SECTION

Climate resilience through environmental management

Conducting forest research as part of a carbon credit programme, PNG. © Cory Wright, UN REDD Programme

Pacific islands are experiencing the most immediate effects of climate change, despite historically low contributions to global greenhouse gas emissions (IPCC 2019). Pacific islands now face expected annual losses of 0.3% to 6% of GDP or more directly due to natural disasters, such as flooding and cyclone damage, with increasing risks under climate change (IPCC 2019). Damages due to some disasters have exceeded the annual GDP (Lee et al. 2018).

The selected regional environment indicators relate to Pacific commitments to manage their greenhouse gas emissions and to climate finance for mitigation and adaptation.

Climate change mitigation is action to reduce greenhouse gas emissions and to enhance carbon sinks. Mitigation is part of efforts to reduce the risks from climate change and extreme events.

Climate change adaptation is adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. Adaptation refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change. Adaptation to climate change can take several forms:

- **Soft**: development of policies and frameworks.
- **Hard (or grey)**: infrastructure specifically designed to protect communities and structures, often involving engineered “hard” solutions.
- **Green/blue**: managing and conserving natural systems that provide services that are essential for reducing the impacts of natural disasters caused by climate change.
- **Amalgam**: a cross between soft, hard and ‘green/blue’ solutions or an integration of natural solutions, ecosystem-based adaptation (EbA), and infrastructure, making natural and man-made systems work together to ensure resilience and reduce human vulnerability.

Pacific people are engaging with innovative solutions to combat the ecosystem effects of climate change, to harness ecosystem services for increased resilience, and to ensure that adaptation measures are aligned with long-term ecosystem health. Adaptation is already happening and at present is conducted in multiple sectors and for multiple purposes. For example, the establishment of terrestrial and marine protected areas (see Regional Indicators: Protection of Pacific Spaces) is an adaptation step.

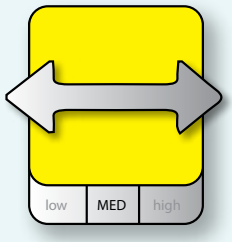
The Global Commission on Adaptation (GCA) argued for nature- and ecosystem-based measures for climate change adaptation, setting out eight Action Tracks in its 2019 report. At the global level down to national levels, data disaggregation of general adaptation and ecosystem-based adaptation funding or efforts is often inconsistent or absent. A complete identification of all existing EbA actions would require an extensive consultative process.

The goal of EbA is to increase resilience and decrease the vulnerability of both people and natural systems. EbA definitions vary, and EbA approaches can be thought of as a policy mix that address a blend of using ecosystems to help humans adapt and protecting ecosystems to facilitate the survival of species and ecosystem services (Scarano 2017). Donatti et al. (2020) identified a range of adaptation outcomes that can be achieved using EbA and propose a set of seven indicators to assess and monitor EbA efforts.

THEME **Atmosphere and Climate**

INDICATOR **Climate Adaptation and Mitigation Funding**

DEFINITION	Total funds received for climate adaptation and mitigation projects
PURPOSE	Indicates capacity for implementing climate change adaptation and mitigation
DESIRED OUTCOME	Climate change projects are adequately financed



Status
Fair

Trend
Stable or improving

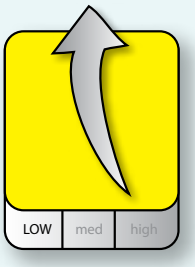
Data confidence
Medium


© Stuart Chape

THEME **Atmosphere and Climate**

INDICATOR **Funding for ecosystem-based adaptation**

DEFINITION	Total funds received to implement ecosystem-based approaches to climate adaptation
PURPOSE	Indicates capacity for implementing ecosystem-based approaches to climate change adaptation
DESIRED OUTCOME	Positive trend in funds received for ecosystem-based approaches to adaption to ensure that PICTs are more able to respond to climate change



Status
Fair

Trend
Improving

Data confidence
Low


© Roland Setu

PRESENT STATUS

Climate change is a growing component of regional and national development projects in the Pacific islands.

In addition to general climate finance, the Pacific region selected a funding indicator that specifies ecosystem-based approaches to climate adaptation: it is important to note that not all adaptation is ecosystem-based, and not all ecosystem-based approaches to management are directly applied toward climate change adaptation.

Each Pacific island country is directing a portion of national budgets toward ecosystem-based adaptation projects, supported by donor funding, although these investments are not always quantified separately from other development or environment-related efforts. Clear identification and reporting of these funds will provide the essential information for this indicator.

Other funding comes into the Pacific islands region for climate change work through bilateral partnerships and project-based mechanisms. Here, we focus on funding provided through the Green Climate Fund (GCF) and the Adaptation Fund and Special Climate Change Fund (SCCF) through the Global Environment Facility (GEF).

Since 2015, there has been growth in the number of entities accredited to access GCF funds, including SPREP (2015), Micronesia Conservation Trust (2017), and The Pacific Community (2019). Approximately USD 306 million in GCF grants has been committed to the Pacific islands region since 2015, with additional support through loans and national commitments to climate resilience (Table 23.A).

GEF grant funding for climate change for Pacific island countries alone increased to a peak of USD 54.1 million over 11 projects in the fifth replenishment cycle (2010–2014), decreasing to USD 39.6 million over 14 projects in the sixth cycle (2014–2018) [Figure 23.1].[1] Pacific islands were also included in a growing number of regional and global projects. From 2011 to 2012, Adaptation Fund grants of USD 26.2 million total were provided to four countries in four projects. Since 2015, Adaptation Fund grants of USD 21.6 million total were provided to seven countries. In 2012, USD 14.8 million was provided to the Pacific islands region through the Pacific Islands Adaptation to Climate Change project (PACC) under the SCCF.

Loan financing is also increasing. The total climate finance received in the Pacific islands region as loans through multilateral development banks reached USD 366 million in 2019, up from USD 169 million in 2015 (World Bank 2020).

[1] UNFCCC Climate Finance database; see https://unfccc.int/climatefinance/gef/gef_data (accessed September 2020)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Quantifying the funding directed toward specifically ecosystem-based approaches to adaption is more complex.

As a partial summary of known EbA efforts, SPREP prepared an overview of EbA projects in the Pacific Region (Table 23.B). Some of the 17 identified projects are specifically designed for EbA, such as the Pacific Ecosystem-Based Adaptation to Climate Change (PEBACC) project active in three countries (Fiji, Solomon Islands, and Vanuatu), whereas others have EbA as supportive components. EbA efforts are underway in all Pacific island countries, to varying degrees.

Pacific commitments to sustainable development and the increasing global attention to ecosystem-based solutions (albeit from a low starting point, estimated at less than 2% in 2017; Buchner et al. 2017) lead us to consider the status of these indicators as *fair* and the trends as *improving* or *stable to improving*. However, information must be collected and assessed to track these indicators and their results into the future. Data are more readily available for general climate adaptation and mitigation funding, but data regarding funds directed to EbA approaches are limited or difficult to access.

CRITICAL CONNECTIONS

Community resilience and ecosystem resilience are intertwined.

Nature is an ally in trapping and storing carbon. Destruction of nature worsens climate change and lowers Pacific resilience. In addition to the carbon stores in forests and well-managed soils, carbon storage in coastal and marine ecosystems, called 'blue carbon', is important for the islands. The ocean is the largest carbon sink. Given that Pacific island countries govern 20% of the ocean that is within national boundaries, Pacific leadership in ocean management is essential for our healthy planet.

The funds required for present and future adaptation are generally considered to be lower in the case of healthy environments providing ecosystem services. Spending on environmental management in general can support resilience.

Waste management is part of a holistic approach to a healthy atmosphere, from reduced consumption (SDG12) requiring less energy/carbon in production and transport to less methane-emitting food waste going to landfills, to less energy/carbon required to manage waste residues.

Simultaneously, greenhouse gas emissions and climate change impact Pacific nature. These effects are emerging in multiplicative, often unpredictable combinations with the impacts of over-extraction, pollution, and other environmental stresses.

Some species will move to different areas as the changing climate changes their habitats. These range shifts can bring humans and other species together in new ways, with potential benefits and potential harm. For example, some species might invade new territories or have problematic population increases, like harmful algal blooms. Opportunities for crops and fisheries might shift, increasing livelihood opportunities in one area at the expense of another. Diseases can spread, among wild species and humans.

To take advantage of these connections, effective national adaptation plans build in ways to receive and respond to scientific and indigenous and local knowledge alongside technology transfer and international cooperation. Multi-sectoral approaches are important: tourism, energy, waste, land-use/development, climate/environment, transport, energy and other sectors all need to partner with communities to address the causes and impacts of GHG emissions.

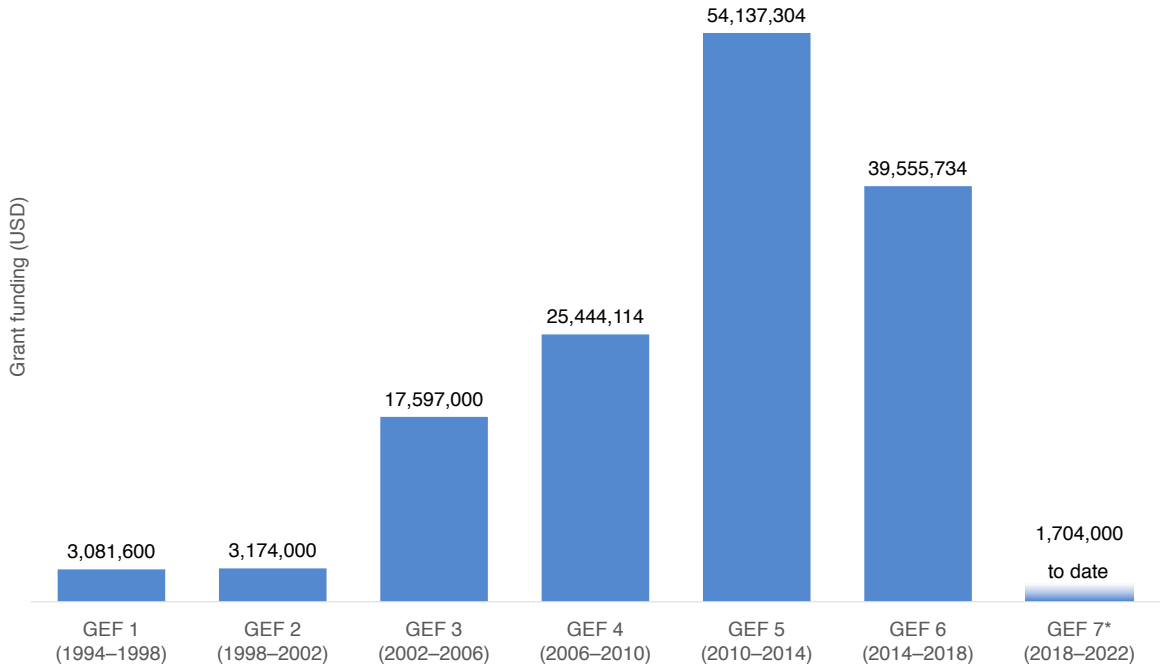


FIGURE 23.1: Global Environment Facility (GEF) grant funding for climate change response in the Pacific island countries, by replenishment cycle. Grant funding represents projects identified as climate change or climate change alongside another focal area, considering only projects exclusively for Pacific islands. Pacific countries were also included in regional (outside of the Pacific islands) and global projects; data not shown here. GEF7 funds are incomplete. Source: UNFCCC Climate Finance database (accessed September 2020); see https://unfccc.int/climatefinance/gef/gef_data

PRESSURES AND OPPORTUNITIES

The global response to climate change requires urgent action with committed support. Globally, the annual costs of adaptation could range from USD 140 billion to USD 300 billion by 2030 and from USD 280 billion to USD 500 billion by 2050 (UNEP, 2018).

Funding mechanisms are increasingly recognising the value of ecosystem-based approaches, assisted by national Environmental Impact Assessments and response for any potential development measure.

Pacific leaders have actively engaged with the GCF, and 52 of the GCF's 124 active projects as of April 2020 are in the Pacific, although many of these are small-scale readiness projects. Ten GCF Adaptation projects are active in the Pacific, as of September 2020 (Table 23.A). Not all of the GCF-funded adaptation projects use ecosystem-based approaches or are ecosystem-friendly.

The government of Germany's International Climate Initiative (IKI) adaptation theme emphasizes EbA instruments. Pacific island countries are included in six of the 125 active IKI projects in the South and Southeast Asia & Pacific region (as of March 2020).

In January 2020, UN Environment Programme and the International Union for Conservation of Nature launched the Global Fund for Ecosystem-based Adaptation (2020–2024) to provide targeted and rapid support mechanisms through seed capital for innovative approaches to ecosystem-based adaptation. The first proposals to this multi-year, € 20 million fund were to be assessed beginning in June 2020.

In 2018, the Global Environment Facility and the GCF launched an initiative to harmonize climate finance flows to strengthen efficient, effective programming in their climate-related support.

The selected adaptation options require funding to create and to implement over an appropriate period of time (GIZ 2018). In addition to partnering with major funding institutions and private donors, countries can also institute financial schemes that can support sustainable financing for EbA or environmental management, such as:

- green or blue bonds, which can be linked to tourism, fisheries, and other industries;
- a system of levies or fines that engage potential users or polluters to maintain critical natural systems that provide essential ecosystem services;
- payment for ecosystem services;
- insurance mechanisms that support conservation of ecosystems and ecosystem services.

Pacific islands are also investing in renewable energy technology. The energy sector is one of the dominant drivers of climate change, globally, and the energy sector alone contributed 40% to nearly 80% of estimated national carbon emissions as reported in Pacific NDCs (see below). Mitigating emissions from this sector by reducing energy demands or reducing the reliance on fossil fuels for energy production is essential for most countries to meet their climate targets (see Regional Indicator: Renewable Energy). Over USD 2 billion was committed to the Pacific energy sector in development assistance from 2011 to 2018, with a strong focus on sustainable energy production.[1]

Energy and transport far outweigh other sectors in terms of the adaptation finance loans received from multilateral development banks in 2019 in the East Asia and Pacific region, with USD 543 million directed toward energy, transport, and other built infrastructure compared to USD 265 million on water and wastewater systems, the next-largest category (World Bank 2020, their Table 15). The same is true for mitigation finance.

Ecosystem-based management suits the Pacific context where most of the land is traditionally owned, requiring a participatory approach engaging local communities (Nalau et al. 2018). Ecosystem-based management is holistic, achieving a range of economic, social, and environmental outcomes in a single project. Cost-benefit analysis can also assist in showing the overall benefits of EbA.

EbA can address capacity constraints by employing adaptive management techniques, using scientific knowledge in combination with traditional and local knowledge, and promoting coordination across agencies and between national and local levels. Many ecosystem-based solutions are easily accessible, which increases their likelihood of use and effectiveness.

Ecosystem conservation, restoration, and protection can enhance resilience. The conservation of native island forests, especially mangroves along shorelines, and associated ecosystems is a key natural adaptation strategy and mitigation measure (Daigneault et al. 2016). Lagoon and freshwater quality benefit from sustainable, ecosystem-based approaches and can be threatened by 'grey' or hardscaping measures, such as seawalls. For example, seawalls support lower biodiversity than natural shorelines (Lai et al. 2018).

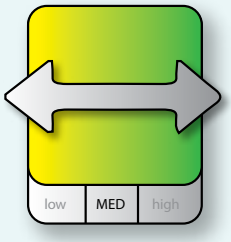
Incorporating ecosystem-based management and adaptation into disaster risk management and the design of disaster responses should lead to more environmentally, socially, and economically appropriate portfolios of disaster risk management and adaptation options.

[1] Lowy Institute Pacific Aid Map: https://pacificaidmap.lowyinstitute.org/database

THEME **Atmosphere and Climate**

INDICATOR **Trend in greenhouse gas emissions**

DEFINITION	Trend of nationally determined contribution
PURPOSE	Greenhouse gas emissions are the primary cause of global warming. Countries have committed to reduce GHG emissions in ratifying UNFCCC and the Paris Agreement.
DESIRED OUTCOME	Negative trend in GHG emissions



Status
Fair to good

Trend
Stable

Data confidence
Medium


Dead forest on disappearing island, Solomon Islands © Stuart Chape

PRESENT STATUS

A nationally determined contribution (NDC) outlines a country's post-2020 plan to reduce national greenhouse gas (GHG) emissions and voluntarily to show how it will adapt to the impacts of climate change. NDCs are a requirement of the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC). Each Pacific island country reports their National Communication to the UNFCCC and NDC to the Paris Agreement (see Regional Indicator: MEA reporting requirements). In 2016, Papua New Guinea was the first country in the world to formally submit its NDC. RMI was the first to submit an updated and upwardly revised NDC in 2019, and all Pacific island countries are expected to complete this process in 2020.

This regional indicator is defined according to the NDC. The primary focus of much climate action is carbon dioxide (CO_2) emissions, but the larger goal is to decrease all direct and indirect greenhouse gas emissions including, among others: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases including hydrofluorocarbons (HFCs).

Pacific island countries are managing and reducing the release of HFCs (see Regional Indicator: Ozone depleting substances). Nitrous oxide from unsustainable livestock management and unsustainable agricultural soil practices is of relatively low concern in the Pacific islands, with few countries having dense, feedlot-style livestock. Globally, human-caused release of excess nitrous oxide has been increasing, at a faster rate since 2009, primarily due to nitrogen fertilizers (Thompson et al. 2019).

Methane is of greater concern, particularly as a large amount of food and green waste enters landfills (see Table 5 of the *Cleaner Pacific 2025*, SPREP 2016). Globally, the anthropogenic outputs of methane are increasing, driven by agriculture and the fossil fuel industry which each account for nearly a quarter of methane emissions (Schiermeier 2020 and references therein). In the Pacific, the primary sources of excess methane are sewage and domesticated animal waste, such as piggeries, as well as food and green waste in landfills or other treatments.

The Pacific island countries accounted for less than 0.2% of the world total anthropogenic carbon emissions in 2016, the most recent year with complete data (WRI 2020).[2] Broadly speaking, emissions have remained roughly stable for most Pacific countries in the past decade (Figure 23.2). National emissions measurement and reporting has been improving.

The Pacific island countries are committed to strengthening their NDC targets and to strengthening national mitigation and adaptation efforts using national action plans.

PRESSURES AND OPPORTUNITIES

Net greenhouse gas emissions are closely linked to development decisions and societal affluence as well as to the presence and health of natural ecosystems. Pacific ecosystems, particularly forests and soil systems under wetlands like mangroves and seagrass beds, capture and store carbon while providing other essential ecosystem services. With governance over 20% of the ocean within national exclusive economic zones, Pacific island countries have a great opportunity to monitor and support ocean carbon uptake.

Conversely, the destruction of natural ecosystems can release stored carbon and prevent the capture and storage of carbon from natural processes. The primary sectors considered by most countries in national greenhouse gas accounting are the energy, waste, and agriculture (livestock) sectors. From the perspective of releasing greenhouse gases or losing natural sinks of greenhouse gases, the sector managing land use and development can also be an important partner in the effort to maintain greenhouse gas-sequestering ecosystems. Globally, the energy sector is the

[2] World Resources Institute's CAIT Climate Data Explorer, Climate Watch; see https://www.climatewatchdata.org/

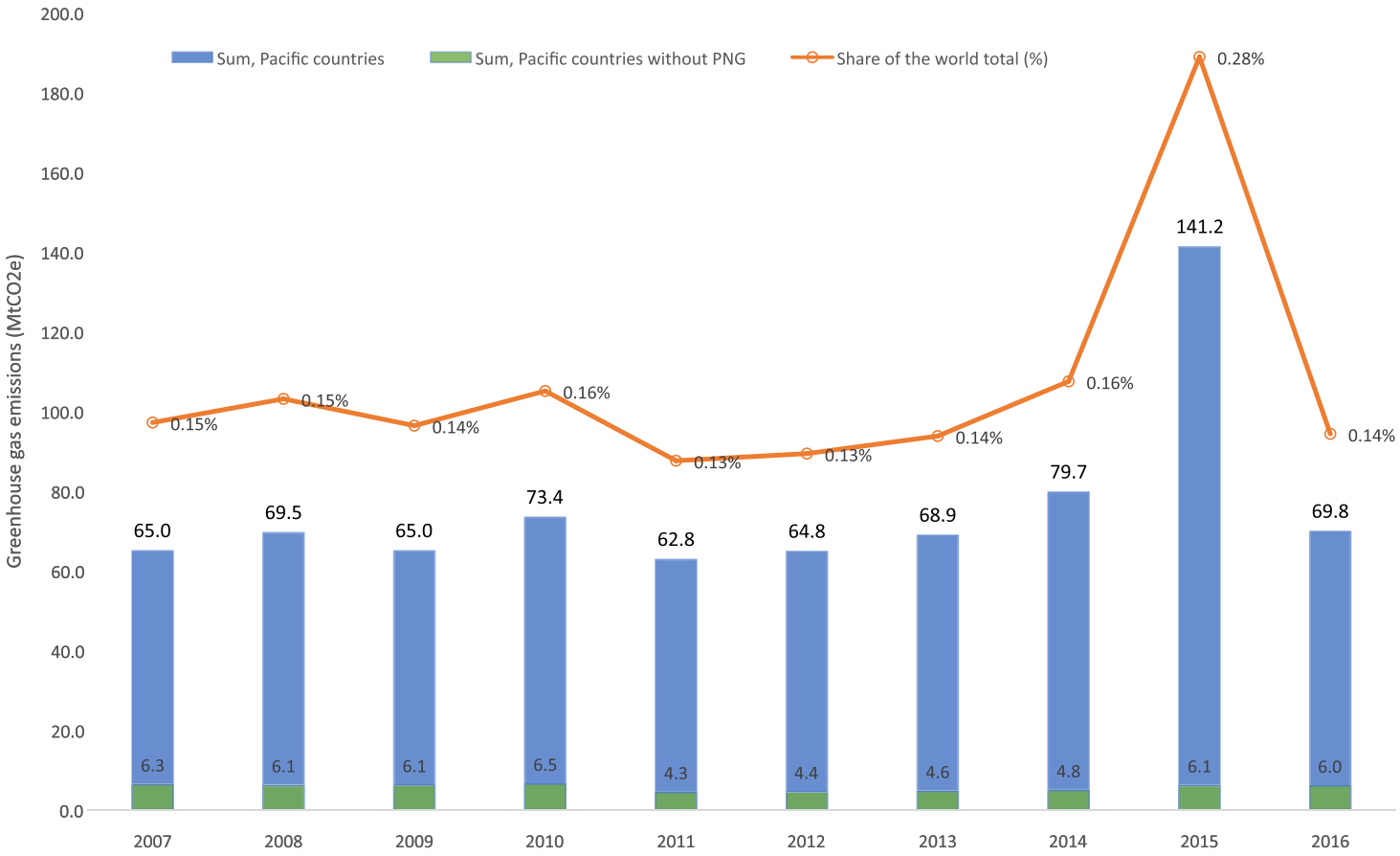


FIGURE 23.2: Total greenhouse gas emissions from the 14 Pacific island countries, as a regional sum and share of the global total, from 2007 to 2016. Data are presented for the sum of all Pacific island countries with and without Papua New Guinea (PNG). The spike in 2015 is related to a spike in emissions from land use change and forestry in PNG. $MtCO_2e$: million tonnes of carbon dioxide equivalent. Source: Climate Data Explorer, World Resources Institute (accessed August 2020)

largest contributor to greenhouse gas emissions but land-use change is ranked second, causing 23% of greenhouse gas emissions (IPCC 2019).

Transport, forestry, fisheries, and other priority sectors in the Pacific are important sources or opportunities for reductions of greenhouse gas emissions. Pacific efforts to transition to renewable energy are important for reducing emissions (see above). Most Pacific countries are seeking to incorporate data from more sectors in their updated NDC.

GHG emissions from shipping are a priority for import-dependent Pacific islands. In 2018, the International Maritime Organisation adopted an initial strategy on the reduction of GHG emissions from ships. International shipping produced about 2% of global anthropogenic CO_2 emissions in 2012 and those emissions could grow by 50% to 250% by 2050 without action (IMO 2018). Global fishing-related vessel emissions increased by 17% from 2013 to 2015, although outranked by international shipping which accounted for about 87% of total CO_2 emissions from ships (ICCT 2017).

The COVID-19 pandemic brought into sharp focus our relationship with nature, the impacts of disturbed ecosystems, and our resilience. There is a fragile but growing push to ensure that post-pandemic recovery plans, at national to global levels, retain and grow commitments to sustainable, resilient actions. In July 2020, the UNFCCC Secretariat and the Global Commission on Adaptation released a *Call to Action for a Climate-Resilient Recovery from COVID-19*. At the peak of shutdowns, emissions did drop, but scientists have shown that the pandemic changes alone will have a negligible impact on climate change; instead, shifts in the energy sector and green recovery efforts could reduce future warming (Forster et al. 2020).

In their NDCs, Pacific island countries are seeking to actively reduce their future emissions as total values, despite their negligible contribution to global emissions. Using the classic model of societal impact on the environment as Impact = function of (Population, Affluence, and Technology), researchers have argued that managing resources and pollution more effectively lower impact and are preferable to attempting to alter population, consumption, and technology changes piecemeal (Alcott 2010). By setting emissions targets, Pacific leaders seek a low-carbon future regardless of population growth and development. Achieving these targets will require holistic management that treats people and nature as allies.

REGIONAL ACTION IS UNDERWAY

Pacific Nationally Determined Contributions Hub (NDC Hub) was launched in 2017 and officially opened in 2020. The Pacific NDC hub is tasked to build upon existing partnerships and mechanisms to facilitate NDC implementation roadmaps, NDC investment plans, and core monitoring to assess progress towards NDCs. For more information and to read each country's INDC, see https://www.pacificclimatechange.net/project/regional-pacific-ndc-hub

To date, seven Pacific island countries (Federated States of Micronesia, Fiji, Nauru, Papua New Guinea, Republic of the Marshall Islands, Tonga, and Vanuatu) are also members of the global NDC Partnership. Support to countries to prepare national assessments and implement NDCs is available through multiple mechanisms, including the NDC Support Facility managed by the World Bank Group. Collaboration and support are considered essential to meet Pacific goals for climate resilience, including ecosystem-based adaptation (see above).

As of 2019, the existing NDCs around the world were insufficient to attain global climate targets and instead would lead to an approximately 10% increase in emissions by 2030 relative to 2016 levels (UNDP & UNFCCC 2019). In September 2019, Pacific island countries announced their intentions to enhance their national goals in their revised NDC commitments (post-2020). Fiji, Marshall Islands, Vanuatu and others pledged net-zero emissions by 2050 (*Uniting Behind the Science to Step up Ambition by 2020*). Papua New Guinea set out a target of carbon neutrality by 2050 in its NDC (2016).

National capacity to assess and monitor emissions is a focal area for Pacific research. Tokelau completed its first inventory of GHG in 2018, covering the period 1990 to 2017.[3] See Figure 23.3 and Table 23.1 for emissions data.

Actions in the energy sector are a primary focus for Pacific countries. In its NDC, Fiji is pursuing an economy-wide indicative reduction of 10% carbon dioxide emissions from energy efficiency improvements. Collectively, these measures will reduce the Fijian energy sector's total carbon dioxide emissions by around 30% by 2030. The government of Kiribati has committed to reducing the country's GHG emissions by 48.8% and fossil fuel consumption by 45% in South Tarawa and 60% on Kiritimati Island by 2025, in the *Kiribati Integrated Energy Roadmap 2016 to 2025* (World Bank 2019).

REGIONAL RESPONSE RECOMMENDATIONS

All UNFCCC Parties are requested to submit the next round of NDCs (new or updated) by 2020 and every five years thereafter (for example, by 2025 and 2030), regardless of their respective implementation time frames. Starting in 2023 and then every five years, all parties will take stock of the implementation of the Paris Agreement to assess the collective progress towards achieving the purpose of the Agreement and its long-term goals. Pacific reporting will feed into this global process.

To advance and monitor progress towards their climate goals, while achieving international visibility, Pacific countries should:

- continue to measure and monitor national emissions over time, building national capacity to assess all relevant greenhouse gases in the prioritised sectors and to pursue analyses of ecosystem carbon balances;
- conserve and restore carbon-capturing ecosystems, with particular attention to forests and wetlands, such as seagrasses, mangroves, and salt marshes;
- strengthen waste management measures to reduce methane emissions;
- plan for low-carbon development;
- strengthen mitigation measures, such as building on efforts to transition to renewable energy and restoring carbon-storing ecosystems; and
- partner for sustainable financing systems to support low-carbon development.

In the face of continued greenhouse gas emissions and climate change, the effort and funding required to mitigate and adapt to changing conditions grows. Part of ensuring that available funds are 'adequate' for sustainable, resilient islands is taking a harmonized management approach to control the future requirements for adaptation and mitigation efforts (see 'Climate preparedness'). To monitor progress towards the selected regional indicators, countries should:

- identify funding directed toward climate change and specifically toward EbA, tracking national and project funds and distinguishing grants versus loans;
- measure total spending on adaptation and environmental management, including EbA, to allow for cost comparison and assessment of management actions;
- plan for ecosystem-based approaches, ideally using fair and participatory planning; and
- partner for sustainable financing systems.

[3] Source: Tokelau's national presentation at the Pacific Islands Renewable Energy Statistics Workshop, Nadi, Fiji, 22–24 October 2019

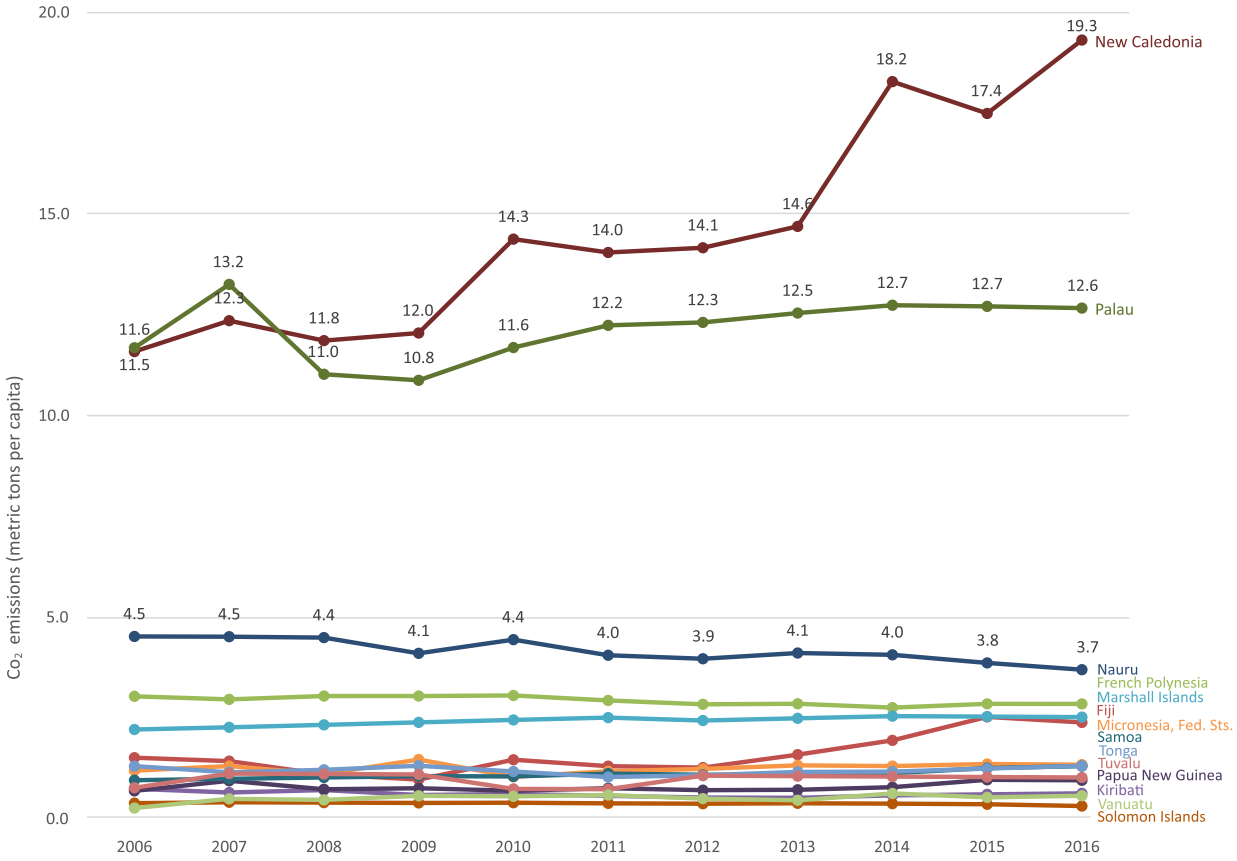


FIGURE 23.3: Pacific carbon dioxide emissions relative to population (metric tons of emitted CO_2 per capita), 2006–2016. Note that the methodology used for the carbon emissions reported by the World Bank differs slightly from the CAIT, and therefore the values might differ slightly from the CAIT data although the trends and relationships among the countries and territories remain the same. Population and population density differs strongly across the region, with Papua New Guinea accounting for 78% of the regional population among Pacific island countries (72% of the regional population combining countries and territories); see Table i.1 for country characteristics. Data are not available for American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands. Source: World Bank's World Development Indicators, August 2020

TABLE 23.1: Pacific greenhouse gas emissions in the most recent year with complete data for all emission types. Values are presented in thousand metric tons of CO_2 equivalent. Source: World Bank's World Development Indicators, August 2020

	CO_2 EMISSIONS (KT)		METHANE EMISSIONS	NITROUS OXIDE EMISSIONS	OTHER GREENHOUSE GAS EMISSIONS, HFC, PFC AND SF6	TOTAL GREENHOUSE GAS EMISSIONS
	2012	2016	2012	2012	2012	2012
American Samoa	–	–	13.1	23.7	7.11 x 10-15	58.8
Fiji	1059.8	2046.2	714.6	343.8	-97.0	2258.2
French Polynesia	751.7	770.1	99.1	37.4	–	–
Guam	–	–	71.5	1.7	-8.44 x 10-15	85.9
Kiribati	51.3	66.0	16.3	4.0	–	–
Marshall Islands (RMI)	135.7	143.0	7.9	0.1	–	–
Micronesia, Fed. States	124.7	143.0	30.4	11.1	–	–
Nauru	40.3	47.7	3.2	0.2	–	–
New Caledonia	3656.0	5328.2	214.7	98.2	–	–
Northern Mariana Islands	–	–	12.4	0.1	–	12.5
Palau	216.4	223.7	1.4	0.0	–	–
Papua New Guinea	5078.8	7535.7	2142.9	1234.1	805.7	11087.5
Samoa	198.0	245.7	132.9	40.3	54.8	356.1
Solomon Islands	183.4	168.7	1449.2	2656.0	228.5	4591.5
Tonga	106.3	128.3	61.4	22.2	–	–
Tuvalu	11.0	11.0	3.4	1.3	2.89 x 10-15	5.2
Vanuatu	113.7	146.7	254.2	108.7	-20.5	446.2

INDICATOR IN ACTION

SDG 9.4.1, 11.b, 13.1, 13.2, 13.b, 14.2, 14.3 • UNFCCC Paris Agreement • Convention on Biological Diversity • MARPOL Annex VI (shipping) • SAMOA Pathway • Framework for Resilient Development in the Pacific • Noumea Convention • Pacific Regional Environment Objectives 1.1, 1.4 • Pacific Islands Framework for Nature Conservation Objectives 2, 5, 6

FOR MORE INFORMATION

Networks: Friends of Ecosystem-based Adaptation (FEBA), supported by IUCN; The Global Adaptation Network, supported by UNEP.

For more about the Pacific NDC Hub, see Project Brief: Establishment of a Regional Pacific NDC Hub

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SPREP PROE

The Secretariat of the Pacific Regional Environment Programme (SPREP) supports 14 countries and 7 territories in the Pacific to better manage the environment. SPREP member countries and members of the Pacific Roundtable on Nature Conservation (PIRT) have contributed valuable input to the production of this indicator. www.sprep.org

National and regional environment datasets supporting the analysis above can be accessed through the Pacific Environment Portal. pacific-data.sprep.org

For protected areas information, please see the Pacific Islands Protected Area Portal. pipap.sprep.org

TABLE 23.A: PACIFIC ISLANDS PROJECTS UNDER THE GREEN CLIMATE FUND

GCF funding noted; in many projects, additional co-financing has been committed.

	PROJECT	YEAR APPROVED	COUNTRY	PROJECT TITLE	GRANT FUNDING (TOTAL PROJECT FUNDING)
Adaptation	FP008	2015	Fiji	Fiji Urban Water Supply and Wastewater Management Project	USD 31 million grant (USD 405.1 million total)
	FP 015	2016	Tuvalu	Tuvalu Coastal Adaptation Project	USD 36 million grant (USD 38.9 million total)
	FP035	2016	Vanuatu	Climate Information Services for Resilient Development in Vanuatu	USD 18.1 million grant (USD 21.8 million total)
	FP036	2016	Pacific islands (Cook Islands, RMI, FSM, Nauru, PNG, Samoa, Tonga)	Pacific Islands Renewable Energy Investment Program	USD 17 million grant (USD 26 million total)
	FP037	2016	Samoa	Integrated Flood Management to Enhance Climate Resilience of the Vaisigano River Catchment in Samoa	USD 57.7 million grant (USD 65.7 million total)
	FP044	2017	Solomon Islands	Tina River Hydropower Development Project	USD 16 million grant, USD 70 million loan from GCF (USD 234 million total)
	FP066	2018	Republic of the Marshall Islands	Pacific Resilience Project Phase II for the Republic of the Marshall Islands	USD 25 million grant (USD 44.1 million total)
	FP090	2018	Tonga	Tonga Renewable Energy Project under the Pacific Islands Renewable Energy Investment Program	USD 29.9 million grant (USD 53.2 million total)
	FP112	2019	Republic of the Marshall Islands	Addressing climate vulnerability in the water sector (ACWA) in the Marshall Islands	USD 18.6 million grant (USD 24.7 million total)
Mitigation	SAP016	2020	Fiji	Fiji Agrophotovoltaic Project in Ovalau	USD 1.1 million grant (USD 10 million total)
Cross-cutting	FP091	2018	Kiribati	South Tarawa Water Supply Project	USD 28.6 million grant (USD 58.1 million total)
	FP052	2017	Nauru	Sustainable and Climate Resilient Connectivity for Nauru	USD 26.9 million grant (USD 65.2 million total)

Source: Green Climate Fund project list (accessed September 2020)

TABLE 23.B: OVERVIEW OF ECOSYSTEM-BASED ADAPTATION (EBA) PROJECTS IN THE PACIFIC REGION

Criteria for projects included here:

- Project end date must not be before 2015.
- Total project value must be greater than USD 1 million.
- EbA is a significant focus of the project (as specified by being included in the title, summary text, major activities, or budget lines).
- Estimated value of the EbA component is greater than USD 250,000 (where estimation is possible).
- 'Participating countries' should only be those where EbA activities occur(ed). For example, if Kiribati was part of a USD 5 million project with a strong EbA focus but in the case of Kiribati all project activities were for hard infrastructure, then Kiribati is not be listed here.

Efforts are summarized by project or investment (Table 23.B.1) and by country (Table 23.B.2).

This table is intended as an overview of major known projects, as of March 2020. This information is not to be considered comprehensive of all EbA efforts in the Pacific region. For more information, please contact sprep@sprep.org with attention to Herman Timmermans, Filomena Nelson, and Espen Ronneberg.

TABLE 23.B.1: Overview of Pacific ecosystem-based adaptation efforts by project/investment.

PROJECT NAME	FUNDER	VALUE	START YEAR	END YEAR	PARTICIPATING COUNTRIES	KEY EBA ACTIVITIES (SUCH AS MANGROVE RESTORATION, REEF RESTORATION, IMPROVED FOREST MANAGEMENT, TRAINING, ETC.)
Pacific Adaptation to Climate Change (PACC) Project	Global Environment Facility (GEF)/ UNDP/Australia	GEF USD 13.2 million AusAID USD 7.6 million	2009	2015	Fiji, Marshall Islands, Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu, and Tokelau	Riparian rehabilitation, mangrove planting, flood control using vegetation, rainwater harvesting for food security, agricultural rehabilitation, composting toilets
Coping with Climate Change in the Pacific Region [CCCPIR] Project	Deutsche Gesellschaft fur Internationale Zussamenarbeit GmbH [GIZ]	€19.2 million	2009	2015	Federated States of Micronesia, Kiribati Marshall Islands, Nauru, Palau, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu	Addressing climate change affects across key economic sectors such as agriculture, forestry, fisheries and tourism
GCCA: PSIS (Pacific Small Island States) Project	EU/SPC	€500,000 per country	2012	2015	Tonga	Designing, building and monitoring the success of 'hard' and 'soft' engineering measures working in combination along two coastal stretches including beach replenishment and coastal mangrove planting
Adapting to Climate Change and Sustainable Energy (ACSE) Project	EU/GIZ	€550,000	2016	2018	Tonga	Trialing of 'Hard' and 'Soft' coastal protection measures in 6 villages in Western Tongatapu, including mangrove rehabilitation
PacSIDS Ridge to Reef (R2R) Project	GEF/UNDP	USD 83 million	2014	2017	Cook Islands, FSM, Fiji, Kiribati, Nauru, Niue, Palau, Tonga, Papua New Guinea, Republic of the Marshall Islands, Solomon Islands, Samoa, Tonga, Tuvalu, Vanuatu	Maintain and enhance Pacific Island countries' ecosystem goods and services through integrated approaches to land, water, forest, biodiversity and coastal resource management that contribute to poverty reduction, sustainable livelihoods and climate resilience
Climate Resilience Sector Project (CRSP)	Asian Development Bank (ADB)	USD 19.25 million	2014	2018	Tonga	Component 4 of the project is 'Ecosystem resilience and climate-resilient infrastructure investments developed through mangrove rehabilitation, establishing communal Special Management Areas (Coastal fisheries)
Pacific Ecosystem-based Adaptation to Climate Change (PEBACC)	German Federal Ministry of Housing, Nature Conservation and Nuclear Safety (BMU)	€5 million	2015	2020	Governments of Fiji, Vanuatu and Solomon Islands. Various donor, civil society, technical and community organisations.	Ecosystem and Socio-Economic Resilience Analysis and Mapping (ESRAM) conceptual approach. EbA demonstration projects – reforestation, agroforestry, community-conservation areas
EU-funded Intra-ACP GCCA+ Pacific Adaptation to Climate Change and Resilience Building (PACRES)	EU	€12 million shared among partners (SPREP, PIFS, SPC and USP) (EbA investment up to €1 million)	2018	2023	Papua New Guinea, Samoa, Solomon Islands, Vanuatu for EbA activities. All 15 Pacific-ACP countries participating in PACRES.	Mangrove restoration and rehabilitation, riparian zone restoration, watershed restoration, agroforestry, urban greening and climate ready cropping
By-catch and Integrated Ecosystem Management Initiative – KRA5 of the Pacific-European Union Marine Programme	EU and Swedish Government	€6.2 million	2020	2022	Governments of Fiji and Vanuatu. Various civil society, technical and community organisations	Integrated ecosystem management plans for selected coastal areas and associated watersheds. BIORAP and participatory planning using the Ecosystem and Socio-Economic Resilience Analysis and Mapping (ESRAM) conceptual approach

PROJECT NAME	FUNDER	VALUE	START YEAR	END YEAR	PARTICIPATING COUNTRIES	KEY EBA ACTIVITIES (SUCH AS MANGROVE RESTORATION, REEF RESTORATION, IMPROVED FOREST MANAGEMENT, TRAINING, ETC.)
Blue Carbon Ecosystems	German Federal Ministry of Housing, Nature Conservation and Nuclear Safety (BMU) with GIZ and SPC as partners	€9 million	2020	2023	Fiji, Vanuatu, Solomon Islands, PNG	Assessment, valuation, conservation and management of mangrove and seagrass ecosystems in Melanesia
Restoration of ecosystem services and adaptation to climate change (RESCCUE)	French Development Agency (AFD) and the French Global Environment Facility (FFEM)	€13 million	2015	2018	Fiji, French Polynesia, New Caledonia and Vanuatu	Strengthening integrated coastal management, ecological restoration and erosion control, community conservation areas (terrestrial and marine)
Strengthening Coastal and Marine Resources Management in the Coral Triangle of the Pacific (Phase 2)	GEF/ADB	USD 15 million	2011	2018	Papua New Guinea, Solomon Islands, Timor-Leste	Output (ii): coastal communities experienced in applying best practices in ecosystem-based management and climate change adaptation
Tuvalu Coastal Adaptation Project (TCAP)	GCF	USD 36 million	2018	2024	Tuvalu	Hard engineering is the focus of the project, however there is also emphasis on ecosystem-based adaptation for coastal protection where appropriate. E.g. coastal revegetation, ridge and dune restoration, coral transplantation or seagrass plantation
Readiness for El Nino project	EU/SPC	€4.5 million	2017	2020	Marshall Islands	Improve soil management practices, establish nurseries, expand the use of drought resistant crop varieties
Mangrove Rehabilitation for Sustainably Managed Healthy Forests (MARSH)	USAID	USD 7.5 million	2012	2017	Papua New Guinea	Mangrove Vulnerability Assessment, mangrove rehabilitation and restoration and mangrove management
Kiribati: Enhancing national food security in the context of global climate change	GEF/LDCF	USD 11.5 million	2015	2020	Kiribati	Coral reef restoration, coastal revegetation to prevent erosion and protect reefs from siltation, improving land and lagoon resources management planning
Enhancing adaptive capacity of communities to climate change related floods in the North Coast and Islands Region of Papua New Guinea	The Adaptation Fund	USD 5 million	2012	2016	Papua New Guinea	Integrated riverbank protection measures to prevent inland flooding, mangrove restoration and conservation to protect against coastal flooding

TABLE 23.B.2: Overview of Pacific ecosystem-based adaptation efforts by country.

Notes: For acronyms, see Table 23.B.1. EbA-related projects should only be listed where they (a) meet the criteria for Table 23.1 and (b) involve the implementation of EbA activities in the listed country. Y: yes.

COUNTRY	EBA PROJECTS CURRENTLY ACTIVE? (Y/N)	NUMBER OF EBA PROJECTS SINCE 2015	EBA-RELATED PROJECTS (LIST)	KEY EBA ACTIVITIES IMPLEMENTED (E.G. MANGROVE RESTORATION, REEF RESTORATION, IMPROVED FOREST MANAGEMENT, TRAINING, ETC.)
Cook Islands	Y	1	R2R	
Federated States of Micronesia	Y	2	CCCPIR, R2R	CCCPIR: Community fisheries management plans and community FAD construction/training R2R: Integrated ecosystems management plans, management and rehabilitation of critical ecosystems (watershed restoration), sustainable land management
Fiji	Y	5	PACC, PEBACC, Blue Carbon Ecosystems, RESCCUE, R2R	Riparian restoration in Rewa river for flood control RESCCUE: Integrated coastal management plan in Kadavu and Ra, ecological restoration and erosion control, community conservation areas (terrestrial and marine)
Kiribati	Y	3	CCCPIR, R2R, Food Security	
Republic of the Marshall Islands	Y	4	PACC, CCCPIR, R2R, Readiness for El Niño	
Nauru	Y	3	PACC, CCCPIR, R2R	
Niue	Y	2	PACC, R2R	PACC: Rainwater harvesting (hard measure) also for irrigation for food security
Palau	Y	3	PACC, CCCPIR, R2R	Mangrove replanting and flood control through vegetation – secured taro plantations and reintroduced mudcrabs
Papua New Guinea	Y	7	PACC, CCCPRI, R2R, MARSH, Enhancing Adaptive Capacity…to Floods, Strengthening Coastal and Marine Resource Management, PACRES	Agriculture diversification for food security. Mangrove rehabilitation and climate-ready cropping
Samoa	Y	3	PACC, R2R, PACRES	Watershed restoration, agroforestry and climate-ready cropping
Solomon Islands	Y	7	PACC, CCCPIR, PACRES, PEBACC, Blue Carbon Ecosystems, R2R, Strengthening Coastal and Marine Resource Management	Mangrove and riparian zone restoration and urban greening
Tonga	Y	6	PACC, CCCPIR, GCCA:PSIS, ACSE, R2R, CRSP	Mangrove replanting
Tokelau	Y	1	PACC	
Tuvalu	Y	3	PACC, TCAP, CCCPIR	Composting toilets for water conservation and producing compost for food security Hard and soft coastal protection. Soft including dune restoration, coastal revegetation, reef restoration
Vanuatu	Y	8	PACRES, PACC, CCCPIR, R2R, PEBACC, By-catch and Integrated Ecosystem Management Initiative, RESCCUE, Blue Carbon Ecosystems	Mangrove and riparian zone restoration and watershed restoration