and the structural and functional characteristics of the mangrove at different spatial and temporal scales. All sectors must be represented and involved in the restoration process, including local communities, scientific-technical groups, economic players, government institutions and funding stakeholders. Assessment of components of vulnerability can allow targeted adaptation. This approach has been trialed in Tanzania, Fiji and Cameroon, and used subsequently to assess mangrove areas in China, Madagascar, Ternerife atoll, Mozambique, Yacutan and the Marshall Islands. Ong and Ellison (2021) adapted vulnerability assessment methods to a resilience assessment ranking method, demonstrated by application

EbA Opportunity 1: Mangrove conservation and restoration to improve coastal community resilience	
	to some mangrove areas in Asia, and Enipein Marine Park in Pohnpei. Community based ecological mangrove restoration engages communities in the restoration process, empowering them to be stewards of their environment and enabling them to regain the livelihoods lost when the mangroves were destroyed. The following steps were taken during recent restoration project in Sokehs (Lewetik) and the Pohnpei State Forestry: 1) Community awareness of importance of mangroves 2) Identification of species of mangroves to replant. "Climate smart" species are those with the highest adaptive capacity, those that have wider ranges of tolerance than others. These are the best to choose for rehabilitation. 3) Direction on where propagules can be collected 4) Instruction on using a transect to plant propagules (and the density on which to replant) 5) Monitoring progress indicators Some villages in Pohnpei reported that mangroves have improved in condition over the last several years owing to effective management, such as community designation of a mangrove protected area at Peidie, and use of a traditional management system at Palikir. Management activities included raising awareness, monitoring, cleanup and restricting dredging. Other villages have prevented dredging, and organised trash cleanups. Villages of Depenhk/ Takaiou and Pohras and Palikir also noted a traditional management system that is beneficial and functional.
KEY REFERENCES TO RESEARCH/STUDIES	• CIFOR. 2020. Mangrove Ecological Restoration Guide: Lessons Learnt. Available at: https://www.cifor.org/publications/pdf_files/Books/2020-Guide-SWAMP.pdf • German Federal Ministry for Economic Cooperation and Development. 2015. Mangrove Restoration Guide – Best Practices and Lessons Learned from a Community-Based Conservation Project.

EbA Opportunity 1: Mangrove conservation and restoration to improve coastal community resilience	
	• Gilman, E., H. Van Lavieren, J. Ellison, V. Jungblut, L. Wilson, F. Areki, G. Brighouse, J. Bungitak, E. Dus, M. Henry, I. Sauni Jr., M. Kilman, E. Matthews, N. Teariki-Ruatu, S. Tukia, K. Yuknavage. 2006. Pacific Island Mangroves in a Changing Climate and Rising Sea. UNEP Regional Seas Reports and Studies No. 179. United Nations Environment Programme, Regional Seas Programme, Nairobi, KENYA. • Community-based Ecological Mangrove Restoration website. Available at: https://www.mangroveactionproject.org/cbemr/ • Ellison, J.C. 2021. Mangrove vulnerability assessment for Pohnpei, Federated States of Micronesia., School of Geography, Planning and Spatial Sciences, University of Tasmania, Australia. • Buffington K.J. et al. 2021. Mangrove Species' Response to Sea-Level Rise Across Pohnpei, Federated States of Micronesia. • Lewis and Brown. 2014. Ecological Mangrove Rehabilitation. • Mangrove Action Project (2006) guide • Elison, J. 2012. WWF mangrove rehabilitation manual. WWF. • Gambia mangrove rehabilitation/ restoration works (Moudingo et al. 2018) • Asian Development Bank: Community based mangrove planting handbook for Papua New Guinea (2018). • Micronesia coral-reef monitoring website providing data trends for adjacent reefs (corals, fishes, algae, and macroinvertebrates) (https://micronesiareefmonitoring.com/)

<table>
<tr><th colspan="2">EbA Opportunity 2: Sustainable forest and agro-forest management for climate-resilient agriculture</th></tr>
<tr><td>DESCRIPTION AND PURPOSE:</td><td>The problem to solve relates to the need to simplify the use of monoculture, which affects the landscape and climate regulation in a watershed area (or similar) as well as also the hydrological water cycle within that defined topographic area.
 
These are natural resource management approaches that integrate planting of trees and agricultural crops and / or use of animals (in a scientifically and ecologically desirable manner), which is feasible and socially acceptable by both farmers and other beneficiaries, in a way that maximizes the benefits of ecological interactions and as a result, attains measurable economic results.[237]
  </td></tr>
<tr><td>CLIMATE RATIONALE:</td><td>Characteristics of agroforestry systems is that these strengthen the resilience of ecosystems and communities as reduces impacts to drought events and extreme rainfall, reducing losses and damage to crops.

General agroforestry systems and climate-resilient agriculture conserve soil moisture, improve the microclimate conditions and increase biodiversity that gives greater stability to production systems best suited to the climate. The production of energy forest species in these systems allows production and sustainable consumption of firewood that defines a neutral role of carbon balance.</td></tr>
<tr><td>BENEFITS:</td><td>Agroforestry and climate-resilient agriculture can provide four main benefits in terms of ecosystem-services: i) climate change mitigation through carbon sequestration; ii) biodiversity</td></tr>
</table>

[237] https://www.scielo.br/j/cerne/a/cPT5pVGq46Sp9FLMRX9GpVf/?format=pdf&lang=en

EbA Opportunity 2: Sustainable forest and agro-forest management for climate-resilient agriculture	
	conservation; iii) soil health enrichment and iv) air and water quality improvement.[238]
SCOPE:	• Intervention Areas: conservation agriculture, grazing management, fire management. • Impact spheres: adaptation and economic • Grant sizes: large grants: between USD 100 – 200,000 • Duration: 3 years
ELIGIBILITY CRITERIA:	• Grant should include more than one CBO within a landscape • Interventions must comply with local level and regional land-use plans • Grantee must have the capacity to implement the full scope of the grant • Measures must comply with local-level land use plans.
COMPLEMENTARY PRACTICES:	• Planting of leguminous species native trees • Incorporation of residues of branches to the ground • Incorporation of manure as organic fertilizer
COST AND MATERIALS:	Variable depending on crops used etc (essentially low cost) • Large and small scale infrastructure and equipment • Services for planning, implementation and management • Training, research and monitoring • Operational costs • Consumables (seeds, crops etc)
METHODOLOGY/ **APPROACH**	Within each agroforestry practice there are many options available to landowners depending on their own goals. The type of Agroforestry systems include: • Plantation-based cropping system • Scattered trees on farms, parklands • Shelterbelts and windbreaks • Boundary planting and live hedges • Woodlots for soil conservation • Horti-pastoral • Plantation crops with pastures • Home gardens • Aqua forestry The following steps have been used in agroforestry initiatives: 1) Set initial steps and priorities according to multiple uses of the property and objectives (i.e., improve environmental conditions, increase yields, diversify livelihoods, etc.). 2) Evaluate existing assets to analyse the best suited options for the land (i.e., available planting materials, equipment, manpower).

[238] https://oxfordre.com/environmentalscience/view/10.1093/acrefore/9780199389414.001.0001/acrefore-9780199389414-e-195

EbA Opportunity 2: Sustainable forest and agro-forest management for climate-resilient agriculture	
	3) Identify current land uses and map areas suitable for agroforestry development 4) Climate assessment will determine what is suitable for the area and develop a seasonal calendar for production 5) Monitor progress indicators
PROVEN METHODS/LESSONS LEARNT	Forestry management and agroforestry system have demonstrated sustainability in preventing loss of soil fertility, soil erosion and conserving available water, thus ensuring food and livelihood security for communities. Agroforestry systems have been used as a buffer against stress from both abiotic and biotic, they offer greater resilience in the face of extreme weather events and climate change. USAID- Climate Adaptive Agriculture and Resilience Project (CAAR) project proved that restoration agroforestry has great potential for regreening degraded lands in a less expensive and participatory way, creating a basis for improved livelihoods, water provision and sustainable food production and has tested models that will be replicated and scaled up in the present GCF programme.
KEY REFERENCES TO RESEARCH/STUDIES	• USAID- Climate Adaptive Agriculture and Resilience Project (CAAR) project • *https://link.springer.com/article/10.1007/s10457-022-00737-8* • *Climate change, Agriculture and Forestry in the Pacific* • *Vulnerability of Pacific Island agriculture and forestry to climate change* • *Agroforestry: a primer – Design and management principles for people and the environment*

EbA Opportunity 3: Watershed Management and Soil Conservation/management Measures	
DESCRIPTION AND PURPOSE:	Challenges related to sustainable watershed management measures, including the need for improved soil conservation, water supply, land restoration, vegetation planting (vetiver grasses etc.) all helping to support climate change adaptation and disaster risk management policies. Reversing soil degradation trends needs identification and implementation of site-specific strategies. The choice of strategies depends on biophysical (climate, geography, soil type, vegetation,

EbA Opportunity 3: Watershed Management and Soil Conservation/management Measures	
	etc.) and human dimension factors (demography, infrastructure, land tenure, etc.). Watersheds provide many important water-related functions and services to a wide range of stakeholders who are directly or indirectly affected by changes in the quantity and quality of water available. Watershed management incorporates the improvement of three main elements[239]: ▪ Natural resources management ▪ Local development management by local governments ▪ Management of externalities inherent in every catchment (for example erosion from hill farming) ▪ Implementation of activities identified within community PAs plans The watershed management process includes the implementation of land use and watershed management practices to protect and improve the quality of water and other natural resources within a watershed by managing the use of those resources in a comprehensive manner. Conserving and managing soils help improving soil organic matter which in turn affects soil humidity, soil fertility and reduces soil erosion. The adoption of soil conservation/management-effective measures sustains and improves soil and ecosystem C pools, enhances soil quality, and increase net primary productivity. 
CLIMATE RATIONALE:	Improvement in soil quality would enhance resilience against climate change by dampening the effects of extreme events, moderating fluctuations in microclimate, reducing diurnal/annual variations in soil temperature and moisture and mitigating climate change. Watershed management is thus an important measure to

239 https://www.researchgate.net/publication/292385435_Improving_watershed_management_programs/link/574f65dc08ae10b2ec055f62/download

EbA Opportunity 3: Watershed Management and Soil Conservation/management Measures	
	make a significant contribution to meeting the intertwined global challenges of protecting and restoring terrestrial ecosystems (SDG 15), combating climate change and its impacts (SDG 13), ensuring sustainable water management (SDG 6), ending poverty (SDG 1), and achieving food security, improved nutrition, and sustainable agriculture (SDG 2).
BENEFITS:	▪ Helps increase production of crops ▪ Reduces mismanagement and over-exploitation of water and natural resources ▪ Soil erosion control ▪ Enhancing ecosystem functions and services ▪ Increase and conserve biodiversity ▪ Create positive plant-soil feedback with positive impact on the biosphere[240]
SCOPE:	▪ Intervention Areas: contour agriculture, grazing management, soil conservation measures. ▪ Impact spheres: adaptation and economic ▪ Grant sizes: large grants: between USD 100 – 200,000 ▪ Duration: 3 years
ELIGIBILITY CRITERIA:	▪ Grant should include more than one CBO within a watershed landscape ▪ Interventions must comply with local level and regional land-use plans ▪ Grantee must have the capacity to implement the full scope of the grant
COMPLEMENTARY PRACTICES:	▪ Awareness-raising at the local level ▪ Training of local people and long-term agro-business community management and monitoring plans to ensure project sustainability
COST AND MATERIALS:	Variable depending on scale of watershed and techniques adopted etc (essentially low cost) • Small scale infrastructure and equipment • Sustainable Land Management services for planning, adaptation and implementation • Training, research and monitoring

240 https://reader.elsevier.com/reader/sd/pii/S2095633915300216?token=8F671AE0D14670639681302D3FDCB7607179F873E5AFE371690B3D71455696836C7A81B7EB0B8DE050C4EE9BFF057F8D&originRegion=us-east-1&originCreation=20220330201002

EbA Opportunity 3: Watershed Management and Soil Conservation/management Measures	
	• Operational costs • Consumables (fencing/vertiver grasses etc)
METHODOLOGY/APPROACH	Soil and water conservation is an integral part of watershed management. The activities are based on: • Prevention or reduction of soil erosion, compaction, salinity • Conservation or drainage of water • Maintenance or improvement of soil fertility These activities are to be selected and implemented according to the respective local conditions, which means that the strategy must be adapted at the local level. Soil and water conservation measures to be implemented may include: (a) In situ conservation, (b) adopting soil conservation practices like contour bunding, terracing, (c) construction of check dams, gully control structures, (d) providing farm ponds and (e) digging wells to collect and utilize the water for supplemental irrigation. The GEF Ridge to Reef project in Tuvaly developed a training manual of integrated land management techniques that sumarises proven methodologuies, approaches and lessons learnt that are applicable to the present programme. These are available here: Also the USAID- Climate Adaptive Agriculture and Resilience Project (CAAR) project, in Yap, developed and scaled-up sustainable land and soil conservation practices in selected pilot sites
KEY REFERENCES TO RESEARCH/STUDIES	• *Introduction to soil and water conservation* • *https://www.sprep.org/news/pacific-soil-biodiversity-protecting-life-below-ground* • *Sustainable Land Management Training Manual- R2R-GEF* • *Micronesia coral-reef monitoring website providing data trends for adjacent reefs (corals, fishes, algae, and macroinvertebrates) (https://micronesiareefmonitoring.com/)* • *https://www.sciencedirect.com/science/article/pii/S0025326X13001525* • *https://www.sciencedirect.com/science/article/pii/S0025326X22008268* • *https://downloads.hindawi.com/journals/jmb/2011/981273.pdf*

EbA Opportunity 3: Watershed Management and Soil Conservation/management Measures	
	• *https://www.sciencedirect.com/science/article/pii/B9780128140031000265*

EbA Opportunity 4: Introducing "Buffer Zones" to help facilitate the management / enforcement of PAs	
DESCRIPTION AND PURPOSE:	Protected Areas (Pas) are areas set aside to protect marine and terrestrial ecosystems. They are an example of an area-based management measure relevant to EBA; others including integrated coastal management (ICM) and marine spatial planning (MSP). MPAs have a clearly defined geographical space, which is recognised, dedicated and managed (through legal or other effective means) to achieve long term conservation of nature, along with associated ecosystem services and cultural values. In order to be a successful adaptation option, PAs need agreed governance and management approaches and the capacity to implement management plans and to carry out monitoring and evaluation. With such structures and capabilities in place, PAs are well positioned to support EBA.  Improve the creation of "buffer" zones (i.e.: conservation of habitat surrounding PAs, reforestation of degraded areas, increasing and enforcement of key habitat cover within PAs). This may require new policies that encourage improved coordination of conservation actions/partnerships, incorporation of 'Other Effective area-based Conservation Measures' (OECMs) etc. Supporting the creation of "buffer zones" increase the connectivity of PAs to facilitate climate-driven redistribution of species. This may include measures that establish new habitat "migration" corridors, improving landscape (or seascape) connectivity by permanent protection of virtual "steppingstones" across States or Nations. This could be designed to watershed protected areas to provide more wildlife habitats to help absorb storm surges and flood events. This may also need measures that incorporate conservation partnerships among lands inside and outside protected areas to increase connectivity and reduce land-use impacts, while building on the interconnections among terrestrial, freshwater,

EbA Opportunity 4: Introducing "Buffer Zones" to help facilitate the management / enforcement of PAs	
	coastal and marine ecosystems. Such strategies require raising awareness of biodiversity values among local communities, and cross-sectoral planning and policy at both island, regional and trans-boundary scales. These lend to private-public partnerships (PPPs), increasing the potential of solutions reaching beyond protected areas boundaries and affecting socio-political change.
CLIMATE RATIONALE:	PAs are the foundation of modern-day conservation approaches. Their importance in protecting biodiversity has been demonstrated across the globe. A clear scientific consensus has emerged that expanding the PA network is critical for maintaining and restoring intact natural ecosystems6, for protecting biodiversity, supporting ecosystem services, and for achieving scalable natural climate solutions.[241] PA management, through helping to reduce non-climate pressures, can help to increase the resilience of ecosystems (and the services they provide) to temperature rise. Where PAs protect ecosystems that help to attenuate waves, they can help reduce wave inundations as sea levels rise. PA management, through helping to reduce non climate pressures, can help to increase the resilience to acidification of ecosystems and the services they provide. Where PAs protect ecosystems that help to attenuate storm waves, they can help reduce associated coastal flooding and erosion.
BENEFITS:	The positive ecological impacts MPAs (as an example) can have on fisheries, such as increased biomass, species density, species richness and size, can lead to spill-over of adult species into surrounding areas, in particular from no-take zones therefore benefitting coastal economies through increased catch and catch per unit effort. MPAs can lead to improvements in coral cover, reef ecology and structural integrity by limiting practices of destructive fishing on reefs. PAs can contribute to diversified livelihoods and they can also help people build their resilience by offering alternative sources of livelihoods and income. Alternative livelihood options within MPAs could include climate change-resistant agricultural activities, raising livestock, aquaculture,

[241] https://www.nature.com/articles/s43247-021-00270-z

EbA Opportunity 4: Introducing "Buffer Zones" to help facilitate the management / enforcement of PAs	
	mariculture, seaweed farming, beekeeping, handicrafts or tree nurseries. ▪ It is a highly effective and low-cost conservation model ▪ Increased participation and engagement of local communities contribute to strengthen their support for conservation and sustainability of the measures. ▪ Positive impact on livelihoods and community development
SCOPE	▪ Intervention Areas: Biodiversity management, reef/mangrove restoration and restoration of "blue carbon stores" (mangroves, wetlands and seagrass meadows); provision of effective ways to remove carbon dioxide from the atmosphere and at the same time to protect atolls/islands from the impacts of storms and sea-level rise and protect biodiversity and livelihoods. ▪ Impact spheres: environmental, adaptation and economic ▪ Grant sizes: regular grants: between USD 10,000 – 50,000 and large grants: between USD 50,000 – 200,000 ▪ Duration: 2-5 years
KEY ISSUES THAT CAN AFFECT SUCCESS:	▪ PAs need good design and management (they can have positive effects on building the resilience of coastal communities, and can equally have the potential to reduce resilience). ▪ PAs need good governance which is crucial both for effective and equitable conservation and in determining the effectiveness and efficiency of PA management. ▪ PAs require adequate management capacity and resource availability. ▪ Understanding the context in which PAs operate is key. ▪ Policies for PAs need to recognise the interconnectivity between terrestrial and marine systems.
ELIGIBILITY CRITERIA	▪ Grant should include more than one CBO within a landscape. ▪ Interventions must comply with local level and regional land-use plans.

EbA Opportunity 4: Introducing "Buffer Zones" to help facilitate the management / enforcement of PAs	
	▪ Grantee must have the capacity to implement the full scope of the grant
COMPLEMENTARY PRACTICES:	▪ Awareness-raising and capacity building at the local level (PA management related rangers enforcement capacity etc). ▪ Training of local people and long-term community management and monitoring plans to ensure project sustainability.
COST AND MATERIALS:	Variable depending on scale of techniques adopted and role (scale) of buffer zones etc. ▪ Small scale infrastructure and equipment ▪ Reef/mangrove/seagrass ecosystem service for planning and adaptation, implementation and management ▪ Training, research and monitoring ▪ Operational costs ▪ Monitoring of outcomes
METHODOLOGY/APPROACH	Buffer zones are areas between core protected areas and the surrounding landscape or seascape which protect the network from potentially damaging external influence and which are essentialy transitional areas. These zones may or may not also be protected areas, depending on the form of management and recognition by the state, and they are important to connect protected areas and prevent land conversion. Adequately understanding the interaction between human activities and species populations and the resulting dynamics is important when designing a buffer zone. Land-use management is a critical factor in the degree to which buffer zones can prove to be effective in conservation.
PROVEN METHODS/LESSONS LEARNT	The size and limits of buffer zones must be achieved and defined based on information on minimum habitat necessary to maintain viable population.
KEY REFERENCES TO RESEARCH/STUDIES	• *Guidelines for Applying Protected Area Management Categories* • *Review of experience with ecological networks, corridors and buffer zones*

EbA Opportunity 4: Introducing "Buffer Zones" to help facilitate the management / enforcement of PAs	
	• *How can we estimate buffer zones of protected areas? A proposal using biological data* • IUCN Green List Components, Criteria & Indicators - IUCN Green List • Conserving our sea of islands State of protected and conserved areas in Oceania; Editors: Paul van Nimwegen, Fiona Leverington, Stacy Jupiter and Marc Hockings 2022-037-En.pdf (iucn.org)

EbA Opportunity 5: Ecosystem Based Fisheries Management	
DESCRIPTION AND PURPOSE:	The ocean and its capacity to support life (through marine resource protein stocks) are increasingly threatened by the scale of human-induced greenhouse gas emissions (GHGs). These GHGs continue to alter some of ocean's underlying characteristics and hence fish stocks. Increased sea temperatures and increasing acidification are some of the consequences that impact fish supplies, and hence affect human health.[242] Sustainable fisheries management is an integrated process that seeks to attain an optimal state that balances ecological, economic, social and cultural objectives for fisheries. Marine protection related management strategies are increasingly turning towards the ecosystem approach to fisheries management (EAFM, or 'ecosystem-based fisheries management', EBFM) as an alternative to species-based management in order to account for the broad range of interdependent relationships that occur within ecosystems. 
CLIMATE RATIONALE:	Marine habitats and species are known to be important carbon stores, but vulnerable to particular anthropogenic activities and need to be protected through appropriate management measures. The open ocean is an important carbon sink and plays

[242] https://portals.iucn.org/library/sites/library/files/documents/2016-067.pdf

EbA Opportunity 5: Ecosystem Based Fisheries Management	
	an essential role in regulating the global climate[243]. Furthermore, interdependence has been exhibited between coastal habitats: for instance, coastal vegetative habitats such as seagrasses and mangroves provide nurseries for the early life-stages of reef fish and are, in turn, sheltered from incoming waves by coral reefs. Thus, Ecosystem Based Fisheries Management (EFM) can complement other EBA strategies to improve the holistic resilience of coastal human and ecological systems and the availability of ecosystem services. (NB: If climate change makes some livelihoods less reliable, access to a wide variety of livelihood options can mean people and communities may be less impacted by a reduction in any one livelihood).
BENEFITS:	Conservation of marine ecosystems may reduce the effects of climate change; consequently, the ocean is part of the nature-based solutions to climate change. Healthy marine habitats also allow marine species to adapt better to climate change.[244] Effective EAFM can achieve multiple objectives that increase coastal communities' resilience under climate change and therefore act as an EBA measure. For example, community based EFM (CEAFM) strategies have been applied successfully in the State of Yap and the Federated States of Micronesia to address destructive fishing practices, land-based marine damages, and climate change impacts. These examples involved community-led consultations that identified long term objectives and drafted Community Fisheries Management Plans, encouraging local participation and generating beneficial outcomes for fisheries. EBA approaches can also result in enhanced food and economic security through restoration of shellfish and coral reefs that support species of importance to subsistence and commercial fisheries.
SCOPE:	▪ Intervention Areas: Marine biodiversity management, fish stock (ground) restoration. ▪ Impact spheres: environmental, adaptation and economic ▪ Grant sizes: regular grants: between USD 10,000 – 50,000 and large grants: between USD 50,000 – 200,000 ▪ Duration: 2-5 years

[243] https://portals.iucn.org/library/sites/library/files/documents/2016-067.pdf

[244] https://ocean-climate.org/wp-content/uploads/2020/02/11.-MPA-networks-and-climate-change-a-political-advocacy-Scientific-notes-2016.pdf

EbA Opportunity 5: Ecosystem Based Fisheries Management	
ELIGIBILITY CRITERIA:	▪ Grant should include more than one CBO within a marine (offshore/nearshore) landscape ▪ Interventions must comply with local level and regional sea-use plans ▪ Grantee must have the capacity to implement the full scope of the grant
INDICATIVE LOCATIONS:	▪ Palau: ✓ ▪ RMI: ✓ Likiep; Wotho; Namdrik; ▪ FSM: ✓ as stated in the FSM NDC (2021); Chuuk State (Kuop MPA).
COMPLEMENTARY PRACTICES:	▪ Maximizing ecosystem services in degraded reefs and other marine habitats requires a portfolio of management strategies that include EAFM approaches (e.g., fish aggregation devices, herbivore management etc) ▪ Awareness-raising and capacity building at the local level ▪ Training of local people and long-term co-fisheries management and monitoring plans to ensure project sustainability
COST AND MATERIALS:	Variable depending on scale of techniques adopted and role (scale): ▪ Small scale infrastructure and equipment ▪ Marine ecosystem service for planning and adaptation, implementation and management ▪ Training, research and monitoring ▪ Operational costs ▪ Consumables (seedlings etc)
METHODOLOGY/APPROACH	The implementation of an ecosystem-based fisheries management (EBFM) involves adopting a comprehensive approach through addressing a broad range of ecosystems, socio-economic and governance issues. Stakeholder involvement, especially that of local communities, as well as inputs from a wide range of actors, e.g. government and technical agencies, is important in the process. Some of the principles to guide the approach include: • Provide motivation • Maximise community participation • Make use of traditional knowledge ang respect local customs

EbA Opportunity 5: Ecosystem Based Fisheries Management	

	• Use science to support community objectives
	• Enlist support from government agencies
	• Suggest alternatives to the overexploitation of resources
	
	An EBFM implementation road map include the following principles:
	
	1. Implement ecosystem-level planning
	  • Engagement Strategy
	  • Fishery Ecosystem Plans
	2. Advance our understanding of ecosystem processes
	  • Science to Understand Ecosystems
	  • Ecosystem Status Reports
	3. Prioritize vulnerabilities and risks to ecosystems and their components
	  • Ecosystem-Level Risk Assessment
	  • Managed Species, Habitats and Communities Risk Assessment
	4. Explore and address trade-offs within an ecosystem
	  • Modeling Capacity for Trade-offs
	  • Management Strategy Evaluations
	5. Incorporate ecosystem considerations into management advice
	  • Ecosystem-Level Reference Points
	  • Ecosystem Considerations for Living Marine Resources
	  • Integrated Advice for Other Management Considerations
	6. Maintain resilient ecosystems
	  • Resilience
	  • Community Well Being

PROVEN METHODS/LESSONS LEARNT	The EBFM implementation plan for the Pacific islands highlights the following guiding principles: 1. Implement ecosystem-level planning 2. Advance the understanding of ecosystem processes 3. Prioritize vulnerabilities and risks to ecosystems and their components 4. Explore and address trade-offs within an ecosystem 5. Incorporate ecosystem considerations into management advice 6. Maintain resilient ecosystems
KEY REFERENCES TO RESEARCH/STUDIES	• *A community-based ecosystem approach to fisheries management*

EbA Opportunity 5: Ecosystem Based Fisheries Management	
	• *Pacific Islands Region Ecosystem-based Fisheries Management Implementation Plan 2018-2022* • *Micronesia coral-reef monitoring website providing trends in coral reefs and fisheries resources (https://micronesiareefmonitoring.com/)* • *https://link.springer.com/article/10.1007/s00338-011-0826-3* • *https://www.nature.com/articles/s41598-018-23971-6* • *https://journals.plos.org/climate/article?id=10.1371/journal.pclm.0000040* • *https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.1727* • *https://www.sciencedirect.com/science/article/pii/S0165783617302850* • *https://esajournals.onlinelibrary.wiley.com/doi/abs/10.1002/ecm.1278* • *(PDF) Climate change disturbances contextualize the outcomes of coral-reef fisheries management across Micronesia (researchgate.net)* • *The Micronesia Challenge: Assessing the Relative Contribution of Stressors on Coral Reefs to Facilitate Science-to-Management Feedback | PLOS ONE* • *Applying a Ridge to Reef framework to support watershed, water quality, and community-based fisheries management in American Samoa (noaa.gov)* • *An applied framework to assess exploitation and guide management of coral-reef fisheries - Houk - 2017 - Ecosphere - Wiley Online Library*

EbA Opportunity 6: Coastal wetland conservation and restoration	
DESCRIPTION AND PURPOSE:	Similar to EbA Opportunity 1 (mangrove rehabilitation), the degradation of coastal wetland ecosystems impacts significantly on the livelihoods of coastal communities. The problem to solve relates to the fact that reduced wetland area often increases the threat to human safety and shoreline development from coastal hazards such as erosion, flooding, and storm waves and surges. Coastal wetlands are among the most valuable ecosystems in the world, but they suffer various anthropogenic threats that include urbanization, deforestation, and pollution. Restoration of these ecosystems aims to restore the integrity of ecological systems to sustain biodiversity, improve resilience to climate

EbA Opportunity 6: Coastal wetland conservation and restoration	
	change and re-establish a healthy relationship between nature and culture.[245] 
CLIMATE RATIONALE:	Reducing non-climate pressures (e.g., pollution) and encouraging temperature tolerant species may increase the resilience of services provided by wetlands (e.g., habitat for fish) to temperature increases. Depending on the type, wetlands can help attenuate waves and hence, reduce wave inundation. They may also act as a water store during times of high water, reducing flooding of coastal areas. Wetlands and marshes can trap sediment and hence vertically build up soil as sea level rises. Coastal wetlands can also help manage the hydrology of the area providing a freshwater source necessary to maintain other habitats such as salt marsh and mangroves that then provide some protection against sea level rise.
BENEFITS:	• Recovery of ecosystem services and functions • Re-establishment of ecological processes such as nutrient cycling • Increase resilience of ecosystems
SCOPE:	▪ Intervention Areas: Biodiversity management, wetland restoration and restoration of “blue carbon stores” (mangroves, wetlands and seagrass meadows); provision of effective ways to remove carbon dioxide from the atmosphere and at the same time to protect atolls / islands from the impacts of storms and sea-level rise and protect biodiversity and livelihoods. ▪ Impact spheres: environmental, adaptation and economic ▪ Grant sizes: regular grants: between USD 10,000 – 50,000 and large grants: between USD 50,000 – 200,000 ▪ Duration: 2-5 years

245 https://www.frontiersin.org/articles/10.3389/fmars.2020.600220/full#:~:text=Coastal%20wetlands%20restoration%20is%20an,global%20implementation%20of%20these%20projects.

EbA Opportunity 6: Coastal wetland conservation and restoration	
KEY ISSUES THAT CAN AFFECT SUCCESS:	▪ Anthropogenic pressures, which include unsustainable land use, aquaculture, agriculture, unsustainable fisheries, tourism, urbanization, shipping industry. ▪ Lack of political support and local engagement
ELIGIBILTY CRITERIA:	▪ Grant should include more than one CBO within a broader wetland landscape ▪ Interventions must comply with local level and regional land-use plans ▪ Grantee must have the capacity to implement the full scope of the grant
COMPLEMENTARY PRACTICES:	▪ Awareness-raising and capacity building at the local level ▪ Training of local people and long-term community management and monitoring plans to ensure project sustainability
COST AND MATERIALS:	Wetland restoration costs often depend on the scale of area being regenerated, but it often has lower maintenance costs and can be more cost-effective in the long term than structural approaches, particularly when considering the combined benefits of increased wetland value and its role in proviing flood protection. However, due to competition for coastal areas and coastal squeeze, implementation costs may increase over time, necessitating spatial valuation and planning for sustainable implementation. ▪ Small scale infrastructure and equipment ▪ Wetland ecosystem service for planning and adaptation, implementation and management ▪ Training, research and monitoring ▪ Operational costs
METHODOLOGY/APPROACH	A systematic approach to coastal restoration projects include five components: planning, implementation, performance assessment, adaptive management and dissemination of results. Important activities under the planning component include: • Site selection with examination of historical or predisturbance conditions • Definition of the level of physical effort needed • Production of engineering designs, costing, scheduling and contingency plans

EbA Opportunity 6: Coastal wetland conservation and restoration	
	• Assessment of on-site contamination Once the planning is concluded and the project's objectives are defined, the implementation phase starts. Activities under this component can include a wide variety of construction actions (e.g. ground enhancement, vegetation planting, dike/dam/levee building, erosion control, etc.) depending on the initial assessment during site selection.
PROVEN METHODS/LESSONS LEARNT	The key to select a restoration method to rebuild damaged wetland is to identify the critical factors leading to wetland ecological degradation, the degree of loss and the corresponsing impact intensity and then use the principle of limiting factor to diagnose the key process of wetland ecosystem degradation, and analyse the controllability and repairability of eco-hydrological processes and ecological environment functions. According to the relationship of hydrological connectivity and biological connectivity, the damaged coastal wetlands are repaired and adjusted with wetland reconstruction, coastline protection and restoration, plant planting, invasive species removal, hydrological restoration, isolation island reconstruction and restoration, restoration of coastal wetland plants and benthic animals, and the addition of nutrients to enhance the ecological process and ecosystem service value.
KEY REFERENCES TO RESEARCH/STUDIES	• *Indicators of coastal wetlands restoration success: a systematic review* • *Research progress and development trend of coastal wetland restoration in greater bay areas* • *Systematic approach to coastal ecosystem restoration* • *Nature-based solutions to emerging water management challenges in the Asia-Pacific region* • *Micronesia coral-reef monitoring website providing data trends for adjacent reefs (corals, fishes, algae, and macroinvertebrates) (https://micronesiareefmonitoring.com/)* •

EbA Opportunity 7: Coral reef conservation and restoration	
DESCRIPTION AND PURPOSE:	Many coral reefs support herbivorous grazers such as parrotfish, which produce sand that helps to replenish beaches and thus maintain beach profiles. Sediment flow to beaches may become more important as sea

EbA Opportunity 7: Coral reef conservation and restoration	
	levels rise and storm patterns in coastal areas exert pressure on beach ecosystems. Common approaches for coral reef conservation include establishing protected areas or no-take zones that exclude anthropogenic disturbance of reef ecosystems. Conserving existing areas of coral reef often results in improved ecosystem service provision. For coral reef restoration, rearing, transplanting and monitoring of coral reef fragments are possible approaches. It may be possible to rear coral larvae on a large enough scale for coral reef restoration but experts, such as specially trained coral biologists, and, possibly, large facilities will be required. Despite the potential adaptation benefits available from coral reefs, only a small number of restoration projects have been undertaken that focus on adaptation. Nevertheless, coral reef conservation and restoration represent promising options for coastal adaptation. 
CLIMATE RATIONALE:	Regarding sea surface temperature rise, reducing non-climate pressures (e.g., pollution) and encouraging temperature tolerant species may reduce incidence of coral bleaching and increase the resilience of services provided by reefs (e.g., habitat for fish, tourism) to temperature increases. Regarding sea level rise, reefs can attenuate (reduce the height and power of) waves. Reducing the height of waves reaching the shore can decrease wave inundation (to a certain extent). When corals grow as sea level rises this attenuation service can be maintained. With regards to ocean acidification, reducing non-climate pressures (e.g., high nutrient pollution and overfishing of herbivorous fish) increases the resilience of reefs to climate change impacts. Services provided by reefs are more likely to be maintained if other threats are effectively managed. Wave attenuation by reefs can also reduce the power of storm waves reaching the shore and thereby reduce coastal flooding and erosion on islands/atolls.

EbA Opportunity 7: Coral reef conservation and restoration	
	Degradation occurs around development areas, such as recent coastal infrastructure leading to increased sedimentation of near-shore coral reefs. Outbreaks of corallivorous Crown-of-Thorns Starfish (CoTS, *Acanthaster* spp.) have caused persistent and widespread loss of coral cover across Indo-Pacific coral reefs. DeBlieck et al. (2018) report a major crown of thorns outbreak in 2009 in Pohnpei, and a moderate bleaching event in 2013. A recent assessment of hard coral communities of Kosrae (Richards 2015) found a significant linear relationship between species richness and coral cover, showing the importance of reef condition to biodiversity. In a recent study conducted in Pohnpei, Palikir people noted coral mortality owing to oil and waste from tuna fishing vessels that anchor nearby. Pesticides, petroleum-based compounds including motor oils and petrols as well as personal care products shampoos, sun-cream) affect coral reproduction. Catchment landuse change can result in increased freshwater discharge with suspended sediment, which reduced coral's algal symbiosis, and is abrasive to coral surface tissues.
BENEFITS:	Coral reefs provide coastal protection. Corals may keep pace with sea level rise. Coral reefs serve as habitat and nursery grounds for fish, supporting fisheries and livelihoods. Coral reefs support diversified livelihoods. Coral reefs can support tourism and recreation and, importantly, coral reef restoration can be cost-effective whilst supporting diversified livelihoods (containing coral species which can be important for medicine). Coral reefs are often adjacent ecosystems to mangroves and are bio-physically connected to mangrove forests through reciprocal services such as reefs providing protection from wave action, and a calcareous sediment supply to the mangroves. Reef health and status therefore contributes to mangrove resilience, in that if these ecosystems are in poor condition, they will increase mangrove vulnerability to change.
SCOPE:	▪ Intervention Areas: Marine biodiversity management, coral restoration and restoration of "blue carbon stores" (mangroves, wetlands and seagrass meadows); provision of effective ways to remove carbon dioxide from the atmosphere and at the same time to protect atolls /islands from the impacts of storms and sea-level rise and protect biodiversity and livelihoods. ▪ Impact spheres: environmental, adaptation and economic ▪ Grant sizes: regular grants: between USD 10,000 – 50,000 and large grants: between USD 50,000 – 200,000

EbA Opportunity 7: Coral reef conservation and restoration	
	▪ Duration: 2-5 years
KEY ISSUES THAT AFFECT SUCCESS:	Anthropogenic pressures - Almost three quarters of the world's coral reefs are thought to be deteriorating as a consequence of environmental stress. Fishing and pollution in particular are chronic stressors that can prolong recovery of coral reefs and contribute to ecosystem decline. Climate change is another challenge faced by coral reef ecosystems. Increasing sea temperatures and ocean acidification, when combined with anthropogenic pressures, are likely to result in losses of ecosystem function and services and coral bleaching. Site and ecosystem characteristics - The degree of wave energy reduction by the reef flat is dependent on its depth, particularly at the shallowest points, and bottom roughness. Therefore, any reef degradation that increases water depth or reduces bottom roughness may reduce coastal protection benefits by increasing exposure to coastal erosion. Maximum biophysical thresholds - Given that the effectiveness of coral reef wave attenuation is partly dependent on water depth, the coastal protection power of coral reefs is likely to be reduced during extreme weather events that raise water levels (e.g., storm surges). However, the effectiveness of reef crests in reducing wave height is increased as the waves become stronger, indicating that reefs as a whole can still reduce risk during extreme events even if part of their attenuation power is lost. Recovery after disturbance - Healthy reefs are able to recover or self-repair to a certain degree following environmental disturbances such as tropical cyclones or multi-year fluctuations in warm oceanic currents, which are responsible for mass bleaching and mortality. However, reefs which are under anthropogenic pressure do not generally recover well from such natural disturbance events. This further emphasises the need for management practices that reduce levels of anthropogenic disturbance (e.g., high nutrient pollution and overfishing of herbivorous fish) on coral reefs and that work towards ensuring the resilience of these systems to climate change related impacts. Also, creating an appropriate enabling environment, both in terms of the policy context and at the local level through a community-based emphasis, is needed for effective coral reef management. Often, this is not in place in many SIDS.
ELIGIBILITY CRITERIA:	▪ Grant should include more than one CBO within a marine (reef) area

EbA Opportunity 7: Coral reef conservation and restoration	
	▪ Interventions must comply with local level and regional land-sea use plans (LMMAs) ▪ Grantee must have the capacity to implement the full scope of the grant
COMPLEMENTARY PRACTICES:	▪ Improve scientific research about marine reef habitats ▪ Maximizing ecosystem services in degraded reefs and other marine habitats requires a portfolio of management strategies that include EAFM approaches (e.g., fish aggregation devices, herbivore management etc). ▪ Awareness-raising and capacity building at the local level ▪ Training of local people and long-term community management and monitoring plans to ensure project sustainability
COST AND MATERIALS:	Coral reef restoration often has lower maintenance costs and can be more cost-effective in the long term, particularly when considering the combined benefits of increased habitat value and flood protection. However, implementation costs may increase over time, necessitating spatial valuation and planning for sustainable implementation of reef "units" over time. There are also a broad range of techniques now internationally available, all of which command different set up and license realted costs. • Small scale infrastructure and equipment • Coral ecosystem service for planning and adaptation, implementation and management • Training, research and monitoring • Operational costs • Consumables (reef planulae etc)
METHODOLOGY/APPROACH	A six-step adaptive process for planning and implementing coral restoration interventions includes: 1. Set Goal & Geographic focus 2. Identify, prioritize and select sites 3. Identify, design and select interventions 4. Develop restoration action plan 5. Implement restoration 6. Monitor and evaluate progress Coral reef restoration methods include: • Direct transplantation: Transplanting coral colonies or fragments without an intermediate nursery phase

EbA Opportunity 7: Coral reef conservation and restoration	

	• Coral gardening: Transplanting coral colonies or fragments with an intermediate nursery phase. Nurseries can be in situ (in the ocean) or ex situ (flow through aquaria).
	• Substrate addition (artificial reef): Adding artificial structures for purposes of coral reef restoration as a substrate for coral recruitment, coral planting, and/or for fish aggregation
	  ○ Electro-deposition: Adding artificial structures that are connected to an electrical current to accelerate mineral accretion.
	  ○ Green engineering: Adding artificial structures designed to mimic natural processes and be integrated into reef landscapes (nature-based solutions, eco-designed structures, living shorelines)
	• Substrate manipulation: Manipulating reef substrates to facilitate recovery processes
	  ○ Substrate stabilisation: Stabilising substratum or removing unconsolidated rubble to facilitate coral recruitment or recovery.
	  ○ Algae removal: Removing macro-algae to facilitate coral recruitment or recovery.
	• Larval propagation: Releasing coral larvae at a restoration site, after an intermediate collection and holding phase, which can be in the ocean or on land in flow through aquaria.
	  ○ Deployment of inoculated substrate: Deploying settlement substrates that have been inoculated with coral larvae.
	  ○ Larval release: Releasing larvae directly at a restoration site
	
	With increasing impacts of climate change, elevated temperatures and acidification with increase stresses on reefs. Increased storm runoff may also bring stresses from watershed discharges, particularly with sediment and toxicity in the freshwater runoff. Adaptation measures recommended by Richmond et al. (2019) are:
	
	• Expand community and stakeholder engagement, to reduce watershed impacts on reefs
	
	• Retain rainwater at individual houses and building complexes, using gutters, tanks and rain gardens
	
	• Use sediment traps, revegetation and improvements in agricultural practices to reduce soil loss from farming areas

EbA Opportunity 7: Coral reef conservation and restoration	
	• Use public outreach and education of consumers to reduce toxicity in runoff from pesticides, oil compounds, and personal care products such as shampoo and sunblock • Develop suitable metrics in coral reef monitoring, both in amount of change as well as methods of monitoring on shorter timeframes.
PROVEN METHODS/LESSONS LEARNT	Restoration will generaly only be succesfull if the causes of reef degradation are known and have been addressed. Restoration is therefore a kick start system recovery, but it needs to be combined with a landscape framework approach that integrates different strategies of both social and ecological adaptive capacity. Studies have shown that reef habitats will vary considerably in their response to local management. Less effort will be required to attain conservation targets in habitats where high-wave exposure, or far distances from urban centers exist. Whereas habitats close to urban centers may require more management effort and may show less of a positive response to management than distant sites.
KEY REFERENCES TO RESEARCH/STUDIES	• *Pacific Coral Reef Action Plan 2021-2030* • *Coral reef mitigation and restoration techniques employed in the Pacific Islands* • *Coral-focused climate change adaptation and restoration based on accelerating natural processes: Launching the "reefs of hope" paradigm* • *Coral reef restoration as a strategy to improve ecosystem services* • *Literature review of coral reef restoration in and around the coral triangle from the viewpoint of marine biodiversity* • *A manager's guide to coral reef restoration planning and design* • *Micronesia coral-reef monitoring website providing data trends for adjacent reefs (corals, fishes, algae, and macroinvertebrates) (https://micronesiareefmonitoring.com/)* • *Scientific articles predicting climate impacts* • *https://www.nature.com/articles/s41598-020-64411-8* • *Assessing relative resilience potential of coral reefs to inform management - ScienceDirect* • *The Micronesia Challenge: Assessing the Relative Contribution of Stressors on Coral Reefs to Facilitate Science-to-Management Feedback | PLOS ONE*

EbA Opportunity 8: Seagrass conservation and restoration	
DESCRIPTION AND PURPOSE:	Reducing wave energy can contribute to reducing flooding and erosion in coastal areas and settlements, two hazards that may increase in severity with a changing climate. Seagrass beds can trap sediment and thus raise their surface elevation. Where sedimentation and accretion rates keep pace with sea level rise, there is more chance that seagrass beds will maintain their coastal protection services in the face of climate change. The most common approach to conserving seagrass ecosystems is to reduce common threats to them (e.g., pollution, damage by boats), for example through new regulations. Restoring seagrass ecosystems can include harvesting and transplanting seagrass plants and subsequent management and monitoring of restored sites.  Supporting seagrass ecosystems through conservation or restoration can help with the continued provision of food and income, and therefore contribute to maintaining people's resilience and capacity to adapt to climate change. 
CLIMATE RATIONALE:	Reducing non-climate pressures (e.g., pollution) and encouraging temperature tolerant seagrass species may increase the resilience of services provided by mangroves (e.g., habitat for fish) to temperature increases. Seagrasses can reduce current velocity, dissipate wave energy and stabilize the sediment, most reliably in shallow waters and low wave energy environments. Reducing the height of waves reaching the shore can decrease wave inundation (to a certain extent). Stabilizing sediment can help seagrasses accrete with sea level rise under certain sedimentation and accretion rates. Seagrass meadows have been shown in some locations to have a buffering effect on pH, modifying it through photosynthetic activity. As a result, healthy seagrass beds may provide a refuge for calcifying organisms. In addition, seagrass

EbA Opportunity 8: Seagrass conservation and restoration	
	biomass is increased by ocean acidification leading to increased carbon sequestration.
BENEFITS:	The contribution of seagrass beds to stable fisheries may mean that communities that do not presently rely on fisheries as a source of livelihood could benefit from this source of livelihood in the future, if other livelihoods come under threat. Seagrass habitat is important for a wide range of species that may spend all or part of their life cycle within the seagrass ecosystem, and conservation efforts are likely to be key for biodiversity protection. Seagrasses also provide key feeding grounds for endangered species such as turtles and have been shown in some locations to have a buffering effect on pH, modifying it through photosynthetic activity. Seagrass beds also provide carbon storage capacity in their own biomass but also through their ability to trap organic sediments thus contributing to climate change mitigation. This is why seagrasses are among the systems referred to as 'blue carbon' sinks. Like it is the case with coral reefs, seagrass health and status therefore contributes to mangrove resilience, in that if these ecosystems are in poor condition, they will increase mangrove vulnerability to change.
SCOPE:	• Intervention Areas: Biodiversity management, seagrass restoration and restoration of "blue carbon stores" (mangroves, wetlands and seagrass meadows); provision of effective ways to remove carbon dioxide from the atmosphere and at the same time to protect atolls /islands from the impacts of storms and sea-level rise and protect biodiversity and livelihoods. • Impact spheres: environmental, adaptation and economic • Grant sizes: regular grants: between USD 10,000 – 50,000 and large grants: between USD 50,000 – 200,000 • Duration: 2-5 years
KEY ISSUES THAT CAN AFFECT SUCCESS:	Seagrass beds are highly sensitive ecosystems, threatened by anthropogenic factors such as physical damage by boats, poor water quality, pollution, dredging and dumping. For seagrass conservation and restoration to be an effective EBA measure, efforts need to be made to mitigate and manage these local, human-induced pressures. Site and ecosystem characteristics are key as seagrass beds reduce waves and currents in shallow areas more effectively when they occupy a higher proportion of the water column. Since some species

EbA Opportunity 8: Seagrass conservation and restoration	
	are naturally taller and therefore occupy a greater proportion of the water column than others, it may be important to take this into account when selecting species for restoration efforts, or when prioritising management efforts for existing seagrass beds. Stiffness, biomass, density, leaf length and morphology are other species-specific characteristics that influence the coastal protection value of seagrass beds. Seagrass beds are most reliably effective at providing coastal protection services in shallow waters with low wave energies and low seasonality. In other circumstances, seagrass beds may less reliably provide coastal protection services. The significance of seagrass beds for commercial fish species production and/or subsistence purposes is likely to be species-specific and may vary geographically and over time. Some fish species may require other habitats such as mangroves or mudflats at certain stages of their life cycle. Thus, solely focusing conservation or restoration efforts on seagrass beds may not have the desired effect for these species. Therefore, if the focus is on protecting fisheries, it is important to identify the specific fish species involved and their habitat requirements. For seagrass restoration, since implementation success predominately depends on trial and error, employing adaptive management using native species is strongly recommended.
ELIGIBILITY CRITERIA:	▪ Grant should include more than one CBO within a seagrass landscape ▪ Interventions must comply with local level and regional land-use plans ▪ Grantee must have the capacity to implement the full scope of the grant
COMPLEMENTARY PRACTICES:	▪ Improve scientific research about seagrass habitats ▪ Maximizing ecosystem services in degraded seagrass beds and other marine habitats requires a portfolio of management strategies that include EAFM approaches (e.g., fish aggregation devices, herbivore management etc). ▪ Awareness-raising and capacity building at the local level ▪ Training of local people and long-term community management and monitoring plans to ensure project sustainability
COST AND MATERIALS:	Seagrass transplanting is labour intensive, and can require the use of divers in deeper water, which can result in considerable financial expenditure where volunteers are not available. Transplanting also has

EbA Opportunity 8: Seagrass conservation and restoration	
	an ecological cost, as inappropriate harvesting can damage the source ecosystem. The recovery time depends on the species harvested. ▪ Small scale infrastructure and equipment ▪ Seagrass ecosystem service for planning and adaptation, implementation and management ▪ Training, research and monitoring ▪ Operational costs ▪ Consumables (seedlings etc)
METHODOLOGY/APPROACH	Seagrass restoration should be considered when seagrass loss, damage or degradation in an area has advanced to an extent that it can no longer be expected to recover on its own. It is critically important to always first assess the reasons for the loss and address the underlying causes before proceeding with the restoration process. Different methods for seagrass restoration are used, they all depend on the experience and familiarity with species' growth habits and life histories. Manual transplanting restoration methods include: • Sediment-free: Plants are dug up using a shovel (or other device), the sediment is shaken off from the roots and rhizomes and the plants are placed in tanks, floating pens or similar, for holding until made into 'planting units'. Planting units are planted either directly into the bed (as sprigs) or anchored using a device such as a peg or a staple, attached to metal frames or woven into biodegradable mats. • Seagrass with sediment methods: Other variations include the plug method, which uses coring devices (of metal or PVC) to extract the plants with the sediment and rhizomes intact, or the tray method, which uses metal trays to dig and collect larger (50x50cm) sods. • Seed-based methods: Seed-based restoration techniques have been used successfully in large-scale restoration of several seagrass species that mass-produce large quantities of seeds and/or form dense seed banks. In an effort to scale up restoration efforts and reduce costs on a per hectare basis, a number of mechanical methods have been developed that make use of heavy equipment or machinery for collection of plant material & seeds or for planting.

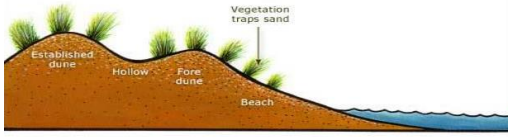
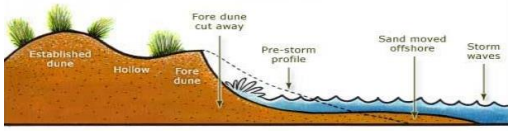
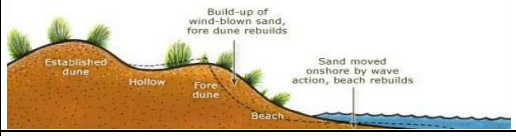
EbA Opportunity 8: Seagrass conservation and restoration	
PROVEN METHODS/LESSONS LEARNT	Common reasons for failure of seagrass restoration attempts: • Innapropriate site selection • Poor planning • Damage from human activities, storms, floods or spills • Poor water quality • Uprooting of transplants due to strong flows, high wave energy or swell • Sediment instability causing erosion or smothering and burial of seedlings Selection criteria for restoration sites include: • Habitat suitability (environmental conditions conducive to seagrass growth, including temperature, salinity, light, flow velocity, wave exposure, tidal conditions, substrate) • Level of human disturbance (from activities or developments that affect seagrass health and survival) • Previous experience (at similar sites) • Advice from local area experts (or elders that know the area well) • Practical considerations (accessibility, distance, logistical, institutional and legal considerations) • Proximity to existing seagrass beds • Evidence of historical seagrass presence at the site • Recent incidental sightings of seagrass colonisation in or near the area • Depth: seagrass restoration sites should have similar depths to nearby healthy meadows and not be subject to chronic storm damage
KEY REFERENCES TO RESEARCH/STUDIES	• Seagrass Ecosystem restoration guidelines • Seagrass restoration guidelines for Kiribati • Effects of climate change on seagrasses and seagrass habitats relevant to the pacific islands • Mapping the seagrass conservation and restoration priorities: Coupling habitat suitability and anthropogenic pressures • Prioritizing localised management actions for seagrass conservation and restoration using a species distribution model • https://www.sciencedirect.com/science/article/pii/S0025326X13001525 • https://www.sciencedirect.com/science/article/pii/S0022098119303302

EbA Opportunity 8: Seagrass conservation and restoration	
DESCRIPTION AND PURPOSE:	Reducing wave energy can contribute to reducing flooding and erosion in coastal areas and settlements, two hazards that may increase in severity with a changing climate. Seagrass beds can trap sediment and thus raise their surface elevation. Where sedimentation and accretion rates keep pace with sea level rise, there is more chance that seagrass beds will maintain their coastal protection services in the face of climate change. The most common approach to conserving seagrass ecosystems is to reduce common threats to them (e.g., pollution, damage by boats), for example through new regulations. Restoring seagrass ecosystems can include harvesting and transplanting seagrass plants and subsequent management and monitoring of restored sites. Supporting seagrass ecosystems through conservation or restoration can help with the continued provision of food and income, and therefore contribute to maintaining people's resilience and capacity to adapt to climate change.
CLIMATE RATIONALE:	Reducing non-climate pressures (e.g., pollution) and encouraging temperature tolerant seagrass species may increase the resilience of services provided by mangroves (e.g., habitat for fish) to temperature increases. Seagrasses can reduce current velocity, dissipate wave energy and stabilize the sediment, most reliably in shallow waters. Reducing the height of waves reaching the shore can decrease wave inundation (to a certain extent). Stabilizing sediment can help seagrasses accrete with sea level rise under certain sedimentation and accretion rates. Seagrass meadows have been shown in some locations to have a buffering effect on pH, modifying it through photosynthetic activity. As a result, healthy seagrass beds may provide a refuge for calcifying organisms. In addition, seagrass biomass is increased by ocean acidification leading to increased carbon sequestration. Seagrass can reduce current velocity, dissipate wave energy and stabilize the sediment most reliably in shallow waters and low wave energy environments

EbA Opportunity 8: Seagrass conservation and restoration	
BENEFITS:	The contribution of seagrass beds to stable fisheries may mean that communities that do not presently rely on fisheries as a source of livelihood could benefit from this source of livelihood in the future, if other livelihoods come under threat. Seagrass habitat is important for a wide range of species that may spend all or part of their life cycle within the seagrass ecosystem, and conservation efforts are likely to be key for biodiversity protection. Seagrasses also provide key feeding grounds for endangered species such as turtles and have been shown in some locations to have a buffering effect on pH, modifying it through photosynthetic activity. Seagrass beds also provide carbon storage capacity in their own biomass but also through their ability to trap organic sediments thus contributing to climate change mitigation. This is why seagrasses are among the systems referred to as 'blue carbon' sinks.
SCOPE:	• Intervention Areas: Biodiversity management, seagrass restoration and restoration of "blue carbon stores" (mangroves, wetlands and seagrass meadows); provision of effective ways to remove carbon dioxide from the atmosphere and at the same time to protect atolls /islands from the impacts of storms and sea-level rise and protect biodiversity and livelihoods. • Impact spheres: environmental, adaptation and economic • Grant sizes: regular grants: between USD 10,000 – 50,000 and large grants: between USD 50,000 – 200,000 • Duration: 2-5 years
KEY ISSUES THAT CAN AFFECT SUCCESS:	Seagrass beds are highly sensitive ecosystems, threatened by anthropogenic factors such as physical damage by boats, poor water quality, pollution, dredging and dumping. For seagrass conservation and restoration to be an effective EBA measure, efforts need to be made to mitigate and manage these local, human-induced pressures. Site and ecosystem characteristics are key as seagrass beds reduce waves and currents in shallow areas more effectively when they occupy a higher proportion of the water column. Since some species are naturally taller and therefore occupy a greater proportion of the water column than others, it may be important to take this into account when selecting species for

EbA Opportunity 8: Seagrass conservation and restoration	
	restoration efforts, or when prioritising management efforts for existing seagrass beds. Stiffness, biomass, density, leaf length and morphology are other species-specific characteristics that influence the coastal protection value of seagrass beds. Seagrass beds are most reliably effective at providing coastal protection services in shallow waters with low wave energies and low seasonality. In other circumstances, seagrass beds may less reliably provide coastal protection services. The significance of seagrass beds for commercial fish species production and/or subsistence purposes is likely to be species-specific and may vary geographically and over time. Some fish species may require other habitats such as mangroves or mudflats at certain stages of their life cycle. Thus, solely focusing conservation or restoration efforts on seagrass beds may not have the desired effect for these species. Therefore, if the focus is on protecting fisheries, it is important to identify the specific fish species involved and their habitat requirements. For seagrass restoration, since implementation success predominately depends on trial and error, employing adaptive management using native species is strongly recommended.
ELIGIBILITY CRITERIA:	• Grant should include more than one CBO within a seagrass landscape. • Interventions must comply with local level and regional land-use plans. • Grantee must have the capacity to implement the full scope of the grant
INDICATIVE LOCATIONS:	• Palau: ✓ • RMI: not applicable • FSM: ✓ as stated in the FSM NDC (2021)
COMPLEMENTARY PRACTICES:	• Improve scientific research about seagrass habitats. • Maximizing ecosystem services in degraded seagrass beds and other marine habitats requires a portfolio of management strategies that include EAFM approaches (e.g., fish aggregation devices, herbivore management etc). • Awareness-raising and capacity building at the local level • Training of local people and long-term community management and monitoring plans to ensure project sustainability

EbA Opportunity 8: Seagrass conservation and restoration	
COST AND MATERIALS:	Seagrass transplanting is labour intensive, and can require the use of divers in deeper water, which can result in considerable financial expenditure where volunteers are not available. Transplanting also has an ecological cost, as inappropriate harvesting can damage the source ecosystem. The recovery time depends on the species harvested. • Small scale infrastructure and equipment • Seagrass ecosystem service for planning and adaptation, implementation and management • Training, research and monitoring • Operational costs • Consumables (seedlings etc)

EbA Opportunity 9: Beach conservation and restoration	
DESCRIPTION AND PURPOSE:	Beaches are widely seen as a buffer between the land and sea and as providing important coastal protection and tourism opportunities. A range of conservation and restoration approaches have been developed to support these functions. Further to minimizing disturbances, common onsite approaches include implementing physical barriers that trap sand, mechanically stabilizing dune ridges, and planting schemes using species adapted to the ecosystem to biologically fix or reforest the dune ridge. Where beaches are currently eroding, 'beach nourishment' has been used as an approach to maintain the beach profile, and involves depositing sand onto the beach from offshore or quarries. As beach nourishment can involve artificially building up sand on the shoreline, it can be seen as a more structural or hybrid adaptation approach. Further to minimizing disturbances, common onsite approaches include implementing physical barriers that trap sand, mechanically stabilizing dune ridges, and planting schemes using species adapted to the ecosystem to biologically fix or reforest the dune ridge. Calm conditions  Beach erosion during storm  Beach recovery 
CLIMATE RATIONALE:	Reducing non-climate pressures (e.g., clearing and trampling) and encouraging plant development increases the resilience of services provided beaches.
BENEFITS:	Beaches are a buffer between the land and sea and as providing important coastal protection and tourism opportunities. Conserving beach habitat is therefore important for this specialist flora and fauna. Sand plays an important role in water regulation and purification,

EbA Opportunity 9: Beach conservation and restoration	
	as coastal dune aquifers are an important source of water extraction
SCOPE:	▪ Intervention Areas: Biodiversity management, dune restoration. ▪ Impact spheres: environmental, adaptation and economic ▪ Grant sizes: regular grants: between USD 10,000 – 50,000 and large grants: between USD 50,000 – 200,000 ▪ Duration: 2-5 years
KEY ISSUES THAT CAN AFFECT SUCCESS:	Beaches and sand dunes have been significantly damaged by human actions and as a result are in decline, mainly due to coastal development and tourism pressures. Coastal urbanization, for example, has in some cases destroyed dune systems, significantly reducing their capacity to supply sand during times of severe erosion, thereby increasing erosion risk. Additionally, dredging offshore can change beach profiles and so increase beach erosion. An important consideration for the use of sand dunes in coastal erosion and flood defence is the need for space, as they require more space than conventional, 'hard' engineering structures. The more space available between the sea and human-populated areas, the higher the efficiency of the system. This however may be challenging in highly populated coastal areas, and conflicts of interest may arise, especially if coastal sand dune restoration takes place in areas primarily used for residential or tourism purposes.
ELIGIBILITY CRITERIA:	▪ Grant should include more than one CBO within a relevant landscape ▪ Interventions must comply with local level and regional land-use plans ▪ Grantee must have the capacity to implement the full scope of the grant
COMPLEMENTARY PRACTICES:	▪ Awareness-raising and capacity building at the local level on beach restoration techniques

EbA Opportunity 9: Beach conservation and restoration	
	▪ Training of local people and long-term community management and monitoring plans to ensure project sustainability
COST AND MATERIALS:	The success of the community-led approach for vegetation planting has had varying success and is dependent on local commitment, therefore local awareness raising campaigns may assist in promoting local efforts to protect dunes. ▪ Small scale infrastructure and equipment ▪ Mangrove ecosystem service for planning and adaptation, implementation and management ▪ Training, research and monitoring ▪ Operational costs ▪ Consumables (seedlings etc)
METHODOLOGY/APPROACH	Beach conservation and restoration include activities related to: • Dune stabilisation: it is needed to protect other natural features, create sheltered wetland habitat, provide needed beach access for recreational use and overcome hazardous situations • Dune management: it is necessary to achieve the balance between open, uncontrolled dune movement and selective stabilization • Land use management: understanding the different potential land use options in dune areas is important to define how these areas will be protected and managed. Potential land use options include urban land, community services, woodland and wildlife habitat. The six steps required to stabilise an active dune permanently include: • Prepare the site • Plant sand-stilling dunegrasses • Maintain dunegrass stands • Pland secondary grasses, legumes, shrubs or trees

EbA Opportunity 9: Beach conservation and restoration	
	• Maintain secondary plantings • Incorporate landscape plantings
PROVEN METHODS/LESSONS LEARNT	The methods and best practices include: • Manage foot traffic with delineated beach access pathways. • Designate dune restoration areas with rope or other barriers to protect vegetation from foot traffic. • Remove obstructions and invasive species in the restoration areas. • Plant native vegetation to encourage sand build up over time and to stabilize dunes. • Install sand fencing to accelerate accumulation of wind-blown sand. • Rebuild dunes with sand from the same littoral/beach cell, if needed.
KEY REFERENCES TO RESEARCH/STUDIES	• *Stabilizing coastal sand dunes in the Pacific Northwest* • *Hawai'I Dune Restoration Manual*

8. Gender and ESS context for the proposed programme

8.2. Gender and EbA adaptation

Coastal and marine ecosystems and the services they provide are the basis for Pacific resilience in terms of livelihoods and economic growth, food security, and cultural identity. For example, in terms of food security, many inhabitants of protected areas (Pas) live in rural areas along island coasts, where there is an abundance of protein-rich marine food and fertile lowlands suitable for agriculture or within small coastal cities and towns. The health of marine systems is vital to many subsistence and artisanal fishing communities and is a primary source of livelihood and protein for a majority of the population living in coastal rural communities both men and women. In the Pacific Islands, data shows that the consumption of fish protein is almost 1.5 times the global average. As such, the fisheries and pisciculture play a critical role in the economic, social and cultural fabric of those communities.

A key strategy for mitigating fisheries losses due to climate change impacts is to ensure other threats to coral reefs are reduced to a minimum while simultaneously increasing the incentives for sustainable fishing so that over-fishing alongside coral reef decline does not completely destroy the fisheries sector. It is therefore essential to sustain healthy functioning coastal and marine ecosystems for as long as possible as a strategy for supporting and sustaining the resilience of Pacific SIDS in the face of increasing and compounding climate change impacts.

Though gender considerations are recognized as important to the success of EbA, for gender to be successfully mainstreamed, EbA initiatives need to systematically take a gender-responsive approach and go beyond sensitivity to actively address gender inequalities. Gender norms influence the roles and responsibilities that people take on in their households and communities.[246] These differences can be observed across a range of ecosystem services. With respect to water, the World Health Organization (WHO) and UNICEF reported in 2017 that women and girls are responsible for collecting water in eight out of ten households that did not have water at their premises.[247] In the fisheries sector, analysis by the Food and Agriculture Organization of the United Nations (FAO) found that men comprise approximately 85% of the harvesting workforce, while women undertake 90% of the processing work.[248] Suderland et. al.(2014) in *Challenging perceptions about men, women, and forest product use: A global comparative study* assessed gender differences in use of forest products found that there are typical roles played by women and men, a common assertion in the literature on gender and forestry, although these vary across regions.[249] There is also emerging

[246] IBID.
[247] World Health Organization & UNICEF (2017). Progress on drinking water, sanitation and hygiene: 2017 update and SDG baselines. https://washdata.org/report/jmp-2017-report-final
[248] Food and Agriculture Organization of the United Nations (FAO). (2016a). State of the world fisheries and aquaculture 2016: Contributing to food security and nutrition for all. www.fao.org/3/a-i5555e.pdf
[249] Sunderland, T., Achdiawan, R., Angelsen, A., Babigumira, R., Ickowitz, A., Paumgarten, F., Reyes-García, V., & Shively, G. (2014). Challenging perceptions about men, women, and forest product use: A global comparative study. World Development, https://doi.org/10.1016/j.worlddev.2014.03.003

evidence that gendered roles lead to differences in the value given to different ecosystem services. For example, Martín-López et al., (2012) found that women placed more value on regulating services such as air purification and water regulation, while men prioritized provisioning services such as agriculture.[250]

While additional research is needed in these areas especially within the context of the Pacific, these examples help to illustrate the ways in which roles may be assigned along gender lines, keeping in mind that these dynamics are context specific, and that other factors such as age, socio-economic status, disabilities, sexual orientation etc. that also influence the roles people play.[251]

Integrating gender considerations in ecosystem-based initiatives should increase the effectiveness and sustainability of interventions. The IPCC Special Report on Climate Change and Land (2019) asserts that recognizing gender differences and enabling women to realize their land rights and apply their knowledge in decision making would support sustainable land management and integrated adaptation actions.[252]

All of this suggests that integrating gender considerations in EbA actions can yield benefits that reach beyond progress toward gender equality, in terms of more inclusive governance and better management of resources. These considerations have been integrated into the overall design of the current programme detailed in Section 10.

8.3. Gender mainstreaming considerations for sub-grants

"A gender-responsive approach to EbA is one that actively promotes gender equality, by acknowledging gender differences and tackling discriminatory policies, practices, and norms."[253] Recent work on integrating gender considerations in adaptation has identified three key elements of a gender responsive approach – these include:

- Recognition of gender differences in adaptation needs and capacities.
- Gender-equitable participation and influence in adaptation decision-making process
- Gender-equitable access to finance and other benefits resulting from investments in adaptation.

Under each of these elements are specific actions or "building-blocks" that can be taken to ensure EbA interventions are gender responsive. This starts with:

1. Informing EbA interventions with a gender analysis.

[250] Martín-López, B., Iniesta-Arandia, I., García-Llorente, M., Palomo, I., Casado-Arzuaga, I., García Del Amo, D. ... C. Montes. (2012). Uncovering ecosystem service bundles through social preferences. https://doi.org/10.1371/journal.pone.0038970

[251] Fortnam, M., Brown, K., Chaigneau, T., Crona, B., Daw, T.M., Goncalves, D., Hicks, C., Revmatas, M., Sandbrook, C., & Schule-Herbruggen, B. (2019). The gendered nature of ecosystem services. Ecological Economics. https://doi.org/10.1016/j.ecolecon.2018.12.018

[252] IPCC, 2019: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems: https://www.ipcc.ch/srccl/

[253] GIZ – "Toward Gender-Responsive EbA", available at: https://www.adaptationcommunity.net/wp-content/uploads/2021/07/Toward-gender-responsive-EbA.pdf

2. Specifying targeted EbA actions that address gender-specific needs and capacities.
3. Once gender differences and needs are outlined it is important to ensure gender-equitable participation and inclusion in the decision-making process which can be done through actively engaging under-represented voices in the EbA planning process.
4. This can also be ensured through EbA actions that promote equitable and inclusive governance of natural resources.
5. The third element is providing gender-equitable access to the benefits that results from the project interventions, which leads to the last two building-blocks - setting-up structures for the project interventions that are gender-equitable and inclusive and.
6. Including participatory monitoring and evaluation to track who is benefiting from the EbA activities and how.

For the small grants program, each of the grant applications will include selection criteria designed around the above outlined building blocks to ensure that: (i) gender differences in terms of needs and capacities have been accounted for and incorporated into the grant design; (ii) gender-equitable participation will be encouraged and actively fostered, especially regarding decision-making; and (iii) both the grants program and the outcomes/benefits of each grant – including financial – are inclusive to both men and women.

There are several gender considerations and dimensions with respect to key priority areas for EbA identified in Pacific Island States. These are detailed in the Gender Assessment and Action Plan (Annex 4 of the Funding Proposal)

To ensure the recommendations and findings of the gender assessment and consultation process are fully integrated into the project design, a Gender Action Plan (GAP) has been developed. Details on how roles and responsibilities for gender mainstreaming will be divided across the implementation arrangements of the EDA programme, as well as the GAP can be found in section 6 of Annex 4 of the Funding Proposal.

8.4. Environmental and Social Risk Analysis

The overall programme risks were assessed against the eight International Finance Corporation (IFC) performance standards. This assessment can be found in Annex 12 of the Funding Proposal, which also includes an Environmental and Social Action Plan.

The overall estimated risks of the programme against the IFC's performance standards are low, and primarily limited to the implementation of sub-grant activities, all of which will be screened to ensure they are Category C (low risk). In addition, because each of the sub-grants will either be designated as "regular" or "large" in size (USD 50,000; 50-200,000), with the bulk of the grants falling under USD 50,000, any risks that they might pose are quite limited in terms of reach and impact. Based on the above assessment of E&S risks, the programme components in the table below are categorized based on the IFC/GCF risk categorization as follows:

- **Category A.** Activities with potential significant adverse environmental and/or social risks and impacts that, individually or cumulatively, are diverse, irreversible, or unprecedented.
- **Category B.** Activities with potential limited adverse environmental and/or social risks and impacts that individually or cumulatively, are few, generally site-specific, largely reversible, and readily addressed through mitigation measures; and

- **Category C.** Activities with minimal or no adverse environmental and/or social risks and/or impacts.

The risks by outcome of the programme are detailed in Annex 12 of the Funding Proposal.

Only sub-projects categorized as Category C that have negligible environmental and social risks will be selected. The specific risk potential will depend on the specific sub-projects proposed, but an indicative list of potential impacts/risks and some general mitigation strategies are detailed in Annex 12 of the Funding Proposal.

8.5. ESS Screening Process for sub-grants

As part of the SGF, proposals for sub-grants will include an environmental and social safeguard screening to avoid, minimize and mitigate any harm to people and ecosystems and to incorporate environmental and social concerns as an intrinsic part of project cycle management. Initial screenings will be conducted at the EOI stage, for which a screening template will be included as part of the full proposal package. During the EOI stage, applicants will provide confirmation of a Cat C (low) E&S risk level.

The SGF will deliver two types of grants:

- **Regular grants**: Between USD 10,000 – 50,000 for Civil Society Organisation and NGOs subprojects. Grantees receiving these will not have to submit an Environmental and Social Management Framework (ESMF) but will undergo E&S Risk screening at the expression of Interest stage and at the full proposal submission and approval stage.
- **Large Grants**: Between USD 50,000 – 200,000 for larger and more established entities (NGOs and local governments). Grantees will have to develop an ESMF with support provided by the programme activities, which will be sent as part of the overall grant package for final approval.

Only proposals categorized as low risks (Category C, in line with MCT's E&S Policy and the GCF's environmental and social safeguards), will be cleared for full proposal development.

The SGF will include a set of exclusionary criteria which will disqualify sub-grants or sub-grant activities in order to mitigate risks and ensure that all sub-grants fall under the Category C designation.

For details on the roles and responsibilities in E&S Screening throughout the sub-project investment cycle, see Annex 12 of the Funding Proposal as well as the Operations Manual. Furthermore, a full Environmental and Social Action Plan has been developed in section 9, Annex 12.

9. Implementation Arrangements for the EDA Programme

9.1 Project Governance

This programme will be managed by MCT (Micronesia Conservation Trust) as a regional Direct Access Entity with the following fiduciary functions: micro-size, project management, category C (E&S) and awarding grants. MCT is also the financing mechanism for the Micronesia Challenge (MC) and is a member of the Micronesia Challenge Steering Committee (MCSC).

The EDA implementation approach, validated through the stakeholder consultations, is to use existing structures that are in place and develop the capacity and transparency of these structures through an inception and capacity building phase (*Component 1: **Increased capacity of identified entities (eligible for grants) to design and implement EbA sub-projects)***

It is envisaged that the committees and organisations already established and operating within each of the three countries will be leveraged to form the EDA Programme governance structure. The programme will have two levels of Functions: An Oversight Function, related to the overall programme oversight, and a Decision-Making Function, related to the sub-grant funding decisions. These functions are separated to ensure that there is no conflict of interest among those who are entrusted with the oversight function and those who make the sub-grant funding decisions. The programme will also have a Management Function through a Small Grants Facility Coordination Mechanism.

The following sections describe the functions below.

OVERSIGHT FUNCTION – The Programme Board

The EDA will establish a Program Board (PB) to serve as the main oversight body for the program. The PB will be chaired by the NDAs of Palau, FSM and RMI, as well as members of the current MC Steering Committee (MCSC), including the focal points from: the Ministry of Natural Resources and Commerce (RMI), the Department of Resources and Development (FSM), and the Ministry of Agriculture, Fisheries and the Environment (Palau). The PB will provide strategic direction to MCT, as the AE that will be managing the overall implementation of the program, to ensure the program achieves the desired results. The PB will meet once a year, convened by the AE[254], and if required will hold ad hoc virtual meetings. In case consensus on relevant decisions cannot be reached within the Board, the MCT representative

[254] At project inception a calendar will be agreed upon the NDAs and the AEs trying to coordinate this meeting with other strategic meetings in order to piggy-back and reduce travel costs.

will mediate to find consensus or propose a final decision to ensure that the project implementation is not delayed.

Specific responsibilities of the PB include:

- Provide overall guidance and direction to the program, ensuring it remains within any specified constraints.
- Address and unblock program issues as raised by the Accredited Entity.
- Provide guidance on project risks and agree on possible mitigation and management actions to address them.
- Advise on major and minor amendments to the project within the parameters set by MCT, as agreed with the GCF FAA.
- Support coordination between various donor and government-funded in-country projects and programs.
- Ensure coordination with various government agencies and their participation in program activities.
- Track, monitor and secure co-financing for this program.
- Review the program progress, assess performance, and appraise the Annual Work Plan for the following year.
- Provide directions and recommendations to ensure that the agreed deliverables are produced according to plans.
- Approve the program Inception Report, Mid-term Review and Terminal Evaluation reports and corresponding management responses.
- Review the final program report package during an end-of-project review meeting to discuss lessons learned and opportunities for scaling up.
- For the E&S specific responsibilities of the PB include: (i) providing guidance on project risks related to E&S and agree on possible mitigation and management actions to address them; (ii) monitoring whether E&S risks are adequately monitored through review of programme progress reports; (iii) ensuring that E&S risk monitoring is integrated into Annual Work Plans; (iv) ensure that the programme's Inception Report, Mid-term Review and Terminal Evaluation reports include provisions for E&S and (v) review the final programme report package during an end-of-project review meeting to discuss lesson learned as they relate to the effectiveness of screening, tracking, and reporting on E&S risks.

DECISION MAKING FUNCTION – The Grants Committee

The EDA Program will have a **Regional Grants Committee,** which will serve as the **decision-making body** and will be the ultimate responsible party for selecting the subprojects. The Grants Committee will be composed by the Executing Entities of the programme that will serve as the financial vehicles to provide finance to selected sub-projects at the local level.

Decisions of the Grants Committee will be taken by consensus. In the event all efforts at reaching consensus have been exhausted, the MCT representative will find consensus or propose a final decision to ensure that the programme implementation is not delayed.

The Grants Committee will meet twice a year times a year in order to organize and review Expressions of Interests, the roster of eligible entities and to conduct a final selection of the

sub-projects.[255] The Grants Committee will be responsible for ensuring that all sub-grants have been screened properly for E&S risks and that only low risk (Cat C) proposals are approved for funding.

The EDA FACILITY - MANAGEMENT MECHANISM

The Regional Programme Coordination Unit

The Regional Program Coordination Unit (RPCU)

A Regional Program Coordination Unit (RPCU) will be hosted at MCT's headquarters in Pohnpei FSM, The RPCU will be employed by MCT and will oversee the programme operation across the three countries. The RPCU will be composed by the following staff:

- one Program Coordinator,
- one Program Administrative and Financial Assistant,
- one Regional Grants Officer.
- one Monitoring, Evaluation and Learning Officer

Specific responsibilities of the RPCU include:

- Run the day-to-day operations of the EDA program, including designing and implementing the annual work-plan and budget.
- defining, prioritizing and implementing the program activities, including the capacity building and knowledge management ones (Components 1 and 3)[256].
- Organizing, with the EEs the call for proposals,
- Supporting the initial screening of EOIs, in coordination with the country Grants Officers, to determine project eligibility.
- Preparing the presentation of the eligible projects to the Grants Committee for final approval.
- Gender and E&S screening for which the RPCU will be supported by an external Gender and Environmental and Social Safeguards (GESS) expert will support the PCU in undertaking a gender and E&S integration check to determine if, at the EOI stage, the grantees have identified gendered, and safeguard needs and capacities incorporated into project design.

The Executing Entities

At the country level, the program builds its design on established Executive Entities (EE) which will provide finance to sub-projects at the local level. These funding vehicles will be: MCT in FSM, The PAN Fund in Palau, and the MIMRA in RMI. The EEs will follow this Umbrella Operations Manual. Given that the SGF will operate on established EEs in each country, it is expected that in the inception period of the program implementation, the present OM is revised to each country EEs requirements. This will be done under *Activity 2.1.1: Establish and formalize regional oversight, governance, protocols and guidelines and redress mechanism for the SGFs to be implemented by each country.*

[255] Sub-projects are defined as EbA interventions that will be funded by the SGF under Component 2 of the EDA programme.

[256] For implementing the activities under Components 1 and 3 the RPCU will hire, through a competitive procurement process, national/regional and/or international firms and regional/national and/or international consultants for implementing specific activities according to the annual work plan, budget and procurement plan. Please refer to Annex 3- Budget notes for details.

The EE will sign a subsidiary agreement with the AEs, in which the EE will be requested to present an annual workplan and budget to be integrated into the programme annual workplan and budget. The EEs will work under the guidance of the RPCU to conduct the initial screening of the Expressions of Interest (EOI) for subprojects, ensuring these falls within the appropriate thematic areas and that there is no duplication with other ongoing support in-country. An external GESS expert will be hired to support E&S safeguard and gender screening. At the country level, each EE will use their existing committees for the pre-approval of the selected sub-projects. The EEs will hire a National Grants Officer to manage the SGF at the national level, who will coordinate closely with the RPCU for the daily operation of the programme in each country. This will allow ensuring the financial vehicles have the sufficient capacities to manage the SGF at the country level and ensure the RPCU manages and supervises the implementation of the workplans by the EEs.

MCT in its role as AE, and in response to clause per clause 10.02 of the AMA, has conducted capacity Assessments of the EEs. Capacity Assessments are available to the GCF. MCT will retain the overall responsibility and oversight for the programme in the three countries.
The SGF will have one, umbrella SGF Operation Manual (OM)[257] that will set the rules of the functioning of the EDA SGF and the management of its project cycle. For more details please refer to Annex 13- Operations Manual.

Federated States of Micronesia- Micronesia Conservation Trust

The Micronesia Conservation Trust (MCT) is an entity based in the Federated States of Micronesia, operating in that country and serving the jurisdictions of the Micronesia Challenge, including RMI and Palau. Its mission is to promote biodiversity conservation and related sustainable development. In order to achieve its mission, it focuses on providing long-term sustained funding through grant programmes, building the capacity of organisations of the FSM and the jurisdictions of the Micronesia Challenge, including RMI and Palau to design and manage conservation and climate adaptation programmes. It also provides regional forums for collaborations among government, the private sector, the community and non-profit organisations to collectively address the challenges of natural resource management and climate adaptation. It also manages endowment funds and other piloting revolving funds for ecosystem services. MCT has an established Grants Cycle which applies to all grants made through MCT.

Republic of Palau - the Protected Areas Network Fund[258]

The Republic of Palau has a network of protected areas, created by Law No 6-39, known as the Protected Areas Network (PAN). To support the efforts of the States to protect their resources and to attain the goal of the Micronesia Challenge, and to facilitate states' ability to access available international financial and technical resources, the Republic of Palau has established an independent non-profit organisation to serve as a financial trustee of the monies obtained to support the PAN and to manage the funds from donations and arrival fees. This non-profit organisation is called the **PAN Fund**. The PAN Fund began operations in

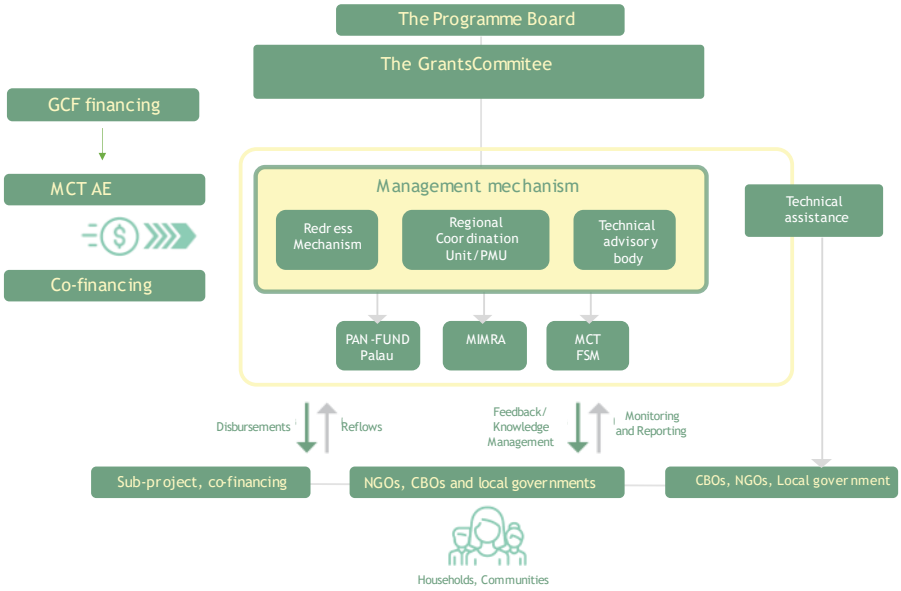
[257] This will be based on the MCT's existing Policy and Operations Manual

[258] More information available here: PAN Fund | What Is PAN Fund? (palaupanfund.org)

March 2012, and since then has disbursed over USD 13.1 million dollars to support the PAN.[259]

Republic of Marshall Islands - the Marine Islands Marine Resources Authority – (MIMRA)[260]

MIMRA is the governing body dealing with coastal and community affairs, finance and corporate affairs, as well as fisheries development. Under the Reimaanlok process, MIMRA works closely with local governments and communities to facilitate the development of resource management plans, under which communities become responsible for managing their own natural resources.



The Redress Mechanism

The SGF will also have a grievance / redress mechanism that will be aligned with MCT's policies and framework in accordance with MCT's Policy and Operations Manual.[261]

The Umbrella Operations Manual (Annex 13) further details of the specific grievance mechanism process for E&S issues will be outlined in the Full Funding Proposal. Additional detail for processes will be included in the Operations Manual for the EDA programme.

The External Technical Advisory Body

The SGF will have an external technical advisory body composed of the Colleges of each country, including the College of Micronesia, College of the Marshall Islands (CMI) and Palau Community College (PCC). They will have a dual role of supporting the RPCU in assessment

[259] The Palau PAN Fund. Available at: https://www.palaupanfund.org/structure.html

[260] More information available here: PAN Fund | What Is PAN Fund? (palaupanfund.org)

[261] MCT Policy and Operations Manual, 2018

and advice, including developing screening tools and identifying enabling factors for local groups as well as reporting on lessons learnt on the programme implementation and the sub-projects.

Following the development of a roster of eligible entities and delivering capacity building for them for a) applying for grants and b) implementing sub projects (Component 1), Component 2 of the programme involves the development and implementation of the Small Grants Facility.

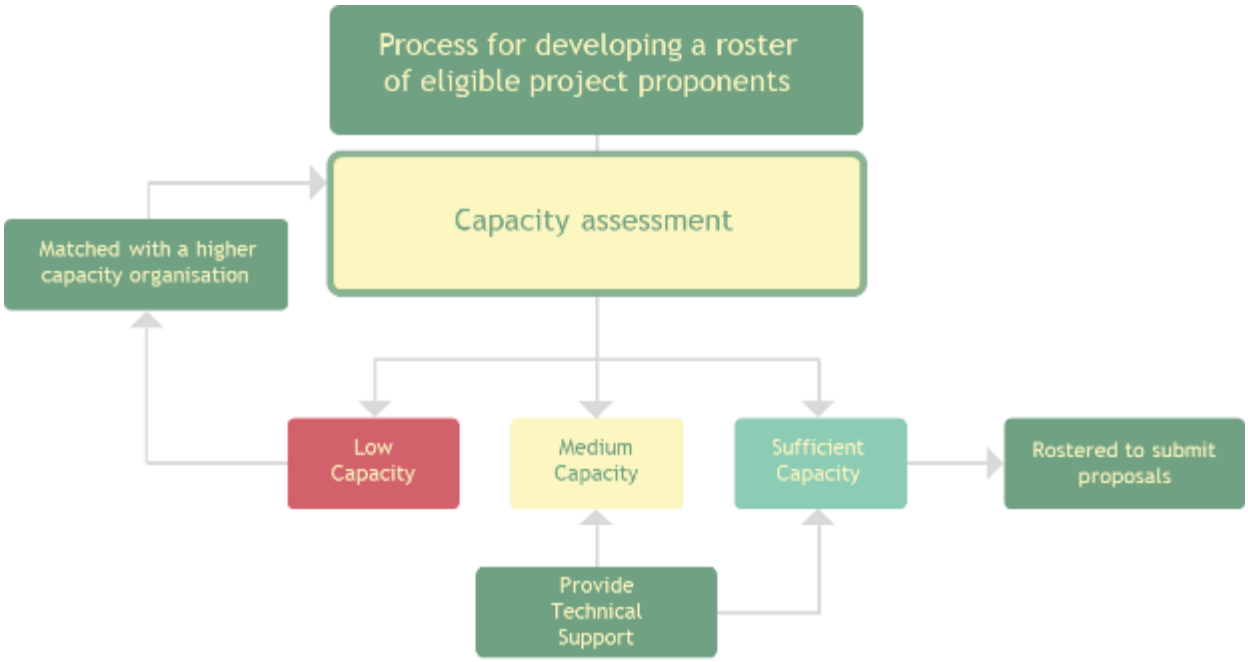
Capacity assessment of prospective grant recipients

The programme's prospective roster of eligible organisations will be created under Component 1 of the programme and will include a capacity assessment for SGF applicants. This will allow assessing their existing capacities and capacity building needs to implement projects (see details in the Logical Framework and refer to capacity assessment criteria under Operations Manual).

Upon completion of the capacity assessment, the applicant will be ranked, and action will be taken accordingly:

- **Sufficient capacity:** If it is determined that the applicant has sufficient capacity, the applicant will be rostered as immediately eligible to submit an EOI.
- **Minor issues (Medium capacity):** If it is determined that the applicant has minor organisational, managerial, or financial gaps (medium capacity), then technical assistance will be offered to improve capacity along those lines (Under Component 1).
- **Severe gaps (Low capacity):** If it is determined that the applicant has severe gaps (low capacity), the organization will be matched with a higher capacity organization to collaborate on the sub-grant and resubmit the EOI with the higher capacity organization as the lead agency. Activities 1.1.3. and 1.1.4 of the projects are envisaged to address issues identified in the capacity assessment activity. They involve developing a "Training of Trainers" program and organizing "Writeshops" to help rostered entities to formulate robust project concepts that are likelier to succeed. [262]

[262] More information on these activities can be found in the submitted SAP Funding Proposal.



Sub-project investment cycle

The SGF will deliver two types of grants:

- Regular Grants: Between USD 10,000 – 50,000 for Civil Society Organisation and NGOs subprojects.
- Large Grants: Between USD 50,000 – 200,000 for larger and more established entities (NGOs, CSOs, CBOs and local governments' subprojects (including State and municipal governments).

Stage 1: Expression of Interest (EOI)

In this first stage, prospective grant recipients will be required to submit a short EOI outlining their proposed EBA intervention under the SGF (see the Operations Manual for the EOI form).

The first EOI will be issued approximately six months after the start of the implementation of the EDA programme. Following, that EOI calls will occur once a year.

Advertisement of the EOI

Having a clear and robust funding mechanism advertisement is imperative to ensure transparency and inclusive access to the SGF. The frequency, medium and duration of advertisement will differ between the three countries to cater to the different contexts. This will ensure that target beneficiaries are exposed to the advertisement of the EOIs through appropriate means of communication that are widely available, easily accessible and in the appropriate language and does not exclude any groups of the local population. More information will be provided in the Operations Manual.

Screening of EOIs

The EOI will be screened for alignment with GCF criteria, the level of E&S risk, gender integration and the engagement of local communities and marginalised groups.

All EOIs must demonstrate engagement and input from community stakeholders. Organisations (NGOs, CSOs) that submit an EOI must demonstrate that their small grants will address climate risks faced by local communities and will be pre-screened for gender integration and environment and social risks, based on established criteria (Refer to Annexes 4 and 12 for a Gender Assessment and Action Plan, and Environmental and Social Action Plan, as well as the Small Grant Facility's Operations Manual) Support for prioritising EBA solutions will include training (delivered under Component 1) on how to conduct and document stakeholder consultations.

If the EOI is successful, i.e., it falls within the appropriate thematic areas, it aligns with the GCF investment criteria, it passes the screening procedure and there is no duplication with other ongoing support within the target country, the EOI will be cleared, and the prospective grant recipient will be invited to submit a full proposal.

If the EOI is not successful, feedback will be provided as to why the EOI was not cleared. The applicant could be supported by a Facilitating Agent, which will be selected through a call for tenders, to provide project development support to refine the EOI to meet the eligibility criteria for submission into a later EOI call. If relevant, the applicant may be referred for training and capacity development under Component 1.

Every call for EOIs will be supported by Writeshops (see more details under Activity 1.2.1). These Writeshops sessions will allow potential recipients to learn more about the SGF opportunities and to obtain support to develop their project ideas.

Stage 2: Invitation to submit full proposal.

Once an EOI is successful and the organisations meet the organisational capacity requirements, the applicant will be invited to develop a full proposal and will be provided support to do via Writeshops and from Facilitating Agents, who will be selected through a call for tenders. Support will be provided for project implementation, monitoring and reporting of the sub-projects. This support will allow prospective grant recipients to integrate scientific and local knowledge, and to develop the needed skills to successfully design and implement the sub-projects. Funding in the budget has been allocated to hire specialist E&S safeguard and gender expertise to support the project development process if required.

Applicants will submit the full project proposals to their national Financial Vehicle Grants Officer, within 3-4 weeks following trainings. The funding proposal should provide information on how communities will benefit from the sub-grant and detail how knowledge / skill transfer will occur.

Pre-screening and completeness checks

The Financial Vehicle Grants Officer will review the proposal for completeness. Particular attention will be paid to whether stakeholder input and engagement has been continued through the full proposal development (from the EOI stage).

Pre-selection of country sub-projects through the national Financial Vehicle process
Once pre-screening and completeness checks have been conducted by the national Grants officer, the proposals will be reviewed through the national Financial Vehicle selection process to pre-select those that will be put to approval consideration by the Grants Committee.

Regional Programme Unit (RPCU) recommendations

The RPCU will then compile the reviewers' comments into an integrated review and make recommendations to the Grants Committee on whether or not to approve or not approve the project or call for additional work on the detailed project proposal. All reviews will be made available to proponents.

Grants Committee – final approval

If the project passes the review, it will be presented to the Grants Committee for final screening using criteria provided in the Operations Manual. Reviewers from the Grants Committee will evaluate the proposals against the agreed checklist, which includes the GCF investment criteria. Screening on whether the proposal has appropriately identified E&S risks and sufficiently incorporates gender elements will also be included. The specific review process/criteria for E&S screening and review of the sub-grants are included in the Operations Manual. An initial sub-grant gender assessment is included as part of the Gender Analysis and Action Plan (Annex 8 of the funding proposal).

The Grants Committee will then decide whether to approve the full proposal, reject it, or refer it back for further modifications. The record of the Grants Committee meeting will capture the PB's recommendations and the reasoning behind the decision. In the cases of conditional approval, the meeting record will detail the conditions that need to be met for approval.

Communication and next step

The RPCU will notify prospective applicants of the recommendations of the Grants Committee via the national Financial Vehicle Office. Applications that are approved will enter the contracting stage. Projects that are referred to proponents for further modification will have an opportunity to be resubmitted in the next call for proposals.

Stage 3: Contracting

Once the Grants Committee approves the project, the national Financial Vehicle will prepare and enter into a contract agreement with the awarded Grant Recipient.

Legal agreements

The legal agreements between the National Financial Vehicle and the Grant Recipient will be negotiated and finalised based on the nature of the activity and of the anticipated funding flows. The agreements will contain all relevant details regarding the terms and conditions of the SGF financing, outlined in Annex 13 in the Umbrella Operations Manual and following each National Executing Entities rules and procedures.

Contracts

Contracts will specify the annual project work plan and associated budgets, deliverables, and disbursement schedules, in line with the Umbrella Operations Manual. They will also specify monitoring, evaluation, and reporting requirements. Baselines will need to be established within the first three months of grant sub-grant inception. This stage will conclude with the signing of legal agreements between the Financial Vehicle and the Grant Recipient.

Stage 4: Implementation, monitoring, and reporting

Grant Recipients will be expected to implement their sub-grants according to the schedules and deliverables that are set out in their contracts. A milestone approach to sub-grant awards and payment schedules will be utilised and is discussed further in the operations manual.

Funding duration

The duration of implementation period of the subprojects will vary depending on the amount of financing they have acquired and the nature of project (e.g., infrastructure, awareness raising, policy). Therefore, the appropriate duration of each subproject will be determined on a case-by-case basis when they are assessed and selected through the SGF. The acceptable duration of the subprojects will also be assessed based on the selection criteria. For example, as a part of the screening processes, a subproject's timeline and implementation plans will be assessed to determine if it will be able to realistically implement the planned activities within the allocated time and according to the grant received.

Monitoring

At the sub-project level, Grantees will report every six months to their Executing Entities following their guidelines, as well as report during a mid-year "live" meeting, either in person or online. Project performance reports should be based on the Monitoring and Evaluation Plan grantees will submit to their respective Executing Entities.

Refer to Annex 13 for details in the Umbrella Operations Manual on subproject monitoring.

Reporting

At the sub-project level, Grantees will report annually to their Executing Entities following their guidelines, as well as report during a mid-year "live" meeting, either in person or online. Project performance reports should be based on the Monitoring and Evaluation Plan grantees will submit to their respective Executing Entities.

At the program level, Executing Entities will submit project performance reports to the RPCU. These reports will summarize project progress and risk management related activities. Annual financial and narrative reports will also be submitted by the Executing Entities offices.

Managing risk

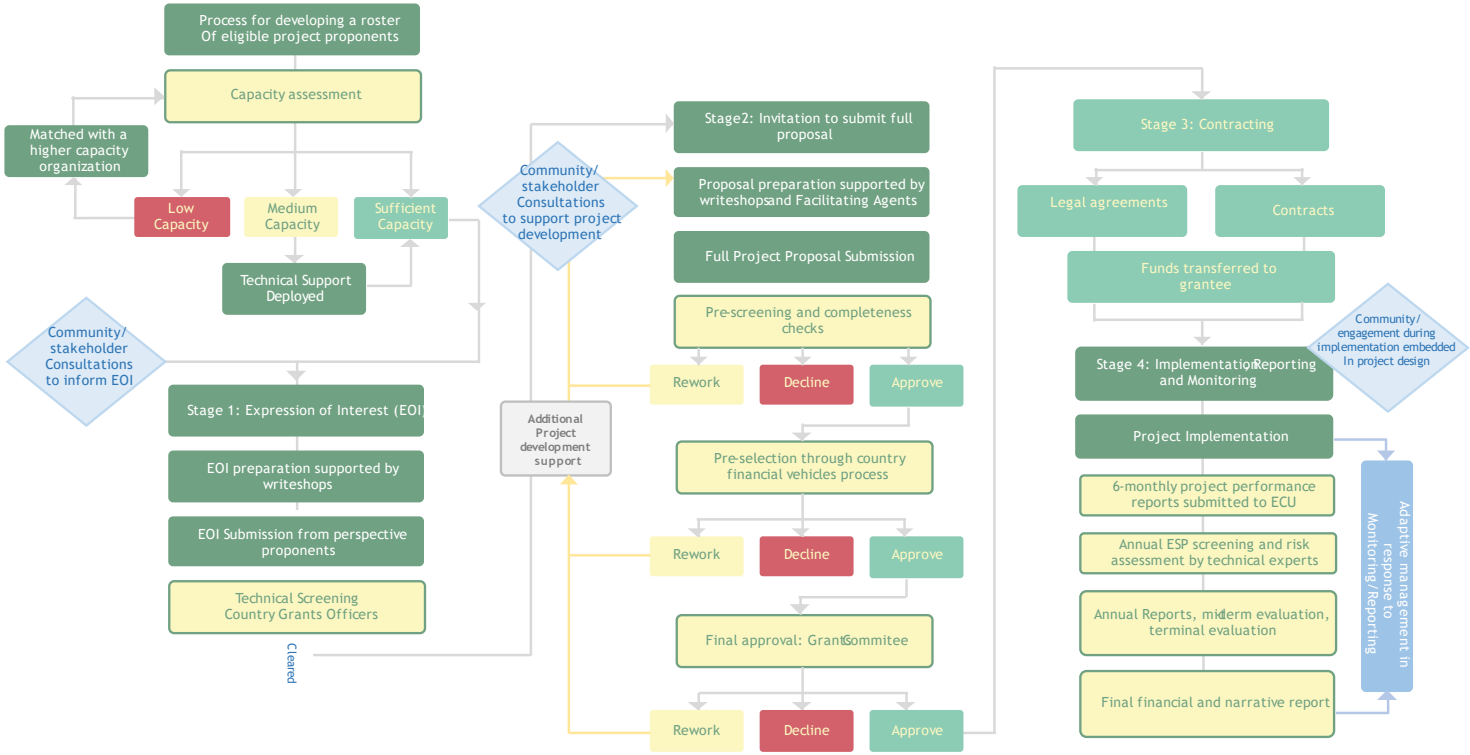
The Executing Entities will be responsible for working with the Grant Recipients to ensure that recommendations identified through reporting in the step above are integrated into the relevant project risk management plans and into future implementation activities. Where risks are detected, the EE may propose the redirection of project funds to risk management activities, or the withholding of the next tranche of payment until satisfactory risk management actions are determined and agreed. In this regard, it is noted that every effort will be made to support grant recipients to positively respond to and manage unanticipated risks.

Project closure and Knowledge Management

Throughout the implementation of the EDA program, opportunities will be created for recipients to meet and share lessons and experiences amongst each other as well as local and national stakeholders (Component 3 of the project), particularly through the program-

level MEL and the creation of a shared platform. All recipients are expected to submit a final financial and narrative report at mid and final term.

All Grant Recipients will be expected to submit a final financial and narrative report.


Process for developing a roster Of eligible project proponents
Capacity assessment
Matched with a higher capacity organization
Low Capacity
Medium Capacity
Sufficient Capacity
Technical Support Deployed
Community/ stakeholder Consultations to inform EOI
Stage 1: Expression of Interest (EOI)
EOI preparation supported by writeshops
EOI Submission from perspective proponents
Technical Screening Country Grants Officers
Cleared
Community/ stakeholder Consultations to support project development
Additional Project development support
Stage2: Invitation to submit full proposal
Proposal preparation supported by writeshopsand Facilitating Agents
Full Project Proposal Submission
Pre-screening and completeness checks
Rework
Decline
Approve
Pre-selection through country financial vehicles process
Rework
Decline
Approve
Final approval: Grant Commitee
Rework
Decline
Approve
Stage 3: Contracting
Legal agreements
Contracts
Funds transferred to grantee
Stage 4: Implementation Reporting and Monitoring
Community/ engagement during implementation embedded In project design
Project Implementation
6-monthly project performance reports submitted to ECU
Annual ESP screening and risk assessment by technical experts
Annual Reports, mid-term evaluation, terminal evaluation
Final financial and narrative report
Adaptive management in response to Monitoring/Reporting

Sub-grant intake form and review criteria

As part of the SGF Financing Mechanism, working drafts of the relevant forms and review criteria have been developed (see Annex 13, Umbrella Operations Manual). These however will need to be endorsed by the project's governance mechanism during the first six months of programme implementation, prior to the first EOI call. Input from the Grants Committee will need to be incorporated and the final approval of the entire mechanism including intake form and review criteria will be granted by the Grants Committee. Additional adjustments could be considered following the stakeholder engagement and stakeholder capacity building efforts as part of Component 1.

Appendix I: Eligible Organizations, by country

This is a provisional list of institutions, scoped out through purposive sampling during the Concept Note stage. In the implementation stage, these organizations will be contacted, and the programme will aim to expand the list based on the results of the activity that will develop a Roster of eligible organizations.

Federated States of Micronesia

Organization	Location and Type	Contributed Value/Role in Project	Examples of Programs
Kosrae Conservation and Safety Organization	Kosrae State/NGO	Long-standing relationships with communities in the project areas, ongoing engagement in protected area and natural resource management, facilitation of LEAP process, implementation and execution of climate change adaptation actions and projects. Potential executing partner.	Community awareness raising, facilitating community resource management planning and project implementation/execution. Habitat rehabilitation and Protected areas network coordination. Co-management of the Utwe-Walung UNESCO Biosphere Reserve.
Yela Environmental Landowners Association	Kosrae State/NGO	Representing landowners at one of the potential project areas, on-going engagement in protected area and natural resource management, development of forest stewardship plan, implementation and execution of climate change adaptation actions and projects. Potential executing partner.	Forest inventory, management of YELA conservation easement area, resource monitoring and climate change adaptation and resource conservation actions.
Conservation Society of Pohnpei	Pohnpei State/NGO	Long-standing relationships with communities in the project areas, ongoing engagement in protected area and natural resource management, facilitation of LEAP process, implementation and execution of climate change adaptation actions and projects. Potential executing partner.	Community awareness raising, facilitating community resource management planning and project implementation/execution. Habitat rehabilitation and Protected areas network coordination. Co-management of the Ant Atoll UNESCO Biosphere Reserve.

Organization	Location and Type	Contributed Value/Role in Project	Examples of Programs
College of the Marshall Islands (CMI)	Majuro/Higher Education	CMI provides access to qualified, student-centred, post-secondary educational services to the Marshallese people. CMI provides selective higher educational programming, intellectual resources and research specific to the needs of the nation.	Educational programs (formal and continuing/community education), collaborator for capacity building and project implementation/execution.
Chuuk Women's Council	Chuuk State/NGO	Long-standing relationships with communities in the project areas, ongoing engagement in protected area and natural resource management, facilitation of LEAP process, implementation and execution of climate change adaptation actions and projects. Umbrella organization of community women's groups. Potential executing partner.	Community awareness raising, facilitating community resource management planning and project implementation/execution. Habitat rehabilitation and Protected areas network coordination.
Chuuk Conservation Society	Chuuk State/NGO	Long-standing relationships with communities in the project areas, ongoing engagement in protected area and natural resource management, facilitation of LEAP process, implementation and execution of climate change adaptation actions and projects. Potential executing partner.	Community awareness raising, facilitating community resource management planning and project implementation/execution. Habitat rehabilitation and Protected areas network coordination.
Yap Community Action Program	Yap State/NGO	Long-standing relationships with communities in the project areas, ongoing engagement in protected area and natural resource management, facilitation of LEAP process, implementation and execution of climate change adaptation actions and projects. Potential executing partner.	Community awareness raising, facilitating community resource management planning and project implementation/execution. Habitat rehabilitation and Protected areas network coordination.
Wa'agy	Yap State/NGO	Long-standing relationships with communities in the project areas, ongoing engagement in protected area and natural resource management, facilitation of LEAP	Community awareness raising, facilitating community resource management planning and project

Organization	Location and Type	Contributed Value/Role in Project	Examples of Programs
		process, implementation and execution of climate change adaptation actions and projects. Potential executing partner.	implementation/execution. Habitat rehabilitation and Protected areas network coordination.
Island Food Community of Pohnpei	Pohnpei State/NGO	Long-standing relationships with communities in the project areas, implementation and execution of climate change adaptation actions and projects with particular focus on food security and nutrition, promotion of the growing, harvesting and consumption of local foods. Potential executing partner.	Community awareness raising, training on climate smart agriculture, food processing and nutrition.
Marine Environment Research Institute of Pohnpei	Pohnpei State/NGO	Builds capacity in sustainable alternative livelihoods and conservation activities. Conducts climate change and fisheries outreach and education with local communities and entrepreneurs. Potential executing partner.	Development of sustainable and climate smart aquaculture throughout the region.
Kaday Community & Cultural Development Organization	Yap State/NGO	Long-standing relationships with communities in the project areas, ongoing engagement in protected area and natural resource management, facilitation of LEAP process, implementation and execution of climate change adaptation actions and projects. Potential executing partner.	Community awareness raising, facilitating community resource management planning and project implementation/execution. Habitat rehabilitation and Protected areas network coordination.
Yap Institute of Natural Science	Yap State/NGO	Dedicated to the idea of maintaining indigenous integrity through wise sustainable use of local resources, and the search for a valid ethnoecological lifestyle in the Yap islands ecosystem. Potential technical advisory role.	Fruit bat surveys, studying the feasibility of mariculture for Micronesia, reintroducing sailing canoes as commercial fishing vessels.
University of Guam Marine Lab (UOGML)	Guam/University	Standardizes coral-reef monitoring across main islands in RMI and FSM	Facilitating monitoring efforts while training local partners on field techniques, database generation, and taxonomy
RARE	International NGO	Specializes in social marketing and effective communications for conservation. Technical advisory role.	Building management and technical capacity to test site-level solutions from

Organization	Location and Type	Contributed Value/Role in Project	Examples of Programs
			campaigns that incentivize long term support of MPAs.
The Nature Conservancy (TNC) Micronesia Program	International NGO	Empowers regional and local conservation organizations/agencies to be successful in direct conservation action through trainings and capacity building support.	Strengthening local partners' capacity at priority sites to undertake ridges to reef and climate change resiliency planning.

Palau

Organization	Location and Type	Contributed Value/Role in Project	Examples of Programs
Palau Conservation Society	Koror/NGO	PCS is the local conservation organization in Palau. PCS is dedicated to the protection of Palau's unique environment, and work to raise community capacity to steward biodiversity and natural resources. PCS is the only organization in Palau to take a comprehensive ecosystem approach (marine and terrestrial).	Community awareness raising, facilitating community resource management planning and project implementation/execution. Habitat rehabilitation and Protected areas network coordination and project implementation/execution.
Ebiil Society	Babeldaob/NGO	The Ebiil Society's main goal is the education of environmental protection and proper management of natural resources through indigenous knowledge.	Community awareness raising, facilitating community resource management planning and project implementation/execution. Habitat rehabilitation and Protected areas network coordination and project implementation/execution.
Hatohobei Organization for People and Environment (HOPE)	Koror/NGO	Hatohobei Organization for People and Environment (HOPE) is a non-profit organization that aims is to protect the environment and the living standard of the people of Hatohobei Island and State. HOPE works to	Community awareness raising, facilitating community resource management planning and project implementation/execution. Habitat rehabilitation and Protected areas network coordination and project implementation/execution.

Organization	Location and Type	Contributed Value/Role in Project	Examples of Programs
		promote social welfare, develop cultural activities and programs, protect the environment, encourage education, and provide financial and administrative support to the community's goals and objectives.	
Palau International Coral Reef Center (PICRC)	Koror/Research Institution	PICRC is Palau's leading research and aquarium institution. The centre's mission is to guide efforts supporting coral reef stewardship through research and its applications for the people of Palau, Micronesia, and the world. Towards that end, PICRC, a non-profit organization, conducts research that enhances knowledge and conservation of coral reef systems and their associated marine environments.	Community awareness raising, facilitating community resource management planning and project implementation/execution. Educational programs (formal and continuing/community education), collaborator for capacity building and project implementation/execution
Palau Community College (PCC)	Koror/Higher Education	Palau Community College is an accessible public educational institution helping to meet the technical, academic, cultural, social, and economic needs of students and communities by promoting learning opportunities and developing personal excellence.	Educational programs (formal and continuing/community education), collaborator for capacity building and project implementation/execution
Palau PAN Fund	Koror/NGO	This independent non-profit organization serves as a financial trustee of the monies obtained to support the PAN to manage the funds	Community awareness raising, coordination with PAN sites.

Organization	Location and Type	Contributed Value/Role in Project	Examples of Programs
		from donations and arrival fees.	
Ministry of Natural Resources, Environment and Tourism	Koror/Government Ministry	The goal of the Ministry is to be widely recognized in promoting, exploring, exploiting, developing, protecting, and managing the natural resources of the Republic, in areas of marine and fisheries, agriculture, aquaculture, forests, mineral and other land-based and ocean-based resources as well as tourism.	Coordination through the Protected Areas Network Office.
Palau State Governments (16)	Government Offices	The Palau Constitution designates sixteen traditional municipalities of Palau as states. Adoption of the Palau Constitution gave the sixteen states the authority to formulate their own constitutional conventions and elect their respective legislatures and heads of state.	Coordination and collaboration as project executing entities.

Republic of Marshall Islands

Organization	Location and Type	Contributed Value/Role in Project	Examples of Programs
Marshall Islands Conservation Society	Majuro/NGO	MICS is the local conservation organization of the Marshall Islands. MICS is dedicated to building awareness, support and capacity for sustainable use of resources, conservation and protection of biodiversity. It has long standing relationships with communities in protected area and natural resource management. Potential executing partner.	Community awareness raising, facilitating community resource management planning and project implementation/execution. Habitat rehabilitation and Protected areas network coordination.

Organization	Location and Type	Contributed Value/Role in Project	Examples of Programs
Jo Jikum	Majuro/NGO	Jo-Jikum, which means “your home” in Marshallese, is an educational organization that aims to help young Marshall Islanders respond to climate change by organizing climate change workshops, awareness campaigns, community events and other activities. Potential executing partner. Potential executing partner.	Community awareness raising, facilitating community resource management planning and project implementation/execution.
Women United Together Marshall Islands (WUTMI)	Majuro/NGO	Long-standing relationships with communities in the project areas, on-going engagement in protected area and natural resource management, facilitation of LEAP process, implementation and execution of climate change adaptation actions and projects. Umbrella organization of community women’s groups. Potential executing partner.	Community awareness raising, facilitating community resource management planning and project implementation/execution. Habitat rehabilitation and Protected areas network coordination.
College of the Marshall Islands (CMI)	Majuro/Higher Education	CMI provides access to qualified, student-centred, post-secondary educational services to the Marshallese people. CMI provides selective higher educational programming, intellectual resources and research specific to the needs of the nation.	Educational programs (formal and continuing/community education), collaborator for capacity building and project implementation/execution.
University of the South Pacific – Marshall Islands Campus	Majuro/Higher Education	USP is the premier provider of tertiary education in the Pacific region and an international centre of excellence for teaching, research consulting and training on all aspects of Pacific culture, environment and human resource development needs.	Educational programs (formal and continuing/community education), collaborator for capacity building and project implementation/execution

Appendix II: Methodology of the study

Research for this pre-feasibility study was conducted from April – July 2022, and builds on the Technical Report delivered in April 2022. The findings presented in the Technical Report were used to support a more comprehensive consultation phase (undertaken in May and June 2022) with national stakeholders. This, in itself, fed into this pre-feasibility study to ensure that the potential investments will be successfully designed and implemented in a climate-resilient manner. During these months, a series of Inception Phase Workshops were delivered to GCF project stakeholders in the three island nations. The primary literature generated from the stakeholder consultations was reviewed by the international consultants in lieu of in-country missions, which could not be organized due to COVID-19 restrictions.

An extensive desktop review collated documents from different climate sector and development sector actors. A broader review of socioeconomic indicators for the three countries, as they related to the Sustainable Development Goals (SDGs), was also conducted as part of this review and has been included in the pre-feasibility study as Sections 5.1 & 5.2 (FSM), 6.1 & 6.2 (Palau), 7.1 & 7.2 (RMI). While the review has broadly covered climate change issues in the Pacific SIDS, EbA measures, and resource management, the primary focus remained on data sources on protected areas:

- The Pacific Islands Protected Area Portal (PIPAP[263]) provides a core source of information for this study. It is designed to provide a doorway through which Pacific Islands protected area practitioners can share expertise and benefit from opportunities.
- Protected Planet is another authoritative source of data on protected areas and other effective area-based conservation measures (OECMs), which has been used for this study. Through the Protected Planet website[264], users can explore the World Database on Protected Areas (WDPA), World Database on OECMs, Global Database on Protected Area Management Effectiveness (GD-PAME), and a wealth of associated information.[265] The Nature Conservancy (TNC) undertook an important first round of PA data collection using the GD-PAME approach in 2013, though this has not been routinely updated since the Marine Protected Area Management Effectiveness (MPAME), however, most of the sites have completed another round of the MPAME in an ad-hoc fashion only.[266]
- The Marine Protection Atlas (MPAtlas) is building a comprehensive global database of marine protection to identify, monitor, and advocate for fully and highly protected areas. It supports international progress toward effective marine conservation by integrating the latest available data on marine protected areas with science-based assessments that determine their stage of establishment and level of protection. It combines self-reported data submitted by countries to the official WDPA with standardized, science-based assessments that categorize MPA zones in terms of expected components and conservation benefits.

[263] https://pipap.sprep.org/content/about-pacific-islands-protected-area-portal-pipap

[264] UNEP-WCMC (2022). Protected Area Profiles from the World Database of Protected Areas, March 2022. Available at: www.protectedplanet.net.

[265] GD-PAME captures information about completed management effectiveness assessments for protected areas and currently documents close to 29,000 evaluations from 177 countries.

[266] MCT recently funded a round of MPAME assessments for some sites and the Palau PAN Office requires completion of the MPAME to be eligible for funding. The TNC 2013 GD-PAME report identifies MPAME implementing partners though in the time available for this Technical Report were not contacted to determine the latest MPAME for particular sites.

A separate event was concurrently to deliver a working event to help determine a Climate Vulnerability Assessment (CVA) for the PAs within each participating nation. The CVA exercise (which involves production of a Climate Vulnerability Index – CVI) represents a key task towards achieving this intention and to further gather knowledge and information on the role of EbA to support the climate resilience of PAs. The findings are reflected, by country, in Section 4, and a detailed methodology for the CVA-CVI exercise is presented in Appendix II.

Each country profile (Section 5, 6, 7) also benefits from a collation exercise of scores and rankings from composite indices – where available, especially due to paucity of data, to reflect the three participating nations overall performance on different indicators. These indices have differing methodologies and are being employed as indicative (and *not* conclusive) measures of current levels of development, gender equality, poverty, and labour force participation.[267] Scores of three different UNDP composite indices: Human Development Index (HDI), Gender Inequality Index (GII) and Gender Development Index (GDI) as points of departure – where available.

Overall, the methodology benefits from **concurrent triangulation research design**, and deliberately sidesteps sequential research processes. In *sequential designs*, either the qualitative or quantitative data are collected in an initial stage, followed by the collection of the other data types during a succeeding, second stage.[268]

In contrast, *concurrent designs* are characterized by the collection of both types of data during the same stage (which was the case for the development of this pre-feasibility study as well as the Technical Report).[14] Within these two categories, there can be three specific designs based on:(a) the level of emphasis given to the qualitative and quantitative data (equal or unequal); (b) the process used to analyse and integrate the data, and (c) whether or not the theoretical basis underlying the study methodology is to bring about social change or advocacy.[14]

This approach has been deemed suited to this pre-feasibility study, given that the primary objective aims is to assess the factors supporting the relevance of the programme's proposed EDA design for GCF investment, with focus on technical design, prototypes of EbA interventions, social and environmental impacts, legal and regulatory environments. This also ensures that the study is able to propose eligibility criteria for scoping, identifying, and prioritizing sub-projects for EbA measures in the implementation stage, ones that are relevant for the delivery of the components identified in the results framework to drive the overarching programmatic goal forward. Lastly, because the stakeholder consultations undertaken in the islands, was formative in nature, the concurrent research design of this study has helped establish a prompt framework to collate an inventory of information that can act as points of departure for sub-projects in the implementation stage.

[267] As Booysen's research shows, composite indices present both challenges and advantages. For example, numerous fallacies have been identified in the methodologies employed in composite indexing. These indices are mainly quantitative, and present empirical and aggregate measures of complex development phenomena, making values apparently objective, at the cost of subjective nuances. Yet, these also remain invaluable as useful supplements to income-based development indicators, understanding relative degrees of development, simplifying complex measurement constructs as well as providing access to non-technical audiences.
Booysen, F. (2002). An Overview and Evaluation of Composite Indices of Development in Social Indicators Research, (Vol. 59 No. 2). Journal Article.

[268] Creswell JW, Plano Clark VL, Gutmann ML, Hanson WE. Advances in mixed methods research designs. In: Tashakkori A, Teddlie C, editors. Handbook of mixed methods in social and behavioral research.

Appendix III: CVA-CVI

Developing a Climate Vulnerability Index (CVI)

This appendix presents the consultative methodology for developing the CVI through the CVA exercise, the results of which have been presented in Section 4.

In this exercise, workshop participants worked through the following steps to support the development of the CVI for each participating nation:

1. Reviewing the significant "values" of PAs in each nation – including attributes of OUV and other values (Exercise 1).

2. Identifying relevant climate drivers[269] (potential climate stressors – Exercise 2).

3. Identifying the potential impacts of climate change on these values (Exercise 2).

4. Conducting a high-level risk assessment (likelihood and consequence) of these impacts to identify the three key potential climate stressors likely to impact on the PA values within a specified time frame.

5. Considering related physical, ecological, economic and social impacts (Exercise 3).

6. Considering the likely adaptive capacity in relation to the three key potential climate stressors (Exercise 4).

The CVI framework followed that of the North American MPA Rapid Vulnerability Assessment Tool[270], which was modified from the IPCC Vulnerability Framework[271]. As noted in the latter, assessment of vulnerability involves scientific uncertainty and value judgments which have been made throughout this Workshop Report.

For the rapid assessment of the CVI, framework components (Figure 2.1) were evaluated using a categorical system, with category thresholds drawn from various existing resources. Since the various workshop, the CVI framework has adopted the (unmodified) IPCC Vulnerability Framework (as applied in the Third and Fourth Assessment Reports). In this the elements Likelihood, Consequence and Risk are substituted by Exposure, Sensitivity and Potential Impact, respectively. However, the process of the rapid assessment of the CVI is such that the components identified for each participating nation will remain valid under both versions of the framework.

[269] The CVI process uses the term 'climate drivers' to refer to aspects of the climate system that will be affected by climate change and impact on PAs. However, in climate change science, a 'climate driver' is understood to be something that alters the energy balance of the climate system (e.g., aerosols, greenhouse gases, solar radiation, land surface properties). This workshop used the term 'potential climate stressors' to avoid confusion with reports and data in wider climate change literature.

[270] http://www.cec.org/files/documents/publications/11733-north-american-marine-protected-area-rapid-vulnerability-assessment-tool-en.pdf

[271] https://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch19s19-1-2.html

Significant values and relevant potential climate stressors

The values considered in this rapid risk assessment were learned from the attributes assigned to national PAs (OUV's) that were prepared based on findings from the Technical Report (April 2022) and summarised for the Workshop events. These values are fixed to a degree, though some flexibility was designed into the methodology to accommodate stakeholder updates or views on OUVs.

A list of 15 potential climate stressors (seven atmospheric, eight marine – the table was provided to stakeholders to help streamline and standardise the rapid risk assessment process. The list is for application across all PAs for all 3 participating nations, with relevant stressors for each nation (or site if specifically identified during the CVI process). Stressors were identified as either chronic (persistent over long periods) or acute (high intensity, short period). The CVI uses the synonyms in the table below to facilitate understanding of these stressors.

Potential climate stressors likely to impact on each key value (i.e., attribute of OUV) were determined by workshop participants. The outcomes are recorded in the table format below:

Key values	Potential climate stressor impacts
Seagrass	air temperature change, change in wind, extreme marine heat events, extreme temperature events, precipitation change; ocean acidification; other water quality changes (salinity, dissolved oxygen, primary production)
Coral reefs	water temperature change, precipitation change, storm intensity and frequency, storm surge, extreme marine heat events, sea level change, ocean acidification
Geological formations	sea level rise, storm surge, storm intensity and frequency, change in wind, flooding events
Carbonate dominated marine environment	water temperature change, precipitation change, storm intensity and frequency, storm surge, extreme marine heat events, sea level change, ocean acidification
Hyper-saline waters	water temperature change, storm surge, storm intensity and frequency, precipitation change, air temperature change, change in wind, extreme marine heat events, sea level change, ocean acidification, changing ocean currents, salinity change
Aesthetics	sea level change, precipitation change, storm surge, storm intensity and frequency (leading to increased water turbidity)
Botanical significance	precipitation change, extreme temperature events, drought frequency and severity, air temperature change, storm intensity and frequency, extreme marine heat events; sea level change
Threatened species	air temperature change, change in wind, drought frequency and severity, extreme temperature events, humidity change, precipitation change, sea level change, storm surge
Integrity	storm intensity and frequency, precipitation change, extreme temperature events, air temperature change, extreme marine heat events, sea level change, water temperature change, drought frequency and severity (catchment flooding), ocean acidification, change in ocean currents, change in wind

Table 7- Climate stressors in PAs

Vulnerability to OUV was assessed for a 'business-as-usual' scenario (RCP8.5). When evaluating the likely impacts of the identified potential climate stressors, participants considered climate changes out to 2030 and 2050, having determined that impacts in the coming decades should take higher priority than those in the latter half of the century. With this time frame in mind, further discussion identified the most important potential stressors (up to three) for each key value (See table below).

The occurrence of each stressor was counted, allowing identification of the three most important stressors overall: storm intensity and frequency (eight occurrences), extreme marine heat events (five occurrences) and air temperature change (four occurrences). No other stressor was recorded more than three times. The methodology of counting the occurrence of each stressor implies equal weighting to all identified key values. Workshop attendees reflected on the priority of each key value and confirmed that the three potential climate stressors identified were the three most important. (*See next page.*)

Table 8-: Important climate stressors impacting PA values.

Key value	Most important potential climate stressors		
Seagrass	**extreme marine heat event**	**storm intensity and frequency**	
Stromatolites	**storm intensity and frequency**	change in wind	
Carbonate dominated marine environment	**extreme marine heat event**	**storm intensity and frequency**	
Hypersaline waters	water temperature change	**air temperature change**	
Aesthetics	**storm intensity and frequency**	storm surge	sea level change
Evolutionary processes	precipitation change	drought frequency	extreme temperature events
Geological significance	sea level change	change in wind	**storm intensity and frequency**
Botanical significance	drought frequency	precipitation change	**air temperature change**
Threatened species	drought frequency	precipitation change	**air temperature change**
Marine turtles	storm surge	**storm intensity and frequency**	**air temperature change**
Dugongs	**extreme marine heat event**	**storm intensity and frequency**	
Whales and dolphins	**extreme marine heat event**	**storm intensity and frequency**	water temperature change
Sharks and rays	water temperature change	**extreme marine heat event**	
Integrity			

Likelihood, consequence and risk

The likelihood of each of the three key potential climate stressors impacting OUV out to 2030 was assessed for each participating nation using the following scale:

Likelihood based on IPCC	**Very likely** >90%	**Likely** 67–90%	**Possible** 34–66%	**Unlikely** 10–33%	**Very unlikely** <10%

Similarly, the measure of consequence on OUV from each of the three key potential climate stressors (per nation) was assessed using the following scale:

Consequence based on IUCN	**Catastrophic** Loss or substantial alteration of majority of values (esp. the key values comprising OUV) will occur	**Major** Loss or alteration of many values comprising OUV will occur, leading to a significant reduction of OUV	**Moderate** Some loss or alteration of some values comprising OUV will occur; but not causing a significant reduction of OUV	**Minor** Some loss or alteration of a few values comprising OUV will occur; but not causing persistent or lasting effects on OUV	**Negligible** All elements of OUV will remain essentially intact; overall condition of property is stable or improving

For each of the three key potential climate stressors assessed for each participating nation risk was determined using the following matrix:

Likelihood	Consequence				
	Negligible	Minor	Moderate	Major	Catastrophic
Very unlikely	low	low	low	low	low
Unlikely	low	low	moderate	moderate	moderate
Possible	low	moderate	moderate	high	high
Likely	low	moderate	high	high	extreme
Very likely	low	moderate	high	extreme	extreme

The likelihood, consequence and initial risk assessment are summarised in the example shown below.

	Air temperature change	Storm intensity and frequency	Extreme marine heat events
Time frame	Chronic	Acute	Acute
Likelihood	Very likely	Likely	Very likely
Consequence	Moderate	Major	Catastrophic
Initial risk	HIGH	HIGH	EXTREME

Applying Modifiers

The CVI applies modifiers to both likelihood and consequence to account for temporal scale and trend (likelihood) and spatial scale and compounding factors (consequence). The effect of the modifiers above Level 1 is to amplify the likelihood and/or consequence (scaling by 1.0–1.3 in increments of 0.1 for each level), and thus increase the assessed risk. Modifiers were applied using the following scale:

Modifier	Level 1	Level 2	Level 3	Level 4
Likelihood				
Temporal scale The occurrence of each stressor and whether they are…	<1 event/ decade	1–5 events/ decade	5–10 events/ decade	on-going
Trend How the recent trend of the stressor has developed	declining/static	increasing slowly	increasing moderately	increasing rapidly
Consequence				
Spatial scale Extent (%) Protected Area affected by climate change stressors at any one time	restricted <10%	localised 11–50%	extensive 51–90%	very widespread 91–100%
Compounding factors Is climate change likely to influence or interact with other non-climate stressors (e.g. invasive species) in the near future?	very unlikely/ unknown	low probability	medium probability	high probability

An example likelihood and consequence (final risk assessment) table is then produced (per nation) based on the agreed key climate stressors facing each nation (*see next page*).

	Air temperature change	Storm intensity and frequency	Extreme marine heat events
Time frame	Chronic	Acute	Acute
Modified likelihood	Very likely	Likely	Very likely
Modified consequence	Moderate–Major	Major–Catastrophic	Catastrophic
Modified risk	EXTREME	EXTREME	EXTREME
Value/s	Turtles – nest temperature, greater risk; Vegetation – lesser risk. Individual values can be affected differently.	Seagrass, habitat	Seagrass, marine fauna, coral
Notes	Don't know the ripple effect of one component being impacted interacting with another (unknown interactions/ unknowns)	Noted to have occurred and interacted with marine heatwave in 2011. Extreme rainfall (intense downpour) can occur in either winter or summer rains, not just cyclone-related rain.	A marine heatwave is an extreme event, driven by climate processes (ENSO, IOD)

The risk ratings for each of the three key potential climate stressors, per nation, are then selected. In the example presented in the table, this is shown as being EXTREME whilst the consequence of extreme marine heat events is rated as catastrophic.

Adaptive Capacity

Adaptive capacity describes the potential, capability or ability of a PA to adjust to climate change, to moderate potential damage, to take advantage of opportunities, or respond to the consequences.[272] In the CVI framework, adaptive capacity is considered in terms of the local management response, the level of scientific and/or technical support, and the effectiveness of these to address the climate stressor being considered. The table below demonstrates the scoring adopted for this exercise. Basically, in a situation where the resources available provide no effect to address the climate stressor, any identified adaptive capacity is nullified; where there is an effect, the adaptive capacity mitigates the risk of potential impact.

Score	4	3	2	1
Local management response Capacity (i.e. resources, budget, knowledge) for management to respond at local level	high capacity	medium capacity	low capacity	no capacity and/or resources
Scientific/technical support Level of technical support for management at the local level	high level of support	medium level of support	low level of support	no support and/or scientific understanding
Effectiveness to address the climate stressor Extent to which local management will effectively address the climate stressor	high level of effectiveness	medium level of effectiveness	minimal/low level of effectiveness	very low/ negligible level of effectiveness

In a situation where the resources available provide no effect to address the climate stressor, any identified adaptive capacity is nullified; where there is an effect, the adaptive capacity mitigates the

[272] After Foden et al. 2018. Climate change vulnerability assessment of species. WIREs Climate Change, doi : 10.1002/wcc.551

risk of potential impact (*see the table below – note that the order of colours is reversed from other usage to reflect that very low adaptive capacity is the least preferred category*).

Table 9 Adaptive capacity component scores and assessed level of adaptive capacity for three sample potential climate stressors.

	Air temperature change	Storm intensity and frequency	Extreme marine heat events
Time frame	Chronic	Acute	Acute
Local management response	2	3	2
Scientific/ technical support	3	3	3
Effectiveness to address the climate stressor	1	2	1
Adaptive capacity	VERY LOW	LOW	VERY LOW

Where the adaptive capacity has an effect, it serves to mitigate the vulnerability of OUV, according to the vulnerability matrix below. This provides the OUV vulnerability for the nation from the CVI framework, which for the example below is the highest category – HIGH.

Risk	Adaptive capacity			
	Very low	Low	Moderate	High
Low	low	low	low	low
Moderate	moderate	moderate	low	low
High	high	moderate	moderate	low
Extreme	high	high	moderate	low

	Air temperature change	Storm intensity and frequency	Extreme marine heat events
Time frame	Chronic	Acute	Acute
Modified risk	EXTREME	EXTREME	EXTREME
Adaptive capacity	VERY LOW	LOW	VERY LOW
Vulnerability (climate stressor)	HIGH	HIGH	HIGH
Vulnerability (OUV)	HIGH		

Beyond assessment of OUV vulnerability, the CVI framework also considers socio-economic sensitivity and capacity to determine vulnerability of the broader community (e.g., residents, industries – implied in the above table). While these aspects were introduced during the national workshops, the time available was not sufficient to pursue further consideration. Additionally, the participants self-assessed that they had insufficient expertise to address these component

Appendix IV: Full list of PAs, by country

The list of PAs below varies in detail by countries due to the availability and quality of the information on protected areas by country. For Palau and RMI, a full list was provided in March of 2023 by the EE. Data for FSM varies by state due to the autonomy of each state.

Federates States of Micronesia

Pohnpei

Known Name	Official Name	Size of Marine Protected Area (ha)	Location of Protected Area	Ownership Details	Management Authority	Brief Description of Primary Habitats	Top Four Stakeholder Groups
And Bioshpere Reserve	Ant Atoll Biosphere Reserve	3400	6° 46' 33.23" N, 157° 57' 44.02" E	Nahnpei Estate	Nahnpei Estate	Biosphere Reserve	Nahnpei Estate, CSP, MCT, TNC
Depehk/Takaiou Marine Sanctuary	Palipohn Depehk Marine Sanctuary	212	6° 57' 08.98" N, 158° 18' 17.14" E	Dehpehk/Takaiou communities	CCO's/DFW	General (coral reef ecosystem/mangrove dwelling marine organizims	Dehpehk/Takaiou communities UMG, CSP
Enipein Mangrove Reserve	Enipein Marine Park	955	6° 47' 46.67" N, 158° 13' 14.06" E	Woun Koapin Soamwoai communities	WKS CCO's/DFW	Mangrove dwelling marine organizims	WKS, CSP, TNC, KMG
Kehpara Marine Sanctuary	Kehpara Marine Sanctuary	189	6° 47' 54.21" N, 158° 07' 07.12" E	Pohnpei State Governement Leaded by Late Dakio Paul	DFW	Grouper spawning ground	PSG, KMG, CSP
Minto Reef Marine Sanctuary	Minto Reef Marine Sanctuary	518	7° 29' 57.55" N, 155° 19' 22.92" E	Pohnpei State Government	DFW/National Government	General Marine Biodiversity	PSG, National Government

Known Name	Official Name	Size of Marine Protected Area (ha)	Location of Protected Area	Ownership Details	Management Authority	Brief Description of Primary Habitats	Top Four Stakeholder Groups
Mwah Nd Marine Sanctuary	Dekehos Marine Sanctuary	460	7° 00' 32.96" N, 158° 18' 00.64" E	Mwahnd community	CCO's/DFW	General coral reef ecosystem/Manta ray dive site	UMG, CSP, Pohnpei State
Nahtik Marine Sanctuary	Nahtik Marine Sanctuary	75	6° 46' 33.88" N, 158° 12' 56.95" E	Woun Koapin Soamwoai communities	WKS CCO's/DFW	General coral reef ecosystem	WKS, CSP, TNC, KMG
Namwen Na Stingray Sanctuary	Namwen Na Stingray Sanctuary	71	6° 51' 12.45" N, 158° 21' 11.33" E	Pohnpei State Government	Senipehn/Nan Wap CCOs and DFW	Cultural heritage (Sting Ray)/coral reef ecosystem	MMG, PSG, CSP
Nangih Stingray Sanctuary	Nangih Stingray Sanctuary	34	6° 49' 59.61" N, 158° 19' 30.19" E	Pohnpei State Government	Senipehn/Nan Wap CCOs and DFW	Cultural heritage (Sting Ray)/coral reef ecosystem	MMG, PSG, CSP
Nanwap Marine Sanctuary	Nanwap Marine Sanctuary	305	6° 52' 32.02" N, 158° 21' 07.04" E	MLMDA communities	Nan Wap CCO's/DFW	Spawning and aggregation ground for Rabid fish	MLMDA, CSP, MCT, MMG
Oroluk Marine Sanctuary	Oroluk Marine Sanctuary	4144	8° 06' 30.34" N, 154° 16' 59.26" E	Pohnpei State Government	DFW/National Government	Turtle Nesting ground	Oroluk Community, PSG, National Government
Pakin Marine Sanctuary	Pakin Marine Sanctuary	334	7° 03' 26.24" N, 157° 48' 16.92" E	Pakin community	Pakin CCO's, NRM, Sokehs Municipal Government	General coral reef ecosystem	PCA, SMG, CSP, PSG
Pwudoi Mangrove Reserve	Pwudoi Mangrove Reserve	139	6° 51' 16.47" N, 158° 09' 07.18" E	Pwudoi community	NRM	Mangrove dwelling marine organizims	N/A

Known Name	Official Name	Size of Marine Protected Area (ha)	Location of Protected Area	Ownership Details	Management Authority	Brief Description of Primary Habitats	Top Four Stakeholder Groups
Sapwitik Marine Sanctuary	Sapwitik Marine Sanctuary	82	7° 00' 15.56" N, 158° 13' 28.26" E	Prem, Lenger, Sapwtik community	Sapwtik CCO's/NRM	Spawning and aggregation ground for Rabid fish	Sapwtik/Lenger/Parem community, Nett Municipal Government CSP
Senpehn Mangrove Reserve	Senpehn Mangrove Reserve	130	6° 52' 52.89" N, 158° 17' 51.50" E	section 4 commumities Madolenihmw	Senipehn Rangers/Madolenihmw Municipal Gov.	Mangrove dwelling marine organizims	N/A
Palikir Marine protected Area	Palikir Marine Sanctuary	1245	6° 58'37.46"N, 158° 7'41.78" E	Pohnpei State Government	Palikir Community	General coral reef ecosystem	SMG, PSG, CSP, Palikir communities
Pohnpei Watershed Forest Reserve	Pohnpei State Watershed Reserve	5100	6° 52'35.53"N, 158° 13'12.63" E	Pohnpei State Government	Pohnpei State Dept. of R&D	Cloud forest	Municipal governments, CSP, DFW, NRM
Nanwelin Rohi Forest Stewardship Area	Nanwelin Rohi Landowners Forest Stewardship Area	76 acres	6° 55'03.38"N, 158° 16'20.36" E	U Municipal Government	U Municipal government, Landowners	Agroforestry	U Municipal Government, CSP, Landowners
Paies Community Based Mangrove Area	Paies Community Based Mangrove Area	18,6	6° 53'30.90"N, 158° 08'57.74" E	Paies Community	Paies Community	Mangrove Protection	Paies Community, Kitti Municipal Government, CSP
Peidie Mangrove Reserve	Peidie Mangrove Reserve	18	6° 57'16.89"N, 158° 10'55.85" E	Peidie Community	Peidie Community, Sokehs Municipal Government	Mangrove Protection	Peidie Community, Sokehs Municipal Government, CSP, TNC

Yap

Protected Area Name	Type
Tamil MCA Boundary	Marine
Tamil No-take Zone	Marine
Tamil Watershed and Forest Reserve	Terrestrial
Weloy Watershed and Forest Reserve	Terrestrial
Gachpar Marine Protected Area Site	Marine
Reey Marine Protected Area Site	Marine
Nimpal Channel Marine Protected Area Site	Marine

Chuuk´

Protected Area Name	Type
Onei Zone Management Areas	Land and Marine
Fonufon Reef	Marine
Grouper Spawning Site	Marine
Northwest Reef	Marine
Northeast Pass Marine Protected Area	Marine
North Weno Marine Protected Area	Marine

Weno Ridge Forest	Terrestrial
Namwanan Marine	Marine
UFO Forest Stewardship Area	Terrestrial
Totiw	Terrestrial
Ununo-Fongen Onongoch Fefan	Terrestrial
Northeast Pass Marine Protected Area	Marine
Southeast Reef	Marine
Kuop Atoll	Marine
Feneppi North	Terrestrial
Feneppi South	Terrestrial

Kosrae

- Utwe-Walung Marine Park.
- Utwe Biosphere Reserve.
- Awane Marine Park.
- Areas of Special Concern, such as the Trochus Sanctuary and the Okat-Yela Mangrove Reserve.[273]

Palau

NAME	DESIGNATION	TYPE	PROVINCE	LEGAL	IUCN CATEGORY	Marine hectares	Terrestrial hectares	No-take hectares	Area (metres squared)
Ngelukes Conservation Area	Conservation Area	Marine	Ngchesar	state law	IV	104.2586956	0	104.2586956	1042586.956
Medal Ngediull Conservation Area	Fishing Reserve	Marine	Airai	state law	Ia	0	0	319.2822671	3192822.671
Olterukl Conservation Area	Conservation Area	Marine	Ngatpang	state law	IV	70.3196267	0	70.3196267	703196.267
Oruaol Ibuchel Conservation Area	Conservation Area	Marine	Ngatpang	state law	IV	31.49311466	0	31.49311466	314931.1466
Imul Mangrove Conservation Area	Conservation Area	Marine	Aimeliik	state law	IV	85.50889996	0	0	855088.9996
Ngermedellim Marine Sanctuary	Marine Sanctuary	Marine	Melekeok	state law	IV	43.51088555	0	43.51088555	435108.8555
Ileyaklbeluu Conservation Area	Conservation Area	Marine	Ngardmau	state law	Ia	36.04468371	0	0	360446.8371

NAME	DESIGNATION	TYPE	PROVINCE	LEGAL	IUCN CATEGORY	Marine hectares	Terrestrial hectares	No-take hectares	Area (metres squared)
Ngermasech Conservation Area	Conservation Area	Marine	Ngardmau	state law	VI	293.0566068	0	293.0566068	2930566.068
Angaur Permanent Protected Area	Conservation	Marine	Angaur	state law	VI	111.9347474	0	111.9347474	1119347.474
Ngerumekaol Spawning Area	Zone Management Area	Marine	Koror	state law	IV	481.6931601	0	0	4816931.601
Teluleu Conservation Area	Conservation Area	Marine	Peleliu	state law	IV	76.83854149	0	76.83854149	768385.4149
Mesekelat Conservation Area	Conservation Area	Terrestrial	Ngchesar	state law	Ib	0	186.9116748	186.9116748	1869116.748
Ngardok Nature Reserve	Nature Reserve	Terrestrial	Melekeok	state law	IV	0	644.5951833	644.5951833	6445951.833
Medal a Ieychad Waterfall	Nature Reserve	Terrestrial	Ngardmau	state law	III	0	612.9358833	612.9358833	6129358.833
Ngerkall Lake Conservation Area	Conservation Area	Terrestrial	Ngaraard	state law	IV	0	222.6804758	222.6804758	2226804.758
Diong ra Ngerchokl Conservation Area	Conservation Area	Terrestrial	Ngaraard	state law	III	0	91.47799013	91.47799013	914779.9013
Ngaraard Mangrove Conservation Area	Conservation Area	Marine	Ngaraard	state law	IV	167.1490194	0	0	1671490.194

NAME	DESIGNATION	TYPE	PROVINCE	LEGAL	IUCN CATEGORY	Marine hectares	Terrestrial hectares	No-take hectares	Area (metres squared)
Ungellel Conservation Area	Conservation Area	Marine	Ngaraard	state law	Ia	1.42431902	0	1.42431902	14243.1902
Kayangel Subsistence Fishing Zone 1	Co-Management Area	Marine	Kayangel	state law	VI	4133.182198	0	0	41331821.98
Ebiil Channel Conservation Zone	Co-Management Area	Marine	Ngarchelong	state law	IV	1781.138649	0	1781.138649	17811386.49
Helen Reef Conservation Area	Conservation Area	Marine	Hatohobei	state law	II	10641.34862	0	10641.34862	106413486.2
Chiul Conservation Area	Conservation Area	Marine	Ngatpang	state law	IV	35.39969032	0	35.39969032	353996.9032
Ngermeskang Bird Sanctuary	Bird Sanctuary	Terrestrial	Ngaremlengui	state law	III	0	33.82067886	33.82067886	338206.7886
Ngerderrar Watershed Conservation Area	Nature Reserve	Terrestrial	Aimeliik	state law	V	0	381.017101	381.017101	3810171.01
Ngerchelchuus Conservation Area	unknown	Terrestrial	Ngaremlengui	state law	III	0	20.43289307	20.43289307	204328.9307
Velasco Commercial Fishing Zone	Co-Management Area	Marine	Kayangel	state law	VI	25399.8442	0	0	253998442
Ngkesol Barrier Reef	Co-Management Area	Marine	Kayangel	state law	IV	10967.3609	0	10967.3609	109673609

NAME	DESIGNATION	TYPE	PROVINCE	LEGAL	IUCN CATEGORY	Marine hectares	Terrestrial hectares	No-take hectares	Area (metres squared)
Kayangel Subsistence Fishing Zone 2	Co-Management Area	Marine	Kayangel	state law	VI	8501.444431	0	0	85014444.31
Matul crab closing zone	Co-Management Area	Marine	Ngarchelong	state law	VI	73.13173735	0	0	731317.3735
Ngeruangel Marine Reserve	Co-Management Area	Marine	Kayangel	state law	IV	5659.283889	0	0	56592838.89
Olsolkesol Waterfall Conservation Area	Nature Reserve	Marine	Ngiwal	state law	II	232.6471145	0	232.6471145	1282683.774
Ngemai Conservation Area	Conservation Area	Marine	Ngiwal	state law	Ia	232.6471145	0	232.6471145	1043787.371
Chermall Forest Preserve	Preserve	Terrestrial	Kayangel	state law	Ib	0	0	0	13316.71728
Ngerusebek Forest Preserve	Preserve	Terrestrial	Kayangel	state law	Ib	0	0	0	3394.940006
Merir Protected Area	Conservation aArea	Marine	Sonsorol	state/customary chiefs MOU	VI	0	0	0	8020106.268
Ngarchelong Subsistence Fishing Zone	Co-Management Area	Marine	Ngarchelong	state law	VI	0	0	0	439081923
Aimeliik Marine Sanctuary	Conservation Area	Marine	Aimeliik	state law	IV	0	0	0	2848344.415

NAME	DESIGNATION	TYPE	PROVINCE	LEGAL	IUCN CATEGORY	Marine hectares	Terrestrial hectares	No-take hectares	Area (metres squared)
Ngerukewid Island Wildlife Preserve	Preserve	Marine	Koror	state law	Ia	1060.375053	1060.375053	1060.375053	11358423.06

Republic of the Marshall Islands

No.	Atoll	Conservation Area		Type	Category	IUCN Category	Approx. Marine Area	Approx. Terrestrial Area
		Marine	Terrestrial					
1	Ailinglaplap	TBD		Type II	Special reserve-no take			
2	Ailinginae	Ailinginae Atoll (whole)		Type II	Special reserve-no take	Ib	167.67	3.05
3	Ailuk	Enenemman Pass		Type I	Subsistence only	VI	4.17	
		Malok Pass		Type I	Subsistence only	VI	4.09	
		Agulue Pass		Type I	Subsistence only	VI	7.62	
		Enije Pass		Type I	Subsistence only	VI	3.43	
		Enije. Ailuk		Type I	Subsistence only	VI	4.76	
			Enije. Ailuk	Type I	Subsistence only	VI		0.02
		Wod Albon		Type I	Subsistence only	VI	0.01	
4	Arno	Arno - Arno Lagoon		Type II	Special reserve-no take	Ib	3.05	
		Arno - Matolen Lagoon		Type II	Special reserve-no take	Ib	7.05	
		Lanar/Tenak (terrestrial & marine)		Type II	Special reserve-no take	Ib	4.47	0.23
		Jarkwij-Enelauraren (terrestrial & marine)		Type II	Special reserve-no take	Ib	6.35	0.18

No.	Atoll	Conservation Area		Type	Category	IUCN Category	Approx. Marine Area	Approx. Terrestrial Area
		Marine	**Terrestrial**					
		Bikaridj Enaitok (terrestrial & marine)		Type I	Subsistence only	VI	3.14	0.99
		Uirion (terrestrial & marine)		Type I	Subsistence only	VI	5.01	0.56
		Arno. Arno		Type I	Subsistence only	VI	7.75	
		Arno #2 (terrestrial & marine)		Type I	Subsistence only	VI	5.56	0.38
		Jabo (terrestrial & marine)		Type I	Subsistence only	VI	2.38	0.37
		Ine (terrestrial & marine)		Type I	Subsistence only	VI	2.11	0.48
		Matolen (terrestrial & marine)		Type I	Subsistence only	VI	2.25	0.31
		Lanar (terrestrial & marine)		Type I	Subsistence only	VI	3.15	0.75
		Lanar/Tenaku (terrestrial & marine)		Type I	Subsistence only	VI	2.98	0.42
		Kirage (terrestrial and marine)		Type I	Subsistence only	VI	2.69	0.5
		Malel (terrestrial & marine)		Type I	Subsistence only	VI	1.69	0.17
		Dodo/Mereboin (terrestrial & marine)		Type I	Subsistence only	VI	2.62	0.26
5	Aur	TBD						
6	Bikar	Bikar Atoll (whole atoll)		Type IV	Traditional Mo	VI	66.27	0.34

No.	Atoll	Conservation Area		Type	Category	IUCN Category	Approx. Marine Area	Approx. Terrestrial Area
		Marine	Terrestrial					
7	Bikini	Bikini Atoll (whole atoll)		Type II	Special reserve-no take	Ib	765.99	6.31
8	Bokak	Bokak Atoll (whole atoll)		Type IV	Traditional Mo	VI	125.86	3.63
9	Ebon	West		Type I	Subsistence only	VI	57.66	
		East		Type II	Special reserve-no take	Ib	53.61	
10	Erikub	Erikub Atoll		Type IV	Traditional Mo	VI	326.51	0.9
11	Jabot	TBD						
12	Jaluit	Matolen Mo		Type II	Special reserve-no take	Ib	6.18	
		Jitoken Mo		Type II	Special reserve-no take	Ib	4.53	
		Bird Island - Mejai (terrestrial & marine)		Type II	Special reserve-no take	Ib	3.77	0.04
		Dri-Bako Mo		Type II	Special reserve-no take	Ib	46.84	
		Dri-Bako Mo		Type II	Special reserve-no take	Ib	7.81	
		Loraa Mo		Type II	Special reserve-no take	Ib	4.85	
		Enninto Mo		Type II	Special reserve-no take	Ib	0.96	
		Wodenlab Mo		Type II	Special reserve-no take	Ib	0.87	
		Karajraj Kan Mo		Type II	Special reserve-no take	Ib	2.16	
		Bar Mo		Type II	Special reserve-no take	Ib	2.44	
		Jea Ko Mo		Type II	Special reserve-no take	Ib	0.22	
		Nono Mo		Type II	Special reserve-no take	Ib	1.51	
		Kiliek Mo		Type II	Special reserve-no take	Ib	0.33	
		Ribon (west)		Type II	Special reserve-no take	Ib	1.14	
		Matolen Mo		Type I	Subsistence only	VI	9.62	
		Jitoken Mo		Type I	Subsistence only	VI	5.07	
			Takaen An Laben Mo	Type I	Subsistence only	VI	70.02	0.99
		Dri-Bako Mo		Type I	Subsistence only	VI	19.71	

No.	Atoll	Conservation Area		Type	Category	IUCN Category	Approx. Marine Area	Approx. Terrestrial Area
		Marine	Terrestrial					
		Loraa Mo		Type I	Subsistence only	VI	3	
		Reijok Mo		Type I	Subsistence only	VI	4.01	
		Jea Ko Mo		Type I	Subsistence only	VI	1.67	
		Ribon		Type I	Subsistence only	VI	1.61	
13	Jemo	Nearshore	Land	Type IV	Traditional Mo	VI	6.7	0.17
14	Kwajalein	Eniwetak		Type II	Special reserve-no take	Ib	0.74	0.05
		Mejatto islet		Type I	Subsistence only	VI	7.03	
		Jabro island		TBD		TBD		
15	Lae	Lae		Type I	Subsistence only	VI	31.83	
16	Likiep	Aujuraj		Type I	Subsistence only	VI	0.25	
		Anenuaan		Type I	Subsistence only	VI	0.06	0.01
17	Majuro	Majuro atoll				Ib		
						Ib		
		Ene Kalamur		Type II	Special reserve-no take	Ib	0.19	0.01
		Bokanbotin		Type II	Special reserve-no take	Ib	0.19	0
		Buruon		Type I	Subsistence only	VI	0.24	
		Woja CA		Type II	Special reserve-no take	Ib	1.01	
		Denmeo		Type II	Special reserve-no take	Ib	0.88	0.07
		Bikirin		Type II	Special reserve-no take	Ib	0.32	0.03
		Ajeltake						
18	Maloelap	Tarawa-Ollet		Type II	Subsistence only	VI	17.06	
		Ollet-Kojba		Type I	Subsistence only	VI	9.02	
		Kojba-Jang		Type I	Subsistence only	VI	20.91	
		Boujlap (inside reef)		Type II	Special reserve-no take	Ib	10.06	
19	Mejit		Bike	Type I	Subsistence only	VI		0.24
			Ainbwol	Type I	Subsistence only			0.17
20	Mili	Enannlik/Bue		Type II	Special reserve-no take	Ib	96.1	
		Reiher Pass		Type II	Special reserve-no take	Ib		

No.	Atoll	Conservation Area		Type	Category	IUCN Category	Approx. Marine Area	Approx. Terrestrial Area
		Marine	Terrestrial					
		Ajeleran Pass		Type II	Special reserve-no take	Ib		
			Enikor	Type II	Special reserve-no take	Ib		0.01
			Enalik	Type II	Special reserve-no take	Ib		0.6
			Eden	Type II	Special reserve-no take	Ib		0.07
			Kidenkan	Type II	Special reserve-no take	Ib		0
			Nailab	Type II	Special reserve-no take	Ib		0.12
			Akadan	Type II	Special reserve-no take	Ib		0.07
			Laadbab	Type II	Special reserve-no take	Ib		0.02
21	Namdrik	Mature Line #1		Type I	Subsistence only	VI	22.32	
			Madmad	Type II	Special reserve-no take	Ib		0.98
22	Namo	South Channel		Type IV	Traditional Mo	VI	15.16	
		North Channel		Type IV	Traditional Mo	VI	21.28	
		Namo-Motamoj		Type IV	Traditional Mo	VI	4.16	
		Motamoj		Type II	Special reserve-no take	Ib	8.06	
23	Rongelap	Rongelap Atoll (whole nearshore area)		Type I	Subsistence only	VI	1115.58	7.36
24	Rongerik	Rongerik Atoll (whole nearshore area)		Type II	Special reserve-no take	Ib	201.61	1.57
25	Ujae	East		Type I	Subsistence only	VI	187.66	
		West		Type II	Special reserve-no take	Ib	58.86	
26	Utrok	Lagoon		Type I	Subsistence only	VI	64.06	
		Outer1		Type II	Special reserve-no take	Ib	2.22	
		Outer2		Type II	Special reserve-no take	Ib	0.65	
27	Taka	Nearshore	Land	Type IV	Traditional Mo	VI	153.32	0.47
28	Wotho	Northeast		Type I	Subsistence only	VI	7.79	
		Northwest		Type II	Special reserve-no take	Ib	15.6	
		South		Type IV	Traditional Mo		6.3	
		Riwut		Type IV	Traditional Mo	VI	1.8	

No.	Atoll	Conservation Area		Type	Category	IUCN Category	Approx. Marine Area	Approx. Terrestrial Area
		Marine	**Terrestrial**					
			Land	Type IV	Traditional Mo	VI		1.18
29	Wotje	Malo in Lik-Lal ion		Type III	Restricted and Protected Area	Ib	243.94	
		Roea. Watuerok. Lanju - Liklal rok		Type III	Restricted and Protected Area	Ib	95.59	
		Wotje Island		Type I	Subsistence only	VI	232.57	
		WOT-10		Type III	Restricted and Protected Area	Ib	4.71	
		WOT-12		Type III	Restricted and Protected Area	Ib	3.59	
		WOT-13		Type III	Restricted and Protected Area	Ib	3.31	
		Wotje Atoll	TBA			VI		

Appendix V: Additional information on Peer-to-Peer Learning – Micronesians in Island Conservation

Peer learning networks **Micronesians in Island Conservation (MIC)**[274] aim is to support the development of conservation leaders and their organizations, and the Pacific Islands Managed and Protected Areas Community (PIMPAC), whose aim is to provide training and capacity building interventions to field conservation professionals across the Micronesia region.

> *"The purpose of mic is to strengthen the collaborative, organizational, technical, and policy skills of leaders and organizations so that, together with communities, they can advance the conservation and management of important natural areas in Micronesia"*[275].

MIC'S direct impacts include strong, collaborative relationships, increased resources, and new opportunities made available to members, their organizations, and their conservation programs and staff. Conservation outcomes are achieved by MIC members themselves—individually and collaboratively—through their leadership and commitment to action. Before the establishment of MIC in 2000, conservation in the Micronesia region was taking place on a relatively small scale, focused on just a few areas of biological significance, with only a scant number of NGO partners and a few government agencies engaged or collaborating. When MIC was launched in 2002, only three conservation NGOs and two government organizations with conservation mandates had professional staff and ongoing programs. While other government agencies also had conservation mandates, many lacked the necessary staff, skills, resources, or political support to take effective action. The network provided members with a toolbox consisting of strategic and conservation action planning, professional and institutional goal setting and reporting, institutional self-assessments, and learning exchanges.

By bringing conservation leaders together, MIC helped many members recognize that by working collaboratively, they were much better able to affect local and large-scale changes across Micronesia. One of the major accomplishments of the MIC, is the launch of the Micronesia Challenge Initiative, which seeks to put under effective management 50% of the region's marine resources and 30% of its terrestrial resources by 2030. And by 2014 over 30 MIC member organizations, support staff, and other partners were committed to and collectively working toward effective management of more than 140 conservation sites across Micronesia under the framework of the Micronesia Challenge.

[274] https://www.conservationgateway.org/Documents/FINAL%20MIC%20report%20-%20online%20version.pdf

[275] http://mic-network.blogspot.com/2006/08/8th-mic-retreat-in-saipan-brings.html

Need for GCF Support

Since 2018 several members of MIC moved on to new roles and by 2020, FSM, Palau and RMI closed their borders in response to the Covid19 pandemic, reducing dramatically the network to function effectively. Borders for the countries reopened over several months in 2022, and regular travel is now feasible within the region. At the same time the most recent report drafted by the Intergovernmental Panel on Climate Change (IPCC) predicts increasingly dangerous and irreversible risks from climate change if more is not done urgently to reduce greenhouse gas emissions. This provides an opportunity to strengthen the network by recruiting emerging leaders in key NGOs and government agencies as new members, who will participate in communities of practice focused on designing and implementing ecosystem-based climate solutions, and effectively managing protected areas for biodiversity conservation.

MIC Prospective Membership Selection Criteria

General criteria include:

- Alignment of prospective member's needs and know-how with MIC's objectives.
- Prospective member's geographic location.
- The program type or sector a prospective member works in.
- Priority threats of concern that a prospective member is focused on (e.g., climate change, invasive species, etc.).
- Influence of a prospective member, e.g., involvement in other collaborative activities.
- Readiness to use the network to advance their own and collective practice; and/or
- Complementary skills and expertise across the entire membership.

More specifically, MIC requires a two-year minimum commitment from applicants who also fit the following qualifications:

- Be established or emerging leaders of government or non-government organizations committed to protecting important natural areas or sustainably managing resources to increase resilience to the impacts of climate change in the Federated States of Micronesia, Republic of Palau, the Northern Mariana Islands, Guam, and the Marshall Islands.
- Have authority to make decisions about budgets and program priorities in their organization.
- Be willing to commit approximately seven weeks over two years (approximately 3.5 weeks per year) to learning with MIC.
- Have three to five years of job experience (highly desirable).
- Have a strong commitment to Micronesia (indigenous or long-term residents).
- Be recognized or potential champions for change in their state and/or country (e.g., frequently asked to participate in important issues by government, communities, or NGOs).
- Priority will be given to recipients of MCT and MC's internship and scholarship programs

Appendix VI: MPAME tool

Micronesia Protected Area Management Effectiveness: A guide to administering the MPAME tool.

Prepared for the Micronesia Conservation Trust December 2013

Updated February 2018

Adapted by Adelle Lukes Isechal, Consultant
Steven Victor, Deputy Director, TNC Micronesia Program

Contact information.

Adelle Lukes Isechal

Email: adelle.isechal@gmail.com

Steven Victor

Deputy Director, TNC Micronesia Program Email: svictor@tnc.org

Acknowledgements

The Micronesia Protected Area Management Effectiveness (MPAME) tool is an adaptation of MPAMES, a marine protected area management effectiveness score card developed for Indonesia by Carter, E. et al. The Indonesia management effectiveness score card inspired the usefulness of developing a similar protected area management effectiveness evaluation methodology for the Micronesia Challenge jurisdictions.

Adaptation of the Indonesia score card to suite the Micronesia region and the initial field testing of the resulting MPAME tool was supported by The Nature Conservancy Micronesia Program. The development of this user guide was supported by the Micronesia Conservation Trust. We would especially like to thank the many government and NGO partners who participated in the initial testing of the assessment tool and provided essential feedback at a Management Effectiveness Workshop held in Koror, Palau in February 2012.

Curtis Graham, *Chuuk Conservation Society*

Chimres Teresio, *Chuuck Marine Resources*

Osamu Nedlic, *Kosrae Conservation and Safety Organization* Marston Luckymis, *Kosrae Conservation and Safety Organization* Eugene Joseph, *Conservation Society of Pohnpei*

Selino Maxin, *Conservation Society of Pohnpei* Scottie Malakai, *Pohnpei Marine Resources* Liz Terk, *Micronesia Conservation Trust*

Thomas Gorong, *Nimpal Channel Conservation Area-Kaday Village* Jonathan K. Gorong, *Nimpal Channel Conservation Area-Kaday Village* Vanessa Fread, *Yap Community Action Agency*

Henry Muller, *Marshall Islands Conservation Society*

Benedict Yamamura, *Marshall Islands Marine Resource Agency* Dave Burdick, *Guam Coastal Resource Management Office* Steven Johnson, *CNMI Division of Environmental Quality*

John Ingel, *CNMI Division of Environmental Quality*

David Benavente, *CNMI Coastal Resource Management Office*

Lolita Gibbons-Decherong, *Palau Conservation Society*

Wayne Andrew, *Palau National Congress* Rosania Victor, *Helen Reef Program* Stella Patris, *Helen Reef Program* William Andrew, *Helen Reef Program*

King Sam, *Koror State Department of Conservation and Law Enforcement*

Percy Rechelluul, *Palau Bureau of Marine Resources* Lawrence Sumor, *Palau Bureau of Marine Resources* Leong Remengesau, *Palau Bureau of Marine Resources*

Irene Mercader-Guzman, *Palau Automated Land and Resource System*

Carol Emaurois, *Palau International Coral Reef Center* Shirley Koshiba, *Palau International Coral Reef Center* Mark Defley, *USDA Natural Resource Conservation Service* Asap Bukurrow, *Sustainable Decisions*

Mike Aulerio, *The Nature Conservancy, Micronesia Program*

Overview

Assessing management effectiveness

There has been an increasing global trend of establishing marine protected areas as a tool to protect biodiversity, improve fisheries resources and ensure the long-term sustainability of marine resources. This trend has been accompanied by the growing concern that some of these protected areas are not achieving their intended objectives, despite the efforts of numerous government agencies, NGOs and local communities. As a response to this concern, there has been a push to enhance management effectiveness and to develop tools to aid managers track progress and the degree to which management actions are achieving the stated goals and objectives of protected areas.

Along these lines, the World Commission on Protected Areas (WCPA), recognizing the variety of management schemes around the world, rather than prescribing a single assessment methodology, opted to develop a general 'framework' to provide guidance on management effectiveness assessments. This framework is based on the notion that good management follows distinct stages or elements that together closely resemble a generic project management cycle. The framework is intended to guide the development of assessment systems or methodology and to promote standards in conducting such assessments and the reporting of results.

The introduction of the WCPA framework encouraged the development of a variety of assessment methodologies around the world intended for use at a range of scales,

from site-level tools to assessments of entire protected area networks. Such tools have been developed by countries, regions, NGOs and even by international lending institutions like The World Bank who are primarily interested in estimating the return of bank investments in protected areas.

This document presents the Micronesia Protected Area Management Effectiveness (MPAME) tool, a management effectiveness assessment methodology for the Micronesia region. The assessment methodology is an adaptation of a similar assessment tool developed for Indonesia by Carter, E. et al.

Management effectiveness *is the extent to which a protected area is being managed to protect conservation values and achieve intended goals and objectives.*

Conservation context

Micronesia, much like the rest of the world, has seen the increasing trend of establishing marine protected areas particularly within the last 20 years. Most of these efforts have been spearheaded by local communities as a response to the general decline of important marine resources. This movement to establish marine protected areas has often been facilitated by environmental NGOs and government agencies that either have the mission or the mandate to ensure the long- term sustainability of marine resources.

The development of modern conservation in Micronesia has incorporated many elements of traditional management and has resulted

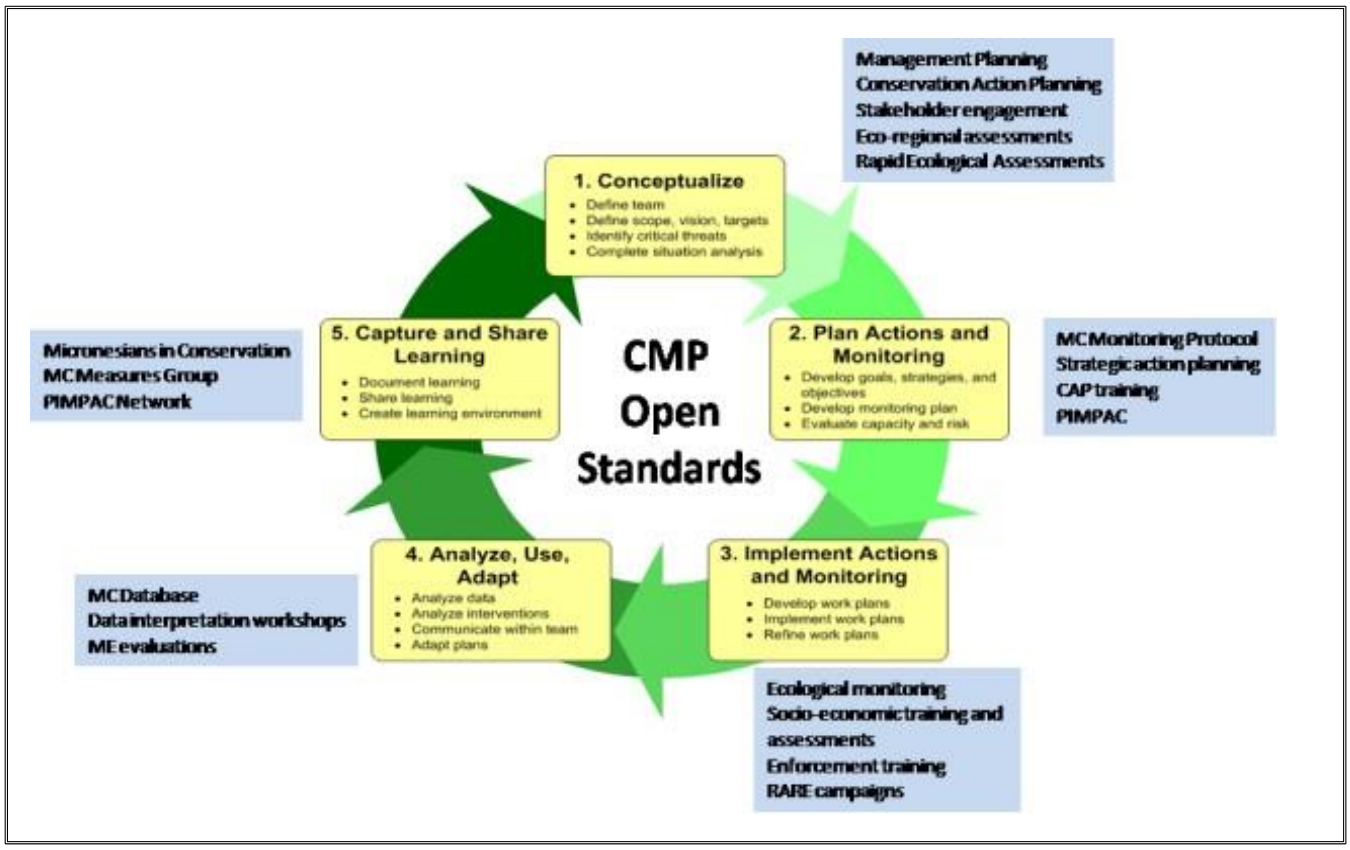
in a variety of innovative co-management schemes, governance structures and strategies unique to Micronesia and even to each of the island jurisdictions. The bulk of conservation efforts have been focused on establishing MPAs through community engagement, mitigating immediate threats, and building networks and creating opportunities to increase capacity for various aspects of PA management.

More recently the direction has somewhat shifted to effective planning for these PAs. This shift to conservation planning has been driven by such tools as PIMPAC's Guide to Management Planning and TNC's Conservation Action Planning and has cast all these past and perhaps fragmented efforts into a more unified model of adaptive management (Figure 1) And as MPA management plans and other action plans are being implemented, site managers will need to improve their ability to capture the experiences and results of current management actions and then using that to adapt, by refining existing strategies or developing new ones. This need to capture results has been made evident by current regional efforts to standardize the collection of monitoring data and how that data is managed and interpreted to inform management actions.

Need and relevance

Much like the collection and interpretation of ecological data, it is anticipated that the assessment of the context, management

Figure 1 Generalized adaptive management model. Blue boxes contain some of the ongoing efforts in Micronesia within the context of the adaptive management model.



structures, mechanisms, and processes that enable MPA management will increasingly become necessary. This assessment methodology would focus less on the status and trends of ecological indicators but would allow for the assessment of the appropriateness, efficiency and effectiveness of the operational framework within which management occurs.

While the results of such assessments will be most useful for adaptive management at the site-level, there is potential usefulness at the network level. Such local and regional initiatives as the Protected Areas Network in Palau and the Micronesia Challenge could potentially use the results of these effectiveness assessments to track network or regional progress and trends.

The Micronesia Protected Area Management Effectiveness tool described in this document offers protected area managers and policy makers a tool for achieving protected area goals by enabling a rapid assessment of the overall management effectiveness of the protected area or a network of areas in a particular state or jurisdiction.

This assessment methodology can:

- identify management strengths and weaknesses.
- indicate the scope, severity, prevalence, and distribution of a variety of threats and pressures.
- identify areas of high ecological and social importance and vulnerability
- indicate the urgency and conservation priority for individual protected areas.
- help to develop and prioritize appropriate management and policy interventions and follow-up steps to improve protected area management effectiveness.

Presenting the MPAME

Management categories and levels

The Micronesia Protected Area Management Effectiveness tool is an adaptation of a management effectiveness score card developed for Indonesia. The tool is an Excel-based questionnaire consisting ofquestions that pertain to each of the following 11 management categories:

- Biophysical assessments
- Conservation effect (includingEcosystem services)
- Enforcement
- Finance
- Infrastructure and equipment
- Legal framework
- Planning
- Socio-economics assessments
- Staffing
- Stakeholder engagement
- Traditional knowledge

The questions are also associated to one of five progressive management levels that together represent a chronological management continuum, from initiation of a new protected area to the fully institutionalized and functional protected area (Figure 2). Questions are either yes/noor multiple choice, in order to allow for a wider range of possible answers. The spreadsheet will automatically generate average scores, for management level and for each of the management categories.

Limitations of scoring

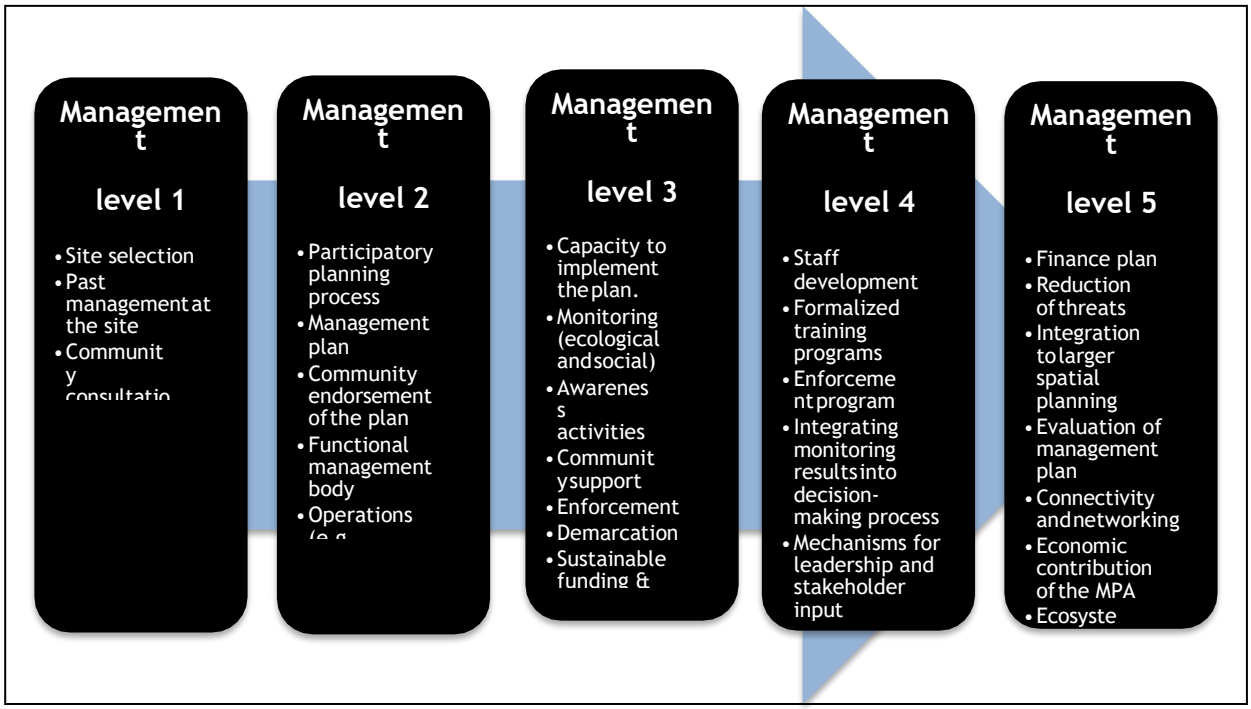
The tool uses a simple scoring system that assumes that the questions deal with management issues of equal weight. This assumption may not be accurate, but it avoids the difficulty of deciding the relative weighting of each of the question or management category. The Managementlevel of a site is simply the highest level that a site achieves a satisfactory score, which was arbitrarily set at 75% for the field testing of the MPAME tool. These scoring limitations should always be recognized when interpreting and using the MPAME results.

In some cases, the assessment team may be tempted to answer questions to try and achieve a higher score. The facilitator needs to be aware when this might be occurring and emphasize the need to answer questions accurately.

Testing the MPAME tool in Micronesia

Marine protected area management effectiveness assessments were conducted in 7 Micronesia Challenge jurisdictions—Guam, RMI, Pohnpei, Chuuk, Kosrae, Yapand Palau. Sites were selected and assessments were facilitated by the local NGO or government agency partner in each of the jurisdictions. A total of 22 protected areas were assessed in 2012 and 2013.

Figure 2 Protected area management continuum conceptualized into 5 management levels.



Scope of assessment

Single site vs. multiple site assessments Determining the scope of the assessment is essential prior to using the MPAME questionnaire. This determination should be made by the management authority or the community group that is tasked with the management of the site. The MPAME tool can be applied to a single protected area or to multiple sites.

Given that the results of these assessments will guide future management, it is recommended that the MPAME tool be applied at the scale at which management occurs. If a management body is tasked with managing a single site, then it would be most beneficial to do a single site assessment. However, if multiple protected areas are being managed by a single management body through the implementation of a single management plan, then a network assessment is possible and perhaps preferable.

Other considerations

There may be other factors that need to be considered in order to determine the scope of the MPAME assessment. These factors may serve to limit or expand the scope of the assessment. They include:

- What are specific objectives of assessment?
- How will the results of the assessment be used?
- Who will participate in the assessment?
- What are the resources available to complete the assessment?
- The timeframe during which the assessment should be completed.
- Who will be coordinating the assessment?

Answering these questions may help to determine the scope of the assessment. It is noted, however, that choosing to apply the MPAME tool to multiple sites means answering the questions within the context of all the sites and there may be a point at which the number of sites will be unmanageable.

The MPAME tool can be used for….

- *A single protected area*
- *Multiple protected or a network of sites in a particular state, region, municipality or country*
- *Subset of protected areas that are grouped under a single IUCN category.*
- *Protected areas that have similar management objectives*

The assessment teams.

Composition of assessment team

The most effective way of administering the questionnaire is to hold a participatory workshop involving protected area managers, staff, and stakeholders. Participants discuss the questions and their interpretations, agree upon the answers, review the results, and recommend priorities and possible next steps.

It is often necessary to have individuals in the assessment team who have specific expertise relevant to past and ongoing activities that are being implemented in the protected area. Identifying the needed expertise and even specific individuals should be done early, as their availability may determine the timing of the assessment.

Management staff should also be part of the assessment team. They should be selected to represent the many aspects of management. If the protected area has been in existence for some time, management staff who were present at the initial establishment of the management program should also be included.

Including community members and other stakeholders will also benefit the assessment. Assessment team members who are not directly involved with management provide a different perspective to the group and may also be in a better position to answer some of the questions in the questionnaire. These stakeholders may be chosen to represent key groups like fishermen, an industry like tourism, and a specific group of leaders like traditional leaders or key community group members, those who may likely be impacted by the protected area.

Team facilitators

The assessment team also includes 2 or 3 facilitators who will lead the team as they fill out the MPAME questionnaire. The role of the facilitators will be to create an atmosphere that generates reliable information. One person will be dedicated to filling in the Excel questionnaire. The other two will be facilitating the group.

Field testing of the MPAME tool across Micronesia in 2012 and 2013 utilized multi-stakeholder teams consisting of 5 to 15 individuals. It is noted that larger groups will make facilitation more difficult and perhaps even become a barrier to arriving at a group consensus.

discussion and asking clarifying questions in order to reach a common interpretation of the questions and to arrive at answers that are acceptable by the group. Individuals who will act as facilitators should be very familiar with the questionnaire and either have had some facilitation training or have participated in a similar assessment in the past.

Administering the MPAME tool

Supporting documents

Before the assessment team fills out the questionnaire, it may be necessary to compile and review all available background information that may be relevant to protected area. These documents may include relevant legislations, community decrees, reports of biophysical or socio- economic assessments, summary of surveillance and enforcement activities etc.

These documents will help the team arrive at answers when there are differences in opinions and ensure the reliability and accuracy of the assessment.

It is necessary to compile and review all previous documents relevant to the protected area. These documents may include:

- *Legislation or community decree that established the protected area.*
- *Management plan of the site*
- *Results of biophysical or socio-economic assessments*
- *Previous management effectiveness assessments*

Filling in the questionnaire

The MPAME tool was initially developed and tested for marine protected areas. However, it may be used for terrestrial or combination marine/terrestrial sites. Team facilitators may re-write the assessment questions to suite the particular protected area prior to administering the questionnaire.

Depending on the protected area, some of the initial questions in the beginning of the questionnaire may be about events in the past. The assessment team will need to answer these questions as they occurred in the past and not with current knowledge.

When necessary, the questions should be translated to the local language in order to promote greater understanding by the assessment team. If this is the case, the questions should be re-written into a new excel sheet and then the answers can be transferred to the MPAME worksheet. Changing the MPAME worksheet directly will interfere with the tool's ability to generate management level and category scores.

Interpreting the results

Once all the questions are answered, management level and category scores will automatically be generated in separate worksheets. The worksheets will contain the scores both numerically and in a tabular form.

Management level

Each of the questions in the questionnaire is attributed to a management level. The management level score is simply the average of the questions in each management level. The management level of a site is simply the highest management level (1 to 5) which a site earned a score of 75% or greater.

Management category

Similarly, each of the questions in the questionnaire are also attributed to 1 of 11 management categories. The MPAME tool also generates score for each management category. The management category scores are averages of the questions that are attributed to that category.

Interpreting the scores

The management level of a site is mainly used to gauge the general progress of the site along a management continuum described in the Presenting the MPAME section of this guide. It is useful for comparing iterative evaluations over time and to compare the different management levels that exist within a network of sites that have been assessed.

For site management, the scores by management category may be better at identifying management strengths and weaknesses. It is useful to go back to the questionnaire to identify the questions that contributed to either a low or a high management category score.

Interpreting the results of the MPAME tool is the essence of management effectiveness evaluations. This is when management strengths and weaknesses are identified, andfuture strategies are developed.

This should generate discussions around specific areas of management that can help the assessment team develop future management strategies. These discussions should include which strategies are of highest priority, the feasibility and resources currently available to implement them, and a generalized timeline of when they can be achieved.

These discussions should be noted in as much detail as possible by one of the facilitators. These are the results of the MPAME evaluations and can be written into a formal report that can be widely disseminated or simply incorporated into a work plan for site management.

MPAME questionnaire

Background information

Name of protected area	
Location of marine protected area	
Date MPA was established	
Ownership details	
Management authority	
Contact information	
Size of marine protected area (ha)	
Percent of MPA that is terrestrial (%)	
Number of staff (temp, permanent or volunteer)	
Annual budget	
Designation (PAN, IUCN category, Ramsar, etc.)	
The PA is part of a larger management zoning. plan	
Brief description of primary habitats represented. in the MPA (reef, seagrass, mangrove, lagoon,estuary, etc.)	
Two primary protected area objectives	
Two most important threats to the MPA	
Two critical management activities	
Top 4 stakeholder groups	
Resource condition (poor, avg, good)	
Date assessment was carried out	
Assessment group	
Date of previous score card assessment	

Assessment questionnaire

Management Category	Question	Rating conditions
Biophysical	Has a biophysical baseline assessment been completed forthe protected area site?	(0) No biophysical baseline assessments have been conducted,and there is little or no information available on the biophysical conditions of the protected area site.

Management Category	Question	Rating conditions
		(1) There have been limited biophysical baseline assessments completed for the site, the information on the biophysical conditions are not sufficient to support

		planning and/or decision-making processes.
		(2) There have been biophysical baseline assessments completed for this site; information on the biophysical conditions is sufficient for key areas of planning and decision making.
Biophysical	Does regular biophysical monitoring occur in the protected area site?	(0) There are no biophysical surveys. or research conducted in the protected area.
		(1) There is some biophysical surveywork in the protected area, but it is limited and not a coordinated effort
		(2) There is considerable biophysical survey and research work in the PA but is not directed towards the management needs of the site
		(3) There is an integrated biophysical monitoring program which is relevant to management needs
Socio-economic	Has a socio-economic baseline assessment been completed for the protected area site and/or nearby community?	(0) No socio-economic baseline assessments have been conducted, and there is little or no information available on the socio-economic conditions of the protected area site. and/or nearby community.
		(1) There have been limited socio- economic baseline assessments completed for the site; the information on the socio-economic conditions is not sufficient to support planning and/or decision making processes.

		(2) There have been socio-economic baseline assessments completed for this site; information on the socio-economic conditions is sufficient for key areas of planning and decision making.
Socio-economic	Does regular socio-economic monitoring occur in the protected area site?	(0) There are no socio-economic surveys or research being conducted. in the protected area
		(1) There is some socio-economic survey work in the protected area,

		but it is limited and not a coordinated effort
		(2) There is considerable socio- economic survey and research work in the PA but it is not specific to the management needs of the site
		(3) There is an integrated socio-economic monitoring program which is coordinated with management needs
Socio-economic	Have alternative livelihood opportunities been explored?	(0) No
		(1) Yes
Socio-economic	Have alternative livelihood opportunities been implemented in the local community, if applicable?	(0) No
		(1) Some groundwork to provide alternative livelihood opportunities is in place, but not effectively implemented
		(2) Yes, alternative livelihood opportunities are ready and available to members of the local community.
		(2) No, not applicable to this protected area site
Planning	Have the boundaries of the protected area been delineated?	(0) No, the boundaries of the protected area have not been. delineated or are unknown
		(1) The boundaries have been delineated, but they are not known outside of the management planning team.
		(2) The boundaries of the protected area have been delineated and are familiar to the management authority and other stakeholder groups
Planning	Has a management planning team with clear roles and	(0) A management planning team has not been established

	responsibilities been established?	(1) A management planning team hasbeen established but has no clear roles, responsibilities, or management authority
		(2) A management planning team hasbeen established with clear roles and responsibilities and management authority
Planning	Does the management planningteam include representation? from key stakeholder groups	(0) No
		(1) Yes

	(Leadership, resource users, etc.)?	
Planning	Does the management planning team have access to material andtechnical guidance for the planning process?	(0) No
		(1) The management planning teamhas access to some material and technical guidance, but it is not adequate for the planning process.
		(2) The management planning teamhas full access to material and technical guidance, and it is fully adequate to support the planning process
Planning	Has a management plan for thePA been produced?	(0) There is no management plan for the PA
		(1) A management plan for the PA is being drafted but not complete
		(2) A management plan for the PA has been produced, but it is lacking in content or applicability
		(3) A management plan for the PA hasbeen produced and is robust enough for effective implementation in the PA.
Planning	Does the management plan statea clear vision for the PA?	(0) No
		(1) Yes
Planning	Does the management plan setobjectives consistent with the vision of the PA?	(0) No
		(1) Yes
Planning	Has a management structure been established to implementmanagement strategies and promote accountability?	(0) No management body has been. identified
		(1) Management body has been organized but is not fully staffed oractively functional
		(2) A management body has been organized and is active, but there aregaps in leadership or management authority

		(3) Management body is fulfilling itsintended function of providing centralized leadership in management of the protected area
Planning	Is the management body activelyimplementing or following the management plan?	(0) There are no activities that are being implemented
		(1) Activities that are implementedare not following the management plan

		(2) Management activities from the plan are being implemented but many activities are not completed
		(3) Management activities are monitored against the plan's targets and most or all prescribed activities are being actively implemented
Planning	Are the results of the regular *biophysical* monitoring being incorporated into planning and decision-making?	(0) Regular biophysical monitoring is. not occurring in the PA
		(1) Monitoring is occurring, but the data have not been adequately analyzed to affect management
		(2) Monitoring data have been appropriately analyzed to extract trends, but have not been incorporated into planning or decision making
		(3) Trends have been extracted from monitoring data and are being incorporated into planning and decision-making
Planning	Are the results of the regular socio-economic monitoring being incorporated into planning and decision-making?	(0) Regular socio-economic monitoring is not occurring in the PA
		(1) Monitoring is occurring, but the data have not been adequately analyzed to affect management
		(2) Monitoring data have been appropriately analyzed to extract trends, but have not been incorporated into planning or decision making
		(3) Trends have been extracted from monitoring data and are being incorporated into planning and decision-making
Planning	Has the PA management plan been regularly reviewed and	(0) The management plan has never been evaluated

	where relevant updated and refined for adaptive management?	(1) The management plan is evaluated periodically, but minimal adjustments are made
		(2) There is an established schedule and process for evaluating and updating the management plan
Planning	Has the management body implemented strategies or	(0) No efforts have been initiated to connect with other regional protected areas.

	programs to connect with neighboring protected areas?	(1) Some efforts to connect with other protected areas have been explored, with limited to no implementation
		(2) The management body has actively connected with the management bodies of neighboring protected areas in order to share resources and network.
Planning	Has the PA management and any associated zoning been fully integrated with applicable local government spatial planning processes?	(0) No
		(1) There has been some coordination between PA management and local government spatial planning processes.
		(2) The PA zoning has been fully integrated with applicable local government spatial planning processes.
Traditional knowledge	Have traditional or local understandings of the biophysical and socio-economic criteria been incorporated into the protected area management plan?	(0) No
		(1) Traditional or local knowledge has been gathered, but not fully incorporated into protected area management plans.
		(2) Traditional or local knowledge has been fully incorporated into the protected area management plans.
Traditional knowledge	Have traditional or community-based management practices been incorporated into the management plan, where applicable?	(0) No
		(1) The management plan includes some aspects of traditional or community-based management practices, but they are not fully incorporated.
		(2) Traditional or community-based management practices have been fully incorporated into the management plan, where applicable.
Stakeholder	Have public consultations	(0) No

engagement	and outreach been conducted to explain the reasoning behind thesite designation and explain the concept and potential benefits ofprotected areas?	(1) Some public outreach has beenconducted with a limited set of stakeholders.
		(2) Extensive and adequate public outreach has been conducted, and the public is aware of the protected area's site designation and potential benefits.
Stakeholder engagement		(0) The boundaries are unknown or have not been delineated.

	Have the boundaries of the protected area been widely shared with the public?	(1) The boundaries are known by the management authority but have not been adequately shared to other stakeholder groups and the public.
		(2) The PA boundaries are known by the management authority and have been shared widely with the public and other stakeholder groups through signs, markings, and outreach efforts.
Stakeholder engagement	Has management planning been a participatory process that allows adequate opportunity for key stakeholders to influence the management plan?	(0) No
		(1) There have been some opportunities for stakeholders to provide feedback, but this feedback had little to no effect on management processes.
		(2) Yes, stakeholders have had adequate opportunities to influence the management plan and processes.
Stakeholder engagement	Has the management plan been endorsed by the community?	(0) No
		(1) Yes
Stakeholder engagement	Have education awareness activities been initiated under the management plan that is focused on the marine resource condition, threats, and management efforts in the PA?	(0) No, there have been no education or awareness activities
		(1) There have been some education or awareness activities, but they are uncoordinated or not directly associated with the protected area.
		(2) There is a planned education and awareness program, but it has not been implemented or there are serious gaps.
		(3) There is a planned and effective education and awareness program that is linked to the objectives and needs of the protected area.
Stakeholder engagement	Are there mechanisms in place to ensure for adequate opportunities for stakeholder	(0) There are no mechanisms in place to ensure for stakeholder participation.

	participation?	(1) There are some mechanisms in place to ensure for opportunities for stakeholder participation in decision- making or management activities, but these are not sufficient.
		(2) Yes, there are sufficient mechanisms in place to ensure foradequate opportunities for stakeholder participation, and

		stakeholders directly contribute tosome management decisions.
		(3) Stakeholders directly participatein making decisions relating to management.
Stakeholder engagement	Are stakeholders aware and concerned about marine resource conditions and threats?	(0) Very few stakeholders are awareor concerned about the protected area conditions, threats and management efforts.
		(1) Less than half of all stakeholdersare aware or concerned about the marine resource conditions, threats and management efforts.
		(2) A significant number (more than half) of stakeholders are aware or concerned about the marine resourceconditions, threats and management efforts.
		(3) Most stakeholders are aware or concerned about the marine resourceconditions, threats and management efforts.
Stakeholder engagement	What is the level of support from the community for the protected area?	(0) Very few stakeholders support the protected area.
		(1) Less than half of all stakeholders support the protected area.
		(2) A significant number (more thanhalf) of stakeholders support the protected area.
		(3) Most stakeholders support the protected area.
Stakeholder engagement	Have information boards, boundary markers and anchor buoys been established and	(0) No, there are no boundary markers or information boards in place.

	arebeing maintained?	(1) Some information boards or boundary markers have been put in place, but they are not maintained or are inadequate.
		(2) Yes, protected area informationboards and boundary markers havebeen put in place, are effective in their messaging, and are well maintained.
Legal	Has the protected area been? formally designated through a	(0) The protected area has not been formally designated

	traditional, community or government decree?	(1) The process for formal designation of the site has been initiated but not completed
		(2) The protected area has been formally designated
Legal	Does the decree clearly state protected area objectives?	(0) There is no decree, or no firm objectives have been agreed on
		(1) The protected area has objectives that have been informally agreed upon, but not legally declared
		(2) The protected area has objectives that are explicit and listed in the legislation
Legal	Does the decree clearly define closure period?	(0) The decree does not clearly define the protected area closure period.
		(1) The decree explicitly defines protected area closure periods.
Legal	Has the management plan been endorsed by government?	(0) No
		(1) Yes
Legal	Have the necessary legal and political mechanisms and procedures been established to support protected area operations?	(0) There are no formal mechanisms and procedures for operations
		(1) There exist some formal mechanisms and procedures but they are lacking for key operations
		(2) Most mechanisms and procedures are in place and others are being developed for key operations
		(3) Mechanisms and procedures for operations are sufficient to meet operational needs
Legal	Is there a clear legal framework to deal with the prosecution process regarding protected area violations?	(0) No legal frameworks exist
		(1) Some legal frameworks exist, but there are gaps that prevent effective prosecution of violations.
		(2) A clear and effective legal framework exists that allows for full and effective prosecution of

		violations.
Staffing	Does the management plan clearly identify and define a realistic number of staff positions necessary to effectively manage the protected area site?	(0) No, there is no management plan, or the management plan does not clearly identify the staff necessary to effectively manage the protected area.
		(1) The management plan identifies required staff positions, but the

		positions are not well defined or realistic.
		(2) Yes, the management clearly identifies and defines the staff positions necessary to effectively manage the site.
Staffing	Are the required positions filled to a level that is sufficient to effectively manage the protected area site?	(0) There are no staff
		(1) Some staff positions have been filled, but staff numbers are inadequate for critical management activities.
		(2) Many staff positions have been filled, but some key positions remain vacant.
		(3) Staff numbers are at an optimum level to adequately address the management needs of the protected area site.
Staffing	Does the management staff have access to appropriate training and capacity building to effectively manage the protected area?	(0) No, training or capacity building opportunities are not available, or staffing levels are not adequate to warrant training opportunities.
		(1) Some training or capacity building opportunities are available, but they are not adequate to address gaps, or the protected area is not fully staffed.
		(2) The protected area is fully staffed, and adequate preliminary training and capacity building opportunities have been provided to ensure the staff can effectively manage the protected area.
Staffing	Are the staff fully trained to meet their required proficiencies and tasks?	(0) Staff are untrained, or the protected area is not fully staffed.
		(1) The protected area is fully staffed, but staff training and skills are low relative to the needs of the site

		(2) The protected area is fully staffed, and staff training and skills are adequate but could be further improved to fully achieve management objectives.
		(3) The protected area is fully staffed, and staff training and skills are in tune with management needs of the protected area and with anticipated future needs

Enforcement	Is there an enforcement group in place with the authority to enforce protected area regulations?	(0) No
		(1) There is some enforcement structure in place, but it is inadequate.
		(2) Yes, the protected area has an enforcement group that is able to enforce protected area regulations.
Enforcement	Have anchor buoys, marker buoys and/or boundary markers been installed?	(0) PA has not been delineated
		(1) PA has been delineated but anchor and marker buoys have not been installed
		(2) PA has been delineated and anchor and marker buoys have been installed
Enforcement	Has a formal enforcement program been established?	(0) No
		(1) Yes
Enforcement	Does the enforcement program have the capacity and training to effectively enforce the protected area rules and regulations?	(0) There is no enforcement program, or it does not have any capacity or training to enforce protected area regulations.
		(1) The protected area has an enforcement program, but there are major deficiencies in capacity to enforce protected area regulations.
		(2) The protected area has an enforcement program, and there is acceptable capacity to enforce regulations.
		(3) The protected area has an enforcement program, and there is excellent capacity and training to ensure effective enforcement of regulations.
Enforcement	Have illegal and destructive activities been reduced or halted within the protected	(0) No, there has been no decrease in illegal and destructive activities in the protected area.

	area?	(1) There has been some reduction inillegal and destructive activities in the protected area.
		(2) Yes, there has been a significant reduction in illegal and destructiveactivities in the protected area.
Infrastructure/equip	Are there basic facilities to support the protected area staff and operations?	(0) There are no facilities to supportthe protected area staff and operations.

		(1) The protected area staff have afacility, but it is inadequate to support operations.
		(2) The protected area staff have a facility that adequately supports theneeds of the protected area operations.
Infrastructure/equip	Does the protected area staff have access to the equipment necessary to support operations?	(0) There is no equipment to supportthe protected area staff and operations.
		(1) The protected area staff have some equipment, but it is inadequate to support operations.
		(2) The protected area staff have access to equipment that adequatelysupports the needs of the protected area operations.
Finance	Does the protected area management plan outline a budget necessary for adequateoperations?	(0) There is no management plan, orthe management plan does not include a budget for the protected area.
		(1) The management plan describes abudget, but it is not adequate or detailed enough to support operations.
		(2) The management plan describes abudget that adequately details the budgetary needs to support adequate protected area operations.
Finance	Does the protected area haveadequate funds allocated to support management?	(0) No, the protected area does nothave a budget or funds available to support management.
		(1) The available funds available areinadequate for basic management needs and presents a serious constraint to effective management.

		(2) The available funding is acceptable, but could be further improved to fully achieve effective management.
		(3) The available budget is sufficient and meets the full management needs of the protected area.
Finance	Have avenues for long-term financing for the protected area been explored?	(0) No
		(1) Yes

Finance	Have avenues of long-term financing mechanisms for the protected area been secured?	(0) No, no opportunities for long-term financing have been initiated or secured.
		(1) Long-term financing mechanisms have been initiated but not secured or established.
		(2) Yes, long-term financing for the protected area have been secured and established.
Finance	Has the local government committed resources and personnel to the long-term management of the protected area?	(0) No, the local government has not committed any resources to the long-term management of the protected area.
		(1) The local government has committed some resources to the protected area, but they are short-term or inadequate.
		(2) The local government has secured and committed resources and personnel on a multi-year basis.
Finance	Is a long-term financing plan being implemented that will cover more than 75% of the protected area's annual operational costs?	(0) No long-term financing plan is being implemented, or the protected area does not have a long-term financing plan.
		(1) A long-term financing plan is being implemented, but it does not cover 75% of the annual operational costs.
		(2) Yes, a long-term financing plan is being implemented and it covers at least 75% of the protected area's annual operational costs.
Conservation effect	Biophysical priority 1:	(0) The condition has degraded
	[insert priority 1 here]	(1) The condition has remained stable
	Is condition stable and or improved?	(2) The condition has improved
Conservation effect	Biophysical priority 2:	(0) The condition has degraded

	[insert priority 2 here]	(1) The condition has remained stable
	Is condition stable and or improved?	(2) The condition has improved
Conservation effect	Biophysical priority 3:	(0) The condition has degraded
	[insert priority 3 here]	(1) The condition has remained stable
	Is condition stable and or improved?	(2) The condition has improved
Conservation effect	Biophysical priority 4:	(0) The condition has degraded

	[insert priority 4 here]	(1) The condition has remained stable
	Is condition stable and or improved?	(2) The condition has improved
Conservation effect	Biophysical priority 5:	(0) The condition has degraded
	[insert priority 5 here]	(1) The condition has remained stable
	Is condition stable and or improved?	(2) The condition has improved
Conservation effect	Are the goal(s) and target(s) identified in the management plan achieving >75% of the planned results according to monitoring or survey results?	(0) No
		(1) Yes
Conservation effect	Have the identified threats to the PA been abated or reduced significantly (>75%) ?	(0) No
		(1) Yes
Conservation effect	Has analysis been undertaken to determine the extent and impact of ecosystem services the protected area is effectively conserving/enabling?	(0) No
		(1) Yes

Useful references

Carter, E., Soemodinoto, A. & White, A. (2010) Guide for Improving Marine Protected Area Management Effectiveness in Indonesia. Bali, Indonesia: The Nature Conservancy Indonesia Marine Program, xi + 49p.

Day J., Hockings M., and Jones G. 2003. Measuring effectiveness in Marine Protected Areas – Principles and Practice.

Hockings, M. 1998. Evaluating management of protected areas: integrating planning and evaluation. Environmental Management 22(3): 337–346.

Hockings, M. 1999. Management effectiveness of protected areas. Theme issue. Parks 9(2).

Hockings M. 2000. Evaluating protected Area Management. A review of systems for assessing management effectiveness of protected areas. School of Natural and Rural Systems.

Hockings, M., Stolton, S. and Dudley, N. 2000. Evaluating Effectiveness: A Framework for Assessing the Management of Protected Areas. IUCN, Gland, Switzerland and Cambridge, UK, 121 pages.

Hockings, M., Stolton, S., Dudley, N. and Parrish, J. 2000b. The Enhancing Our Heritage Toolkit – Book 1. A training manual on how to build assessment, monitoring and reporting systems on the management effectiveness of World Heritage Sites. 36pp. www.enhancingheritage.net

Hockings, M., Stolton, S., Dudley, N. and Parrish, J. 2000c. The Enhancing Our Heritage Toolkit – Book 2. Aworkbook on how to build assessment, monitoring and reporting systems on the management effectiveness of World Heritage Sites. 136pp. www.enhancingheritage.net

Kelleher, G. 1999. Guidelines for Marine Protected Areas. IUCN–The World Conservation Union, Gland, Switzerland.

Pomeroy R., Parks J., and Watson L. 2002. Working Draft Guidebook: How is Your MPA Doing? Guidebook for Evaluation Effectiveness of Marine Protected Areas. A Resource Guide on Biophysical, Socio–Economic and Governance Indicators for Evaluating MPA Managment Effectiveness. http://effectivempa.noaa.gov

Stolton S. et al. 2003. Reporting Progress at Protected Area Sites. A simple site–level tracking tool developed for the World Bank, Washington, DC and WWF.

WWF. Improving Protected Area Management – WWF's Rapid Assessment and Prioritization Methodology. http://www.panda.org/downloads/forests/Summary_final.pdf

Glossary

Alternative livelihood—activities or programs developed by protected area management to ensure new sources of income in order to replace livelihood activities that existed in an area before the establishment of a protected area.

Delineate—to clearly indicate or represent a protected area by marking an outline of the boundaries on a map.

Demarcate—to set apart distinctly a protected area by placing physical markers tomark the boundaries.

Ecosystem services—important benefits to human beings that arise from a multitude of natural resources and processes that are supplied by functioning ecosystems. The UN 2005 Millennium Ecosystem Assessment grouped ecosystem services into four broad categories: provisioning, such as the production of food and water; regulating, such as the control of climate; supporting, such as nutrient cycling and crop pollination; and cultural, such as spiritual and recreational benefits.

Management authority—a government agency or a formally recognized group that leads the implementation of management activities in a protected area.

Management body—the group of people who are responsible for overseeing the management of the MPA. Roles include approving the management plan, overseeing its implementation, and overseeing protected area staff.

Management effectiveness—the extent to which a protected area is achieving its intended goals and objectives.

Management plan—a document that sets out the management approach and goals, together with a framework for decision making, to apply in a specific protected area/s over a given period of time. This document is often developed through consultation with stakeholders in order to ensure support and adherenceby all involved.

Management planning team—the group of people who participate in the planningand the creation of the management plan for the MPA. This group of people wouldbe nominated by the management body. In some cases there may be overlap between the planning team and the management body.

Protected area—an area of land or ocean with specific boundaries that receive special protection because of its recognized natural, ecological and/or cultural values.

Sustainable financing—financing plans, policies and mechanisms that secure stable and sufficient long-term financial resources to cover the full costs of protected areas and to ensure that protected areas are managed effectively and efficiently.