REVIEW OF NATURE-BASED SOLUTIONS IN THE PACIFIC REGION: FOCUS AND OPPORTUNITIES

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1 Executive Summary

This report summarises the findings of a scoping review of nature-based solutions (NbS) in the Pacific region, commissioned by the Climate Resilient by Nature (CRxN) program. The focus was initially on nine representative Pacific Island Countries and Territories (PICT) but broadened as regional and multi-country initiatives were identified. The review consisted of multiple workshops, interviews and a literature review, with a total of 96 NbS projects identified as recently completed (since 2019) or currently underway in the Pacific region.

The scoping review provided an understanding of the NbS focus on the Pacific region and facilitated increased linkages with existing NbS regional initiatives. It also identified the gaps, successes and lessons learnt from recent and current NbS projects in the Pacific and used these to highlight opportunities for future investment and programs.

The review found that the global definition and standards work being undertaken by IUCN is a key reference, with all organisations who use a standard definition deferring to the IUCN global definition. The Kiwa initiative and Promoting Pacific Island Nature-based Solutions (PPIN) program are two key current programs that will continue to shape the application of and investment in NbS in the Pacific.

Several themes emerged around the unique features of NbS in the Pacific, including high vulnerability to climate change, dependence on and connection with marine environments (large ocean states), strong community governance, traditional knowledge and community-based approaches, unique customary land tenure and resource rights, remoteness and challenges of geography, and limited capacity of governments.

A geographic gap was identified in the number of NbS projects in Micronesia compared to other cultural sub-regions, with the greatest project numbers and investment focus in Melanesia. Fisheries, terrestrial ecosystems, agriculture and forestry had the strongest focus in projects, often within the context of climate adaptation.

Projects founded in community-based approaches that incorporate traditional knowledge from the start of the project were frequently mentioned as key approaches that led to NbS project success. Conversely, funding conditions are seen to be creating a number of barriers by: (1) being risk adverse, (2) generally only supporting short-time frames that are insufficient in the context of community-based management, and (3) not allowing sufficient time or funding for comprehensive community engagement and incorporation of traditional knowledge. The capacity of governments, in-country technical specialists and CSOs was also highlighted as a key barrier to success, with sub-conscious bias in project design also potentially contributing to geographic gaps. Other barriers that were identified include the logistics and costs of accessing remote areas and the lack of coordination of NbS projects and priorities between donors and with governments.

Opportunities exist to leverage improved NbS outcomes in the Pacific by increasing the coordination between donors, organizations and governments. And ensuring there is a wholistic, consistent and considered approach in the design phase and throughout project, particularly with regard to the incorporation of traditional knowledge and community co-implementation.

2 Introduction

In 2021, the Australian Government Department of Foreign Affairs and Trade (DFAT) partnered with WWF-Australia on the Climate Resilient by Nature (CRxN) program. The program aims to support communities in the Indo-Pacific to work with nature to tackle climate change. Divided broadly into 3 initiatives, CRxN has Nature-based Solutions (NbS) at the core of its approach (Figure 1).

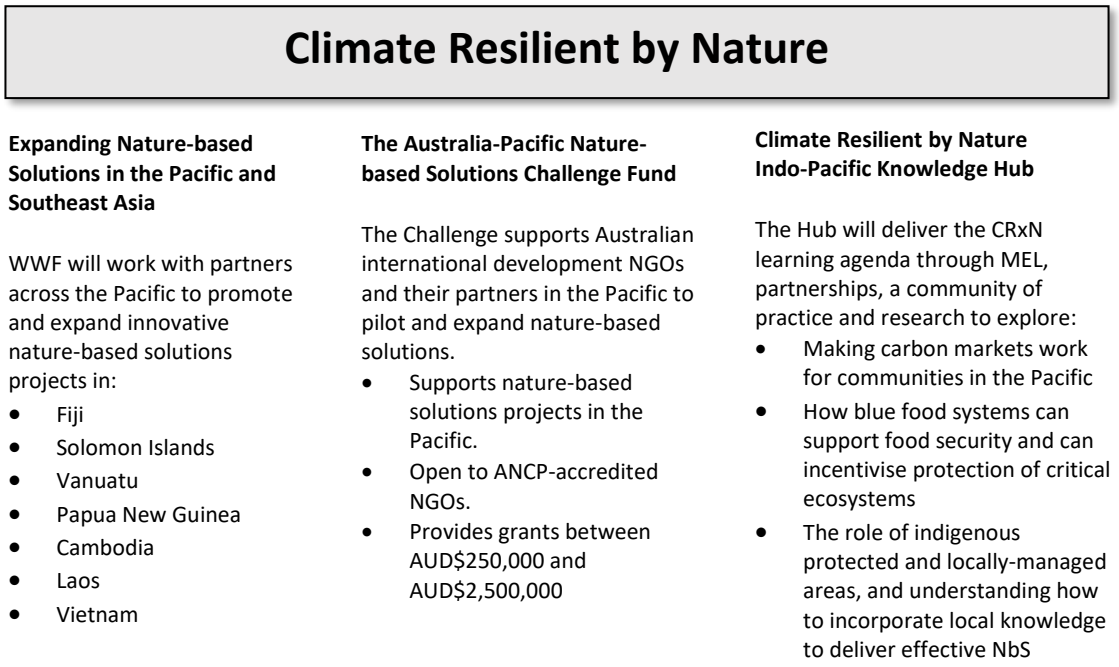

Figure 1: CRxN initiatives and proposed activities

Investment in NbS has been ongoing for decades in the Pacific region, through an evolution from ecosystem-based management and ecosystem goods and services projects. Within this context of existing investment in NbS in the Pacific region, there are opportunities for international development organisations to support strategic planning and coordination, target funding to priority areas, and contribute to sector knowledge gaps. This report summarises the findings of a high-level scoping review to understand the current focus of NbS in the Pacific region, identify gaps and opportunities to engage in this space without duplicating work, and to maximise opportunities for potential future investment and collaborations.

3 Review approach

This review builds on earlier initiatives that informed investment in Nature-based Solutions in the Pacific. In 2019, a review was undertaken to support the New Zealand Ministry of Foreign Affairs and Trade (MFAT) to develop an investment program on resilient ecosystems as part of the Pacific Climate Change Development Program (NIWA 2019). The review report included an assessment and gap analysis of current ecosystem-based interventions underway in the region. This review should be considered a companion report to the NIWA (2019) report, as it builds on the findings and considers relevant initiatives since 2019. Where possible, complementary approaches to classification and identifying gaps were used to enable direct comparison of results (see Appendix A for detailed methods).

The objectives of this scoping review were to:

- provide an understanding of the NbS focus in the Pacific region (including key agencies involved, types of NbS, status of existing work, and NbS definitions and NbS standards);
- facilitate increased linkages into existing NbS regional initiatives (e.g. definition and contextualising standards process); and
- identify gaps, opportunities and future priorities for NbS in the Pacific region that CRxN and the international development sector more broadly can support.

The review considered the three cultural sub-regions of the Pacific – Melanesia, Micronesia and Polynesia – and initially selected nine representative nations as the focus (Figure 3). Noting that the review was not restricted to these nine nations and eventually considered NbS programs more broadly in the region, including multi-country projects. See Appendix A for further details.

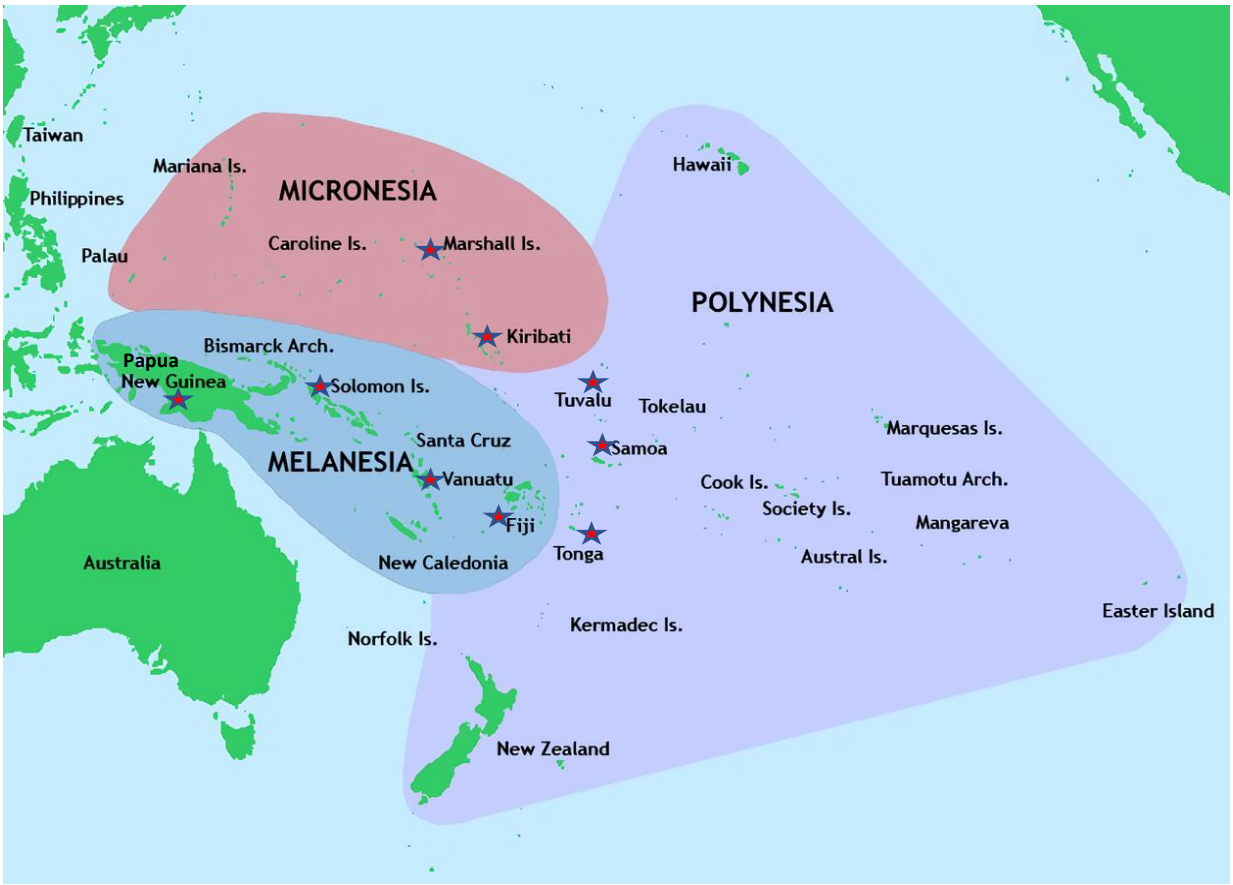

Figure 2. Nine Pacific Island representative countries initially selected for this review. Melanesia – Fiji, Papua New Guinea, Vanuatu, Solomon Islands; Polynesia – Samoa, Tonga, Tuvalu; Micronesia – Kiribati, Marshall Islands.

The scope of the project was adjusted as a result of the preliminary findings from the literature review. The refined scope focuses less on developing an exhaustive list of NbS projects in nine countries (which would have minimal value, given the volume of re-badging and the breadth of activities that are viewed as NbS) to a broader focus. The re-focused review documented current work on the NbS definition, guides and standards being developed specifically for the Pacific region, and existing gaps or opportunities. To achieve this, three datasets were used for the review (Table 1) following the steps outlined in Figure 3.

Table 1: Scoping review datasets used.

Dataset	Collection details	Sample size
Systematic literature review	Systematic search of online literature using defined search terms (see Appendix B) to identify NbS projects in the Pacific. Project details provided as part of the expert elicitation that had not been previously identified were also included.	96 projects
Expert elicitation	Interviews and online survey of regional NbS specialists and practitioners who participated in workshop #2 (see Appendix D for stakeholder list).	13 responses
Expert feedback	Data collected from regional NbS specialists and practitioners who participated in workshop #2 using Mentimeter and breakout sessions (see Appendix D for stakeholder list).	44 participants

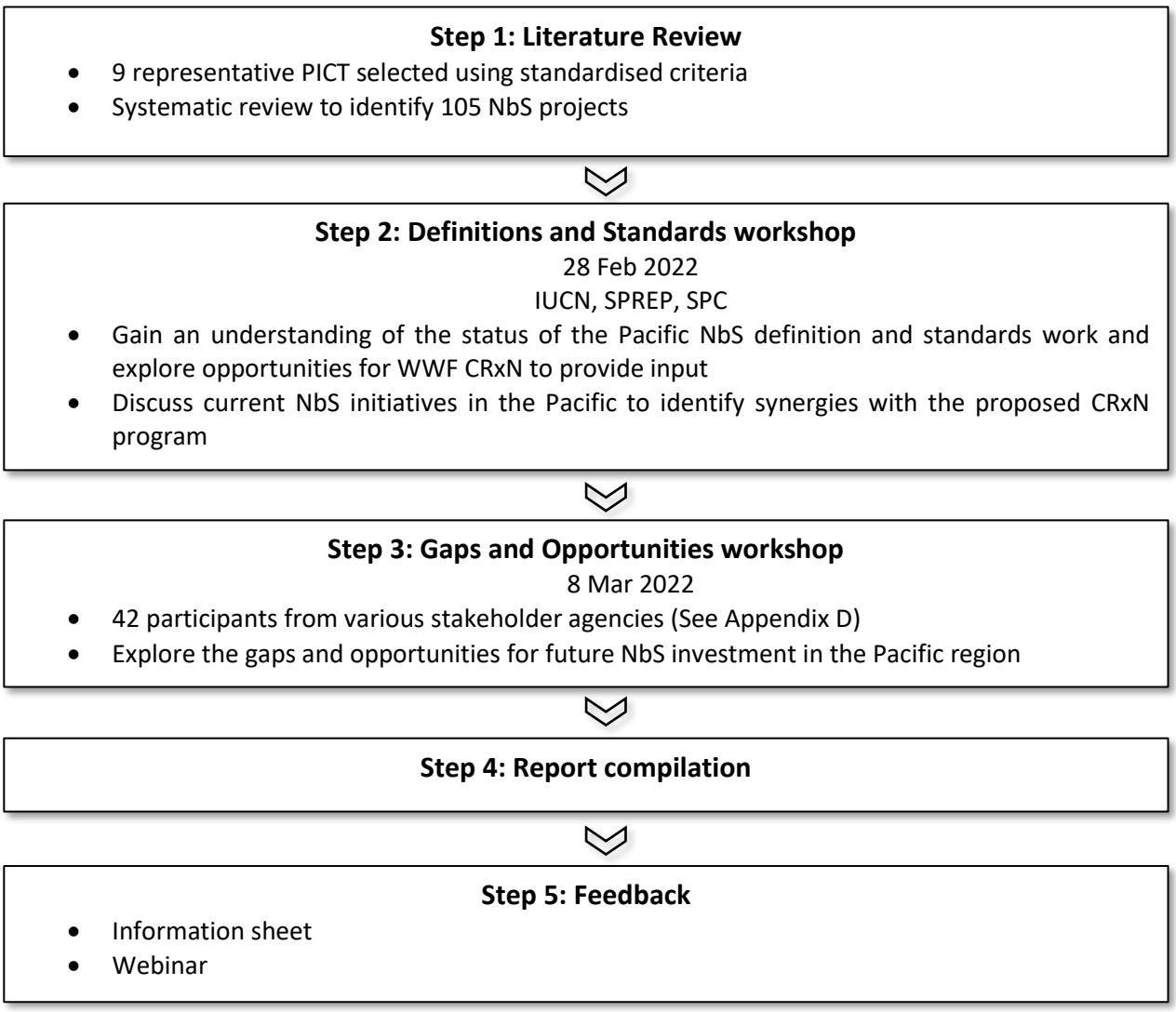

Figure 3: Project steps used for this review and detailed in Appendix A.

The process identified three NbS areas that would benefit from increased attention and engagement from the international development sector:

1. Regional Strategy and Policy
    - Involvement in regional frameworks and policy
    - Standards and guideline development
    - Government frameworks
2. Funding and Investment
    - Geographic and sectoral gaps and opportunities
    - Conditions placed on funding
3. Project design and implementation considerations

The remainder of this report is organized into these three areas with a focus on examining areas of opportunity. The full results of the systemic review are provided in Appendix C, and the stakeholders consulted are provided in Appendix D.

4 Regional Strategy and Policy

4.1 Background

Several organisations are involved in NbS projects in the Pacific, including environmental and humanitarian NGOs and CSOs, Pacific national governments, and regional agencies. Three organisations in particular are leading strategic initiatives: IUCN, SPREP and SPC.

IUCN Oceania plays a strategic role in the Pacific region, including providing direction and leadership on the NbS definition and standards. Although there is no single universally agreed definition of NbS, most definitions have common components relating to benefits to both nature and society with differing degrees of emphasis on aspects, such as traditional knowledge or climate. Globally, the IUCN definition is widely accepted and frequently used (CEO Water Mandate, 2021), including in the Pacific. All organisations who completed the online survey and who apply a definition use the IUCN global definition.

IUCN also launched the NbS Global Standards in 2020 with plans by IUCN Oceania to apply these global standards to the Pacific region. The aim of the global standards is to mainstream NbS into all projects. It is hoped that this will mean that when scoping any project (not just environmental or conservation focussed work) there could be consideration of whether an NbS approach could be taken to achieve the same or better outcomes eg. when proposing to build a seawall could mangrove restoration combined with green infrastructure achieve improved dual environmental and human outcomes. The PPIN project is funded for 4 years. IUCN is also evaluating the feasibility of an NbS certification standard for the Pacific (see https://www.iucn.org/regions/oceania for further details).

The Kiwa initiative aims to strengthen the resilience of PICT ecosystems, economies, and communities by setting up a dedicated one-stop-shop for funding projects that promote NbS. IUCN, SPC and SPREP all play a role in the implementation of Kiwa. IUCN is managing the small to medium grants and providing assistance to project proponents and grantees in accessing and implementing the grants. SPC and SPREP under their technical assistance to the Kiwa Initiative are currently conducting a needs assessment for their joint capacity-building programme, aiming to support PICTs in implementing NbS for climate change adaptation and mainstreaming of NbS into national and local policies and strategies.

The Kiwa initiative is a multi-donor program focused on delivering effective NbS in the Pacific region and aims to build resilience to climate change. The initiative is jointly funded by Australian DFAT, New Zealand MFAT, AFD (France), the Canadian Government and the European Union. The Kiwa initiative commenced in 2020 and is comprised of three components, with a total budget of €41 million:

1. Local projects – small to medium grants of €25,000 to €400,000
2. Large regional grants – €1.5 million to €5 million
3. Technical assistance to support PICT to access large regional grants

4.2 Gaps, Challenges and Barriers

The interviews and 'Gaps and Opportunity' workshop elicited input from a range of NGO and CSO organisations (including IUCN, WWF, SPC, SPREP, Conservation International – see Appendix D for a full list of participants). It identified several gaps, challenges and barriers in the strategy and

policy arena that affect the success of NbS in the Pacific region. Many of those gaps and challenges identified align with those identified by the NIWA review in 2019.

4.2.1 Involvement in regional frameworks

Regional NbS specialists and practitioners who participated in workshops identified a general lack of coordination between NbS investment priorities and projects, presenting a barrier to effective implementation. The high attendance at the workshops to support this review indicates that there is strong interest in and support for a coordinated approach to decision-making and investment in NbS in the Pacific. Organisations reported that projects often overlap in their objectives, with duplication resulting in resource inefficiencies and wasted effort trying to achieve similar outcomes.

As a result of the multiple NbS projects implemented with a lack of cohesion and understanding of the local landscape, 'over-consultation fatigue' is a significant concern that can hinder progress. Workshop participants therefore highlighted the potential value of enhanced collaboration between funding agencies who are investing in multiple NbS initiatives – and capacity building within PICT governments to streamline and optimise project objectives with country needs and avoid unnecessary and repeated engagement.

The large number of both small and large NbS projects identified throughout the Pacific region, as well as the number of regional initiatives intended to deliver strategic NbS, point to the need for greater coordination. The PPIN project was initially devised as a NbS hub with a representative from each NGO and agency to aid coordination of NbS in the region. The role of PPIN has subsequently changed to address policy gaps but there is still an opportunity for the regional initiatives – PPIN, Kiwa and CRxN – to work together to form the basis of a regional NbS coordination hub. This approach would also support, and in turn be more effective, if alignment between key bilateral and multilateral donors was also achieved.

4.2.2 Standards and definitions

It should be noted that as this report was being finalised, the Fifth Session of the United Nations Environment Assembly (UNEA-5-2) adopted on 2 March 2022 a resolution on a multilaterally agreed definition of NbS. It strongly aligns with the IUCN global definition, however this distinct definition may also become increasingly adopted by organisations and countries engaged in NbS in the Pacific.

The IUCN Global NbS Standard[1] aims to facilitate the design, verification and scaling up of Nature-based Solutions. Feedback from regional NbS specialists and practitioners who participated in workshops was varied in terms of the benefit of developing a Pacific-specific NbS standard. Some stakeholders felt that the global standards were sufficient to guide NbS projects and Pacific standards would not add any value given the level of diversity between countries and within countries. The diversity of Pacific nations needs to be recognised also in the strategic frameworks supporting the implementation of NbS. The Pacific is an extremely diverse region culturally, socially, ecologically, and economically. However, it is often grouped into a single location or category when implementing projects. Some generalities can be drawn, but it is important that projects do not attempt to implement a one-size-fits-all approach at a Pacific scale. For example,

[1] https://www.iucn.org/theme/nature-based-solutions/resources/iucn-global-standard-nbs

a women-led project in a matrilineal society such as the Marshall Islands will encounter a different level of success if implemented the same way in a largely patriarchal society, such as Vanuatu.

Ensuring that NbS is considered holistically across sectors and activity types was highlighted in both the interviews and survey for the expert elicitation. Specialists and practitioners believe that NbS has historically been considered an approach for conservation focused projects. The IUCN standards encourage projects outside of the environmental sector to adopt NbS solutions and include professionals from social scientists to engineers and economists to ensure a comprehensive and sustainable approach. This way of viewing NbS is re-enforced by the IUCN approach to the NbS Standards and as applied by some PICT who are reallocating responsibility for NbS from environment and climate ministries into infrastructure or development ministries. There is a need to shift the focus of capacity building and support for government into finance, energy, and infrastructure ministries and move the narrative away from a purely "green concept" to a development or sustainability concept.

4.2.3 Support development of government frameworks

Feedback spoke to national level government policies which often did not support or enable effective community level implementation of NbS. In some instances, this was due to countries adopting national policy approaches that had not been tailored specifically to the PICT. Lack of consistent policy in the NbS space was identified as a key barrier by the NIWA (2019) review. IUCN and MFAT conducted regional consultation on the draft PPIN design in late 2021 with this gap a key focus, and the final design (subject to MFAT approval) is expected to address this policy need.

The three main outcomes for PPIN align closely with the findings of this report and include a need for:

- Nature-based Solutions regional frameworks, law and policy (including economic),
- key stakeholder knowledge, and,
- applying NbS approaches consistently (focused on increased awareness through existing platforms and 'communities of practice').

The IUCN MACBIO project[2] (2013–2018) was highlighted by workshop participants as a good example of a 'fit for purpose' policy framework. The primary strength of this project was the level of in-country consultation undertaken during development to ensure the focus was context specific and met local needs. The project supported Fiji, Kiribati, Solomon Islands, Tonga and Vanuatu to meet their national biodiversity targets as set out in their National Biodiversity Strategies and Action Plans (NBSAP), the 2011–2020 Strategic Plan of the Conservation of Biodiversity (CBD), relevant global Sustainable Development Goals, and the Pacific Oceanscape Framework. To achieve this, the project focused on strengthening institutional and individual capacity to manage and conserve biodiversity in marine and coastal ecosystems, and supported sustainable economies and livelihoods of Pacific Island countries.

The Kiwa feasibility study identified that a disproportionate amount of NbS funding went to Melanesian nations. Early attempts to increase funding to Polynesia and Micronesia identified a need to build CSO capacity in these cultural sub-regions to meet donor requirements. Specialists

[2] http://macbio-pacific.info/

and practitioners who participated in the workshops also identified a key challenge as a lack of government capacity, as well as some PICT not having policy frameworks that align with local/community needs or capacity. Policy frameworks therefore need to be 'fit for purpose' by:

- tailoring them specifically to each country context,
- considering both local and national scales, and
- including communities, CSOs and national government in policy development.

4.2.4 Regional data hub coordination

Specialists and practitioners who participated in the workshops (and other reviews) identified the multitude of NbS projects in the Pacific, and the potential overlap of activities. This is compounded by limited public access to data or any central hub for data management and storage. While SPREP and SPC are recognised as the main data repositories in the Pacific, there are also projects and institutions that maintain smaller datasets. Therefore, accessing relevant data on projects that are currently underway or recently completed, the status of ecosystems, management and governance structures, suitable carbon accounting tools, and success of projects can be difficult.

Key repositories and needs relevant to the coordination of NbS include:

- Pacific Climate Change Center (PCCC) established by SPREP, the PCCC provides a repository for climate-related data as well as training materials. PPIN plans to build on the PCCC as an information platform and a repository for training and E-learning modules.
- sector-specific data may need to be delivered under different platforms (e.g. sector appropriate platforms) that are yet to be developed.
- countries want tailored hubs for their data and other platforms perform this role (e.g. INFORM). Noting that data for remote and atoll PICT are limited, particularly Micronesia, and including these nations will be important for any regional data hub.

4.3 Implications and Opportunities for Development and Conservation Organisations

Based on the systematic review, expert elicitation and previous work done under the NIWA review (2019), there are several areas that have been identified as key gaps for NbS in the Pacific, and that provide opportunities for development and conservation organisations to fill. These gaps and opportunities and the role CRxN can play in addressing them are outlined in Table 2.

Table 2. Opportunities and implications to initiate NbS activities in the Pacific region, and align with existing initiatives.

Opportunity	**Implications for CRxN and international development and conservation organisations**

Involvement in regional frameworks	• CRxN supports and promotes improved coordination of NbS in the Pacific, through actions such as:
	  ○ facilitating regular meetings between IUCN, SPC, SPREP and WWF,
	  ○ providing input into the PPIN project and standards development,
	  ○ facilitating discussions between major and emerging bilateral, multilateral and philanthropic development partners.
	• CRxN map the results of this research project (expanded to include all Pacific countries) against a national level vulnerability

	assessment (considering climate as well as other risk factors) to facilitate long-term coordination and sustainable NbS outcomes. The results of the assessment could help develop agreed NbS Pacific priorities (both geographically and thematically), which could be used as an action pathway for donors and implementing agencies. There would be political challenges in achieving agreement from governments for such an approach, however, the benefits for coordination would be significant.
Standards and definitions	• The international development sector, and other sectors investing or engaging in NbS in the Pacific, ensure that their activities and investments align with the IUCN definition of nature-based solutions. • Further, WWF could request membership on the soon to be established NbS working group, which will consider regional standards and guidance materials for the Pacific region. • When undertaking education activities ensure the scope and opportunities to apply NbS across many sectors is promoted.
Support development of government frameworks	International development and conservation organisations have an opportunity to work with IUCN and other agencies working on NbS in the Pacific, such as SPC and SPREP, to support PICT governments to develop policy frameworks that: • address regional and global biodiversity and climate change obligations, • consider local needs as well as national priorities, and • include communities and CSOs in policy development. International development and conservation organisations support and build CSO capacity in Polynesia and Micronesia to access NbS funding and successfully implement projects, in partnership with IUCN, SPC and SPREP.
Regional data hub coordination	Bilateral and multilateral donors consider support for an agreed Knowledge Hub/platform to bring together project partners, promoting lessons and learnings from NbS (including CRxN) and coordinate inputs to the Hub. Build on Kiwa community-level platform into larger NbS 'community of practice'. Opportunity to partner with existing hubs (e.g. PCCC, INFORM, Pacific Data Hub (PDH)) so as not to fatigue members. There is the opportunity for all development and conservation organisations to support the strategic coordination of projects through the agreed Knowledge Hub by encouraging agencies and projects in the Pacific to register and use the Hub.

5 Funding and Investment

5.1 Background

An estimated US$845 billion of annual investment is estimated to be required to protect the natural environment globally but current spending is only US$134 billion per year (Deutz, A et al 2020). The establishment of large regional NbS initiatives, such as Kiwa, PPIN and CRxN in the past few years, demonstrates that increased funding is flowing into the Pacific for NbS projects, and this is expected to continue, supported by increasing interest from public and private investors, particularly the carbon market (CMI, 2021). Access to investment data is limited with no dedicated platforms for public information on NbS transactions or projects to verify this. However, the results of the systematic literature review show a significant increase in the number of NbS projects (and therefore funding) compared to the NIWA report that reviewed projects up to 2019.

At present this funding is being allocated in a largely ad hoc manner with minimal coordination or strategic planning between funding agencies, donors or government with regards to the geographic focus or the sectors that the projects targeted.

5.2 Gaps, Challenges and Barriers

5.2.1 Geographic funding distribution

The geographic distribution of current NbS projects documented by this review in the Pacific region are not equally distributed across sub-regions or among PICT (Figure 4). The results show that Melanesia receives the highest number of projects, and presumably funding. Micronesia had a significantly lower number of projects, which tend to be smaller scale pilots. Polynesia has an intermediary number of projects, mainly focused on Samoa, Kiribati and Tonga.

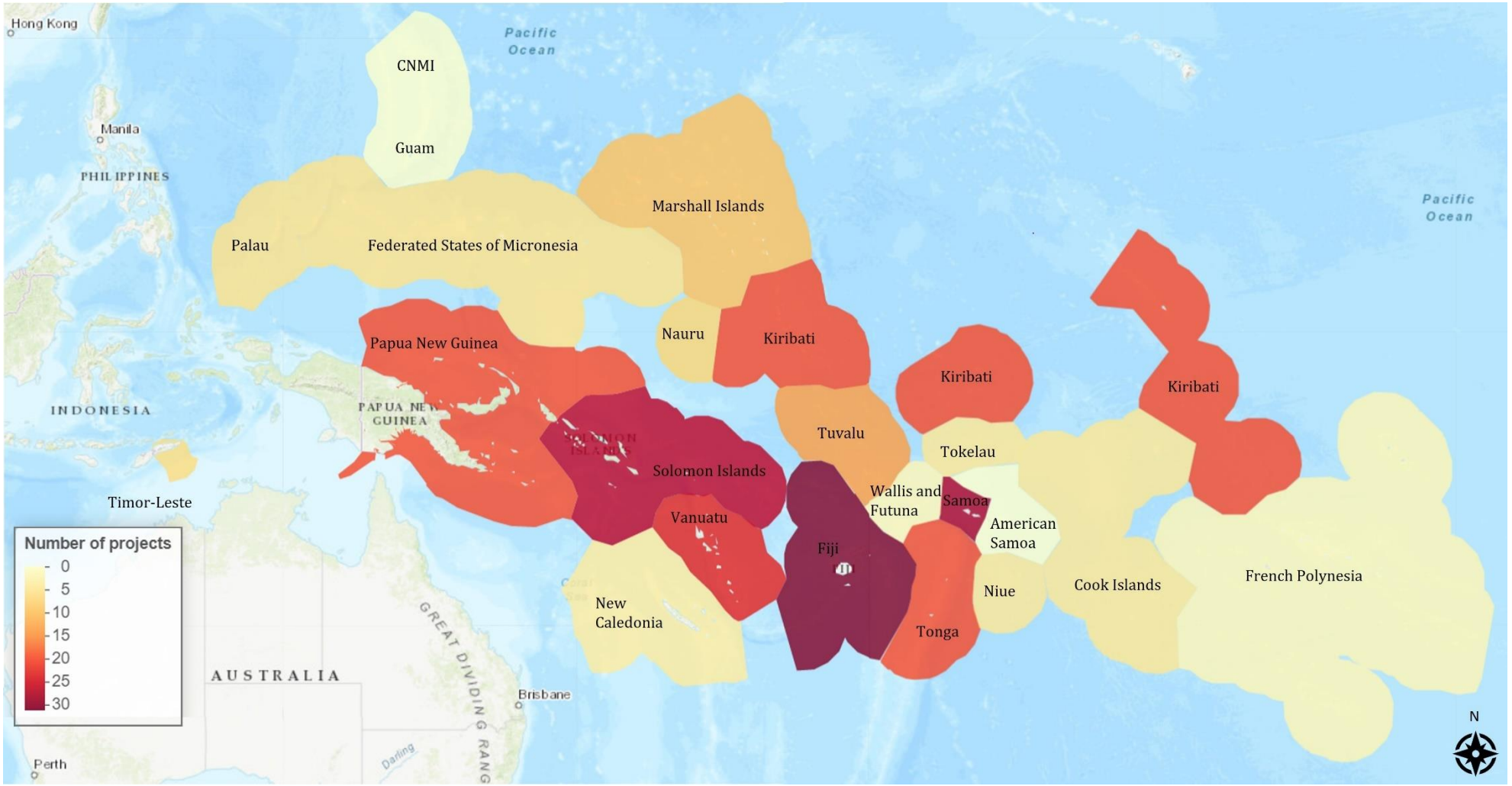

Figure 4: Geographic distribution of NbS projects in the Pacific

Twenty-eight of the projects identified in the review were multi-country or regional projects (Figure 5). Many of these multi-country projects were of significant scale and covered greater than five countries across multiple sub-regions.

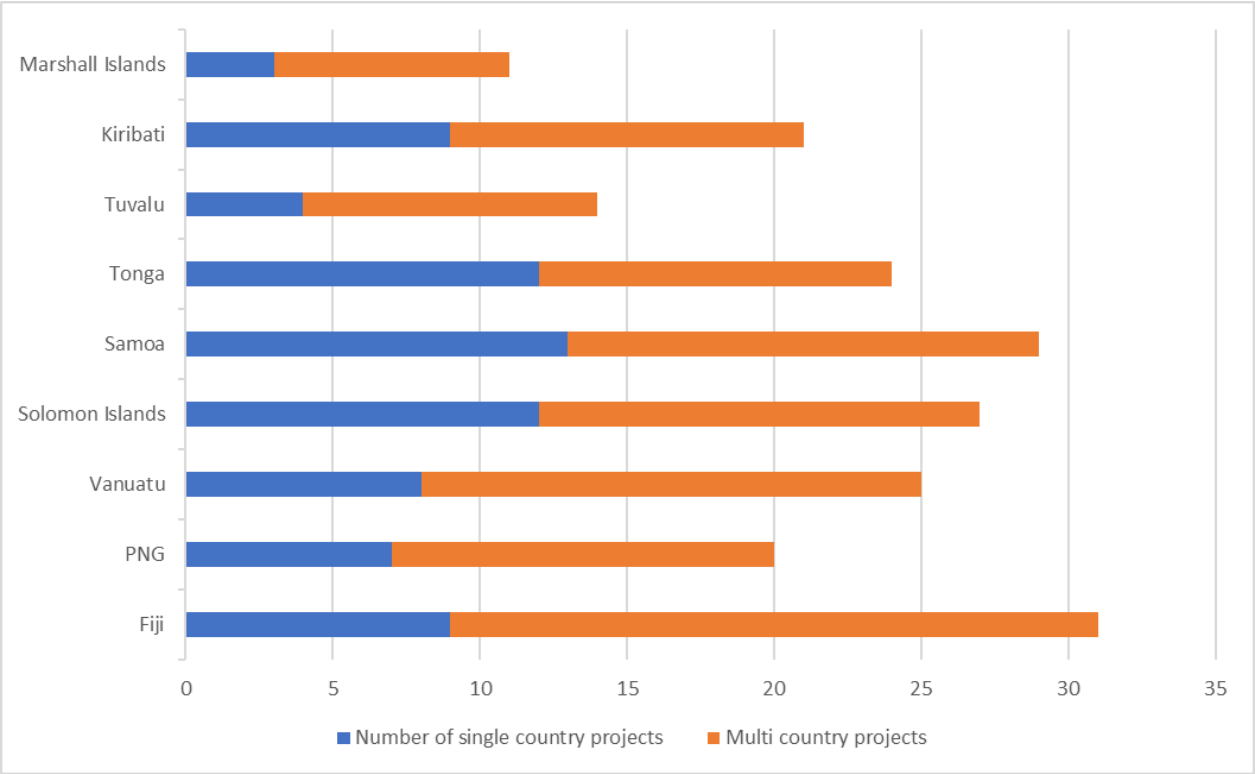

Figure 5: Number of Nature-based Solution projects in each representative PICT

The geographic gaps were also considered against island type or topography (based on Nunn et al. 2016 island classifications) but no significant correlation was found. The number of projects for each PICT does not appear to reflect the population of these nations or their current GDP, nor does it appear to reflect their vulnerability to climate change (based on analysis using the ND-Gain score). This gap in investment supports the view that funding is being allocated without a strategic framework. The disparity may not be of geographic origin, and would need to be investigated further as it could be attributed to a number of other factors, such as:

- proximity to donor nations, such as Australia and New Zealand,
- costs and logistical challenges (e.g. lack of flights) accessing isolated and remote locations,
- greater need due to limited government capacity and funding,
- lack of capacity in smaller island CSOs to meet minimum due diligence standards to access funding,
- smaller population to draw on for skills to support projects (particularly through the recent COVID restrictions which has limited the ability for international travel), and
- knowledge and connections of the relatively small group of people who are involved in NbS project design in the Pacific.

Remoteness (and associated increased costs/logistical challenges) was raised in the workshop feedback as an important project design consideration (See Section 6). This is support by the NIWA 2019 results which found that outer islands (even in high island nations) have a lower number of projects (NIWA 2019).

5.2.2 Sector funding distribution

When NbS specialists and practitioners who participated in workshop 2 were prompted to identify which activities from a list they considered NbS, the results demonstrate that NbS activities are still viewed by most people as ecosystem-based approaches (Figure 6). A relatively small number of participants (≦10) considered broader activities such as water management (e.g. water harvesting, groundwater recharge), agroecology or pollinator support as NbS.

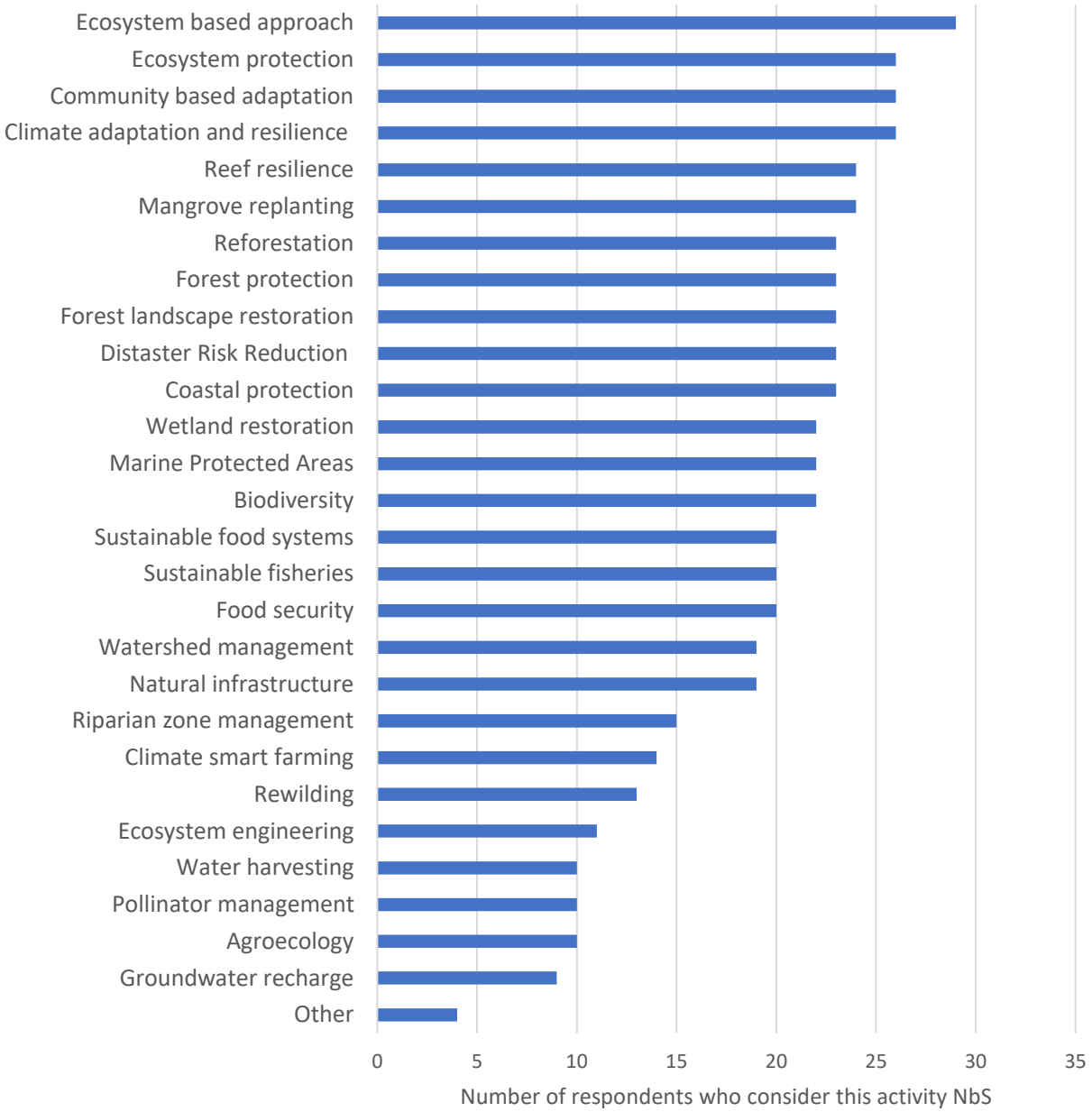

Figure 6: Types of activities considered as Nature-based Solutions by specialists and practitioners who participated in the workshop.

From the literature review, at a broad Pacific level, NbS projects show a strong focus on:

- agriculture (40%),
- natural resource management (33%),
- biodiversity protection or restoration (31%), and
- forestry (28% projects).

Many projects identified as fisheries sector are much broader-based projects that include some form of habitat protection and management and as such have been classified as natural resource management. Fishery based projects were commonly not explicitly identified as NbS but were included in the project count due to the dual environmental and social outcomes. The energy sector had the lowest number of identified projects. Although not specified as a discrete category, climate adaptation was identified as a core focus of many of the NbS projects. This is supported by the participants responses to the online survey, which indicated that the funding for all projects was tied to a need to demonstrate that the project addressed climate change.

Many different habitat types are targeted by NbS projects. Mangroves and coral reef habitats are a major focus (50% of projects), and terrestrial agriculture/created forest (40%), village/urban (35%) and natural forest/ grasslands (25%) are also a focus.

5.2.3 Conditions placed on funding

Conditions placed on funding were identified as a fundamental barrier to the effective implementation of NbS in the Pacific region. For example, 80% of respondents to the online survey indicated that their source of project funding was conditional or had to meet specific parameters. Types of conditions set by donors included:

- must address climate change (100% of respondents),
- must be in a certain country or sub-region (29% of respondents),
- must be led by government (single comment),
- must have nature conservation outcomes (single comment), and
- must have emissions mitigation outcomes (single comment).

Views on the impact of these conditions varied, with some respondents noting they do not believe the conditions changed the project design. Others felt that without restrictions there would be less time taken in administration with more resources put towards implementing effective NbS activities. Some participants also said that without conditions it would be possible for more creative and innovative approaches and opportunities to be developed, not just around climate adaptation but for other benefits, such as biodiversity conservation, that may ultimately have stronger co-benefits.

The conditions placed on projects were seen as barriers for a number of reasons, including:

- **Risk**: Donors are seen as risk adverse, and there is the perception that they don't want to put large sums of money into scaling up of projects if there is the chance of maladaptation or failure.
- **Timescale**: A major challenge which was repeatedly identified was the timescales associated with project-based funding cycles (the dominant funding type for NbS projects in the Pacific). Project funding cycles tend to be typically 3-5 years. This time limitation is seen as too short for the type of community-based NbS needed to achieve scale in the Pacific. This short time frame compromises the adaptation outcomes of NbS programs (Lo 2016) and therefore the long-term support for NbS. Nakau was highlighted as an example of an innovative approach that has allowed for longer funding timelines using carbon market activities.
- **Transitions**: Another drawback of project funding cycles is that when funding ends for a project, even if there is a new round approved, the inevitable delays mean that the project will lose staff and momentum, as well as trust in the communities. Often new funding may also have a slightly different approach or priorities which may lead to confusion or

disenchantment of community members. This should be considered in the context of the NIWA (2019) findings which found that new start-up projects are often more likely to get funded than maintenance and longer-term implementation programs. This is further discussed in Section 6.3.

Challenges were also identified with securing private sector co-funding for projects. Specialists and practitioners who participated in the workshops suggested that this was due to the small private sector in most PICT and the difficult supply chains. It was also raised that the connection between NGOs and the private sector could be improved, with many opportunities to collaborate not realized. Similarly, accessing carbon markets and associated predictable and longer-term finance was seen as a challenge by some participants. Further investigation of this aspect would need to be undertaken to determine specific challenges in this space.

5.3 Implications and Opportunities for Development and Conservation Organisations

Based on the systematic review, expert elicitation and previous work done through the NIWA review (2019), there are several areas that have been identified as key gaps in terms of NbS funding and investment in the Pacific. These gaps and opportunities and the role development and conservation organisations can play in addressing them are outlined in Table 3.

Table 3. Opportunities and implications to improve NbS funding and investment in the Pacific region.

Opportunity	Implications for Development and Conservation Organisations
Geographic funding distribution	• The opportunity to build on the relatively newly developed capacity in some PICT that have been the focus of projects in recent years should be considered. Now that some countries especially in Melanesia have good government capacity there is a framework in place to make strong gains through large scale projects. • Further investigate what can be undertaken to overcome the barrier posed by remoteness. Consider specifically targeting grants for remote locations with longer timeframes and larger travel and logistical cost allowances. • Consider a partner program to improve the basic administrative capacity of small CSOs in remote or less targeted areas. • Refer to regional data hub recommendations in Table 2, which will assist in coordination of funding.
Sector funding distribution	• When undertaking education activities ensure the scope and opportunities to apply NbS across many sectors are promoted. • Refer to regional data hub recommendations in Table 2, which will assist in coordination of funding.
Conditions placed on funding	• Focus on projects that have been tested at pilot level and implement at scale. • Make timeframes for projects longer than the standard 3-5 year cycle, allowing sufficient time for design and inception. • Place as few conditions on projects as practicable to encourage innovative thinking. • Identify opportunities for improving the linkage between private sector funding in projects that address barriers.

6 Project Design and Implementation

6.1 Background

As discussed in Section 4, the IUCN NbS standards represent a useful global framework for designing and implementing NbS. While these standards are useful as a master framework for conceptualizing NbS, the use of NbS cannot be generalized, rather approaches must be tailored to the specific characteristics of the location where they will be implemented (i.e. culture, geography, resource use, capacity and government policy and priorities). The Pacific Island nations across the region share several characteristics that should be taken into consideration when designing and implementing NbS projects. For example, the sea-to-land ratio, high dependence on marine resources, a diversity of traditional cultures, small GDP, high exposure to extreme weather events, expensive transportation costs and remoteness, relatively recent national independence.

While many Pacific Island nations do share certain characteristics, the tendency to group all nations in the Pacific into a single category was flagged as a key barrier to the success of NbS. The needs and appropriateness of specific NbS approaches varies significantly between islands and countries due to their specific characteristics. Additionally, despite some commonalities, there is also significant diversity between nations as well as within the countries themselves. For example, approximately 70 distinct living languages are spoken in the Solomon Islands among a population of approximately 717,690 people (as of 3 May 2022). This diversity of languages is representative of the cultural diversity within the country. Populations in various parts of the country strongly differentiate themselves from populations in other parts of the country and may reject knowledge that originated from other groups. It is fundamental that NbS projects are designed to meet the specific characteristics of the local communities. Section 6.3 highlights key considerations that will help tailor projects to local contexts.

Given the heterogeneity of the region and the general nature of NbS being place-specific, this section offers key considerations for project design and implementation, rather than outline specific standards or requirements.

For new and emerging projects, it is recommended that:

- projects are designed against global NbS standards, and
- grantees are encouraged to consider their projects in accordance with the NbS global standards and the considerations outlined here.

It is recommended that CRxN apply the following considerations:

- evaluate funding proposals against NbS standards,
- support organisations to tailor their project designs to local characteristics, and
- support the mainstreaming of NbS across sectors in the Pacific region.

Traditional knowledge and community participation emerged as particularly important for NbS in the Pacific region. These considerations are therefore contextualized and explained in greater detail in the following sections. Then, a complete list of key considerations (identified in this review) for designing and implementing NbS in the Pacific are presented in Section 6.3.

6.2 Gaps, Challenges and Barriers

6.2.1 Traditional Knowledge

Much of the population of the Pacific region is comprised of subsistence-based communities that depend directly on local ecosystems for their daily food, well-being and livelihoods. As a result, much of the population interacts on a daily basis with their environment. This has been the case for many generations, meaning local communities often have place-based and generational knowledge of their local environments. Local populations are often local experts and *de facto* resource managers who determine the success and sustainability of NbS. It is therefore essential that traditional knowledge, including an understanding of local culture are integrated into NbS projects in the design phase, and that genuine co-development of projects is achieved (see Section 6.2.2 Community Participation).

NbS specialists and practitioners who participated in the workshops identified that traditional knowledge is not being sufficiently incorporated into NbS projects, partly due to traditional knowledge being considered too late in the project design stage. Traditional knowledge is often only considered in the context of natural resource use, with limited consideration of the economic, social, or cultural-social aspects of traditional knowledge. It is important that NbS design consider that the concept of "natural resources" as a resource to be extracted for human benefit may be a culturally relative perspective and may not be shared by project communities. Adequately incorporating traditional knowledge into NbS will allow for the local understanding of the natural world, which is different than that of donors, NGOs or government agencies. For example, communities might view their relationship with the natural world as one of kinship, with personal and cultural identity linked to animals and plants.

In the projects identified in this review, the traditional knowledge component was often token, with insufficient time, expertise (e.g. no inclusion of sociologists), or funds to be integrated effectively. Of the 124 projects captured in this review, only two had traditional knowledge as their main focus. There was strong support from specialists and practitioners to effectively include traditional knowledge in all stages of NbS projects, from design to implementation and closing.

6.2.1.1 Case Study

Traditional culture and customs are still strong throughout much of the Pacific region. Projects that have strong community-based actions that draw on traditional knowledge and customs were reported as being important to the success of NbS. Effectively embedding traditional knowledge in NbS projects has been pivotal in project success, as has inclusive project design and implementation. NbS specialists and practitioners noted that there were some projects that had made steps towards truly utilising and successfully integrating traditional knowledge using a co-development approach. The case study below provides an example of how projects have incorporated traditional knowledge and engaged with communities and culture.

Traditional knowledge case study:	**RESCCUE Project**
Location:	Fiji, French Polynesia, New Caledonia and Vanuatu
Implementation:	2014-2019. Coordinated by SPC and national government departments with implementation partners in each PICT
Description:	https://resccue.spc.int/about-resccue

A component of the RESCCUE project focused on documenting and incorporating traditional knowledge into project activities. Traditional calendars were documented at community scales focusing on resource use (e.g. season for planting and harvesting breadfruit, season when certain fish species are caught). Climate change scenarios were then mapped against the traditional calendars to understand how under each future scenario traditional use patterns would shift and therefore impact on community food security and livelihoods. The engagement in Vanuatu with communities through the project also led to the development of a Community Monitoring Toolkit that empowers community members to monitor their natural resources and use the results to inform local decision-making. The information from the seasonal calendars and monitoring toolkit were used to co-develop community plans aimed at better management of natural resources and adaptation to climate change. Key learnings from this project were that integrating traditional knowledge should be a core component of any project from the start and that community knowledge and information can enhance project activities, support community decision-making, and build ownership of outcomes.

6.2.2 Community Participation

NbS are established not only within an ecological and economic context, but also within a social context. Given the high dependence of communities on their local natural resources, this is especially true in the Pacific, where local populations are often the resource users and as a result, *de facto* resource managers. While this characteristic of the region relates to traditional knowledge (see Section 6.2.1), it also implicates that including communities in project design and implementation is central to sustainable project outcomes. Accordingly, community-based management and community ownership of projects was especially emphasised as being critical to successful NbS by workshop participants.

A key aspect of community participation is understanding and designing for the local social context. This social context (or culture) can be understood as a shared understandings among a particular group of people about how to interpret and interact with the world around them. These shared understandings may define what is important, what is appropriate, and how things are done. These shared understandings between cultural groups may be widely divergent from each other. For NbS to be effective, they must “speak the local language” and be based on the shared understandings of the social context where they will be implemented. Otherwise, a project design that was very successful for one social context may be unsuccessful in another social context. In other words, a project designed according to an Australian or a European shared understanding of “best practices” and “what is logical”, may be completely ineffectual in certain local contexts of the Pacific region.

Community participation fully incorporates the social context by moving beyond token community involvement. Projects should directly address local needs and priorities as defined by various sectors of the local population and projects should be designed according to existing governance structures. This means understanding and working with and through existing local leadership. There may be several types of local leadership, for example, traditional governance, state governance, and church leadership may simultaneously (and not necessarily harmoniously) exist in any given location. Being aware of, working within, and navigating these structures is very important for adequate buy-in from the community and the sustainability of NbS outcomes. Expert elicitation from the workshops and online survey further elucidated that projects often attempt to create new local mechanisms (i.e. committees or leadership) for delivering project outcomes. Often, these are replicating systems that already exist locally. Instead of creating new systems, projects will be more successful when they are designed within and according to existing structures. In addition to governance structures, projects will benefit from building on traditional mechanisms (see section 6.2.1 Traditional Knowledge) for achieving project outcomes. For example, many traditional cultures across the Pacific use *tabu* areas (the term for this changes across the region), which limit resource use and function very similarly to community-based protected areas. Similarly, project goals should be linked to and build upon local understandings of resource management, fortifying functional existing structures or mechanisms that are already in place.

An important consideration for community participation in the Pacific is that traditional governance structures tend to be male dominated and often do not adequately involve or represent women, youth, and people living with disabilities. Significant progress has been made toward addressing Gender Equality, Disability and Social Inclusion (GEDSI) in project development across sectors. As expected, GEDSI is also paramount for community participation in NbS. In addition to increasing the participation and empowerment of women, recent research shows that women may be less likely to respect community-based protected areas if they: (1) are not consulted during protected area design and/or management plan development, (2) do not understand the importance of protected areas, or (3) do not have alternatives for feeding their families.

Further considerations for addressing community participation in project design and implementation are outlined in Section 6.3.

6.2.2.1 Case Study

It was encouraging that many examples of projects that had been successful in embedding community participation were highlighted by workshop participants. These including coral gardening in Vanuatu (led by VanauTai resource network) and in Fiji. Many of these projects were built on the Locally-Managed Marine Area Network (LMMA) model. The case study below provides an overview of this approach.

Community Participation case study:	**LMMA Network**
Location:	Fiji, PNG, Palau and Solomon Islands
Implementation:	Ongoing
Description:	https://lmmanetwork.org/

The approach supported by the LMMA Network was highlighted as a successful example of how community can be placed at the heart of NbS design. The network provides practical capacity building, cost-effective and culturally appropriate engagement tools, and facilitates lesson sharing between practitioners to advance the practice of community-based marine resource management and conservation. The LMMA model for coastal resource management supports food security, biodiversity preservation and climate change adaptation. In Fiji alone, more than 80 percent of inshore areas are under local management. To support the community level work, the LMMA approach embeds NbS in national, regional, and international fisheries and conservation frameworks and policies, such as National Biodiversity Strategic Action Plans, Green Growth Frameworks, Fisheries Roadmaps and Pacific Oceanscape Framework.

6.3 Implications and Opportunities for Development and Conservation Organisations

Based on the systematic review, expert elicitation and previous work done by under the NIWA review (2019), there are several areas that have been identified as key gaps in terms of NbS design and implementation in the Pacific. These gaps and opportunities are outlined in Table 4.

Table 4. Opportunities and implications to improve NbS design and implementation in the Pacific region.

Opportunity	Implications for Development and Conservation Organisations
Traditional Knowledge (see Section 6.2.1. for further detail)	• **Respect communities and build trust**. Communities may not trust outsiders and resist sharing traditional knowledge, even when that knowledge is being lost over time. This suspicion is the result of instances where outsiders have used knowledge shared by trusting communities for their own commercial or political gain, to the detriment of local communities. Examples include: community drawn resource maps being used to later privatise those resources by external interests; or traditional medicines being patented for commercial sale. Working with traditional knowledge requires being sensitive to this history and being respectful of how traditional knowledge is used and shared.
	• **Recognise and value different types of knowledge** in project design and implementation. Capturing and learning from traditional knowledge of ecosystem function can improve the effectiveness of NbS projects.
	• **Capture and share local folk stories related to NbS**. As a result of shifting economic structures, globalization, and cultural change, traditional knowledge, and the stories and structures for maintaining this knowledge, are being lost. Community elders, often the guardians of traditional knowledge, are increasingly moving to urban environments and village youth have diminishing access to the knowledge of prior generations. Capturing and sharing folk stories was identified as best practice for addressing this cultural loss, improving resource management and rooting NbS in the social context. Using folk stories empowers communities by allowing them to understand that their traditional knowledge is often being confirmed by scientific advances. Projects can also ask "What did your parents/grandparents do?" and should actively work to transfer traditional knowledge for NbS between communities and generations.
	• **Strongly embedding traditional knowledge and governance structures in projects from design phase and throughout implementation.** Traditional knowledge has often been considered too late in the design process to effectively inform project activities and community participation.
	• **Collect background information before designing NbS.** Information should include, but not be limited to, traditional and current culture characteristics of the area, leadership, religion(s), existing groups, role of women in resource management and disaggregated resource use, and current or historical use of traditional protected areas (land and sea).

Community Participation (see section 6.2.2 for further detail)	• **Co-design projects with communities.** Local people are the experts on local needs, actors, and governance mechanisms. “Designers” for future projects should take more of a facilitation role to enable community groups and other local stakeholders the space to lead the design of their own projects. Projects should address the needs that the community has identified, always considering the participation and empowerment of women and people living with disabilities, who may not automatically be given a voice within traditional leadership structures.
	• **Design for the social/cultural context.** Increase engagement of social scientists in project design to support project design that is specific and appropriate for the social/cultural context. This will help avoid unintended and negative project outcomes including local conflict, community division, and cultural loss. Use these considerations to directly address local needs and priorities as defined and understood within the social context.
	• **Empower community implementation and management.** Local individuals should be actively involved with implementation and management. Support local people to choose their roles and forms of involvement. Deliver capacity building as needed and wanted by the community. When appropriate, hire local individuals to implement project activities, but consider that broader community participation and sustainable outcomes may better result from truly meeting community needs instead of creating short-term financial incentives.
	• **Be inclusive of under-represented groups/community members.** Projects should be inclusive of people that may not be represented by the most vocal stakeholders. Careful consideration should be given to how a small group of community leaders might benefit from the project to the detriment of others in the community.
	• **Support youth- and women-led initiatives**. Significant global progress has been made toward addressing Gender Equality and Social Inclusion (GESI) in projects. Regardless, many cultures in the Pacific tend to be heavily male-dominated with high incidence of Gender Based Violence and limited representation of women and people living with disabilities. Women and youth led initiatives will support broader community benefit from projects as well as sustainable project outcomes.
	• **Root initiatives in existing community structures.** Work within customary governance and community structures. Programs often attempt to create new structures to deliver projects. While projects may desire to create new structures for projects, communities often express they already have a customary mechanism that can be used. This idea extends to working with local leadership and involving local leaders in project design and implementation. NbS projects will likely have greater success if they link into and build on existing customary and leadership structures instead of starting anew. Simultaneously, it is important to evaluate and address who benefits (and who does not) from the existing leadership or structures, to ensure desired and equitable outcomes. Questions to be considered include: What types of local governance exist? How do they relate to one another? How do the local people understand and approach the issue? What cultural importance does the resource have? What is the history of the use of and relationship with this resource? What

	groups/committees already exist? How has the resource traditionally been managed? Use these considerations to encourage community-based management and community ownership of projects. While respecting traditional/existing governance structures, there is the opportunity to also increase the participation and empowerment of women, youth, and people living with disabilities.
	• **Account for traditional land tenure and local interest groups.** Land tenure in the Pacific region might be shared and/or traditional. It is important for NbS to be designing for the tenure system where they will be implemented. Project leads should be aware about whether the placement of NbS will benefit certain people while excluding others, influencing or altering local power dynamics. Additionally, collective land tenure should be respected and treated as such, avoiding moves to privatize land tenure which can divide communities**.** Similarly, NbS may be a resource that community members can benefit from. Certain interest groups may leverage NbS projects to their own benefit to the detriment of others. This should be accounted for and avoided in project design.
	• **Account for culturally-appropriate timescales**. Traditional knowledge often operates over longer-time scales (i.e. 30-years) and incorporating these into project design and implementation means project development occurs over years instead of months. As a result, projects can be better designed by applying a bottom-up approach. Projects are then better able to identify exactly who should be the beneficiaries among the local communities, and communities have greater control over the outcomes of the projects. Increasing the awareness of donors about the need for different project timeframes will improve the sustainability of NbS.
Vulnerability to Climate Change The Pacific Region is particularly exposed to extreme weather events linked to currently changing climate trends.	• **Projects should account for and aim to increase resilience to projected climate impacts.** Projects should be carefully screened for their potential to increase resilience. While consideration of natural systems is inherent in NbS, related social, political, economic, and physical dimensions should also be considered. How might a project strengthen or weaken these other dimensions? Projects should also be screened for the possibility of causing maladaptation (unintentionally increasing vulnerability). Examples of maladaptation might include creating too much dependence on a single highly vulnerable resource, implementing combined grey-green infrastructure that does not account for unintended impacts such as increased coastal erosion near the infrastructure, or project approaches that may undermine community cohesion, traditional knowledge, land management, or local governance systems.
Project Scaling Workshop results show that scaling should be addressed cautiously. Projects designed for one specific context may not effectively scale to a larger area that includes areas with different	• **Carefully consider implications of scaling.** Projects should be scaled effectively and appropriately when possible, taking advantage of lessons learned and opportunities to have greater positive impact, while also accounting for the different characteristics of new areas where the work will be implemented. This can be addressed by adapting previous successes to new areas, according to the community participation considerations outlined above (tailoring the project to unique contexts and needs instead of using a “one-size-fits-all” approach). This can be a challenge with funders, and should be addressed for increased project success.

characteristics (even within the same country). Simultaneously, significant time and money are being spent on pilot studies and not scaled to achieve impact.	
Countries as Large Ocean States Given their ocean to land ratio, many nations in the Pacific Region are facing particular challenges related to their relative isolation, minimal terrestrial resources, limited fresh water, and high dependence on marine resources.	• **Consider the unique geographic, resource and logistical challenges of the Pacific.** NbS should account for the unique challenges of the Pacific including transportation and other logistical challenges, the importance of marine resources to livelihoods, the need to protect and enhance the limited terrestrial resources, and the limitations on terrestrial and hydrological resources for meeting national economic needs.
Government Frameworks Versus Local Realities Government frameworks may have been developed by pulling heavily on frameworks of countries that are not Small Island Developing Nations. There is a potential for (and experienced) mismatch between government frameworks and local needs.	• **Ensure appropriateness of government frameworks.** In-country consultation should be conducted to ensure projects are designed according to the actual local context.
Support Local Livelihoods Projects that focus exclusively on conservation outcomes are less effective that those that include culturally appropriate livelihoods outcomes. Local populations are heavily dependent on local resources. Long-term NbS outcomes are dependent on the local people having their needs met and not having to undermine NbS for daily needs. This consideration is heavily linked to community participation (detailed below).	• **Incorporate social outcomes in addition to ecological outcomes.** NbS should account for community needs and improve livelihoods, according to the desires of the community and less represented members of the population, using diversified approaches, without driving maladaptation (including overexploitation of resources or overdependence on volatile external markets). Partnerships can be developed to support local supply chains that support livelihoods.

7 Conclusions

The findings of this review, based on a systematic review and expert elicitation, have documented 96 current or recent NbS projects across all cultural sub-regions of the Pacific region. The projects span a range of scales, from small pilot areas to large regional initiatives, and represent substantial investment.

The key gaps and challenges, as well as the factors for success and barriers to success, have highlighted opportunities for the development and conservation sectors to make valuable contributions in this emerging field.

This review identified that at a regional strategic level there is gaps and challenges in the:

- coordination of NbS investment and prioritisation, including lack of publicly available data on NbS projects; and
- lack of consistent policy in the NbS space.

Opportunities for CRxN and other international NbS programs could be realised through:

- taking a coordination role in NbS in the Pacific, including requesting membership on the NbS working group;
- undertaking a vulnerability assessment to improve targeting and coordination;
- applying a consistent NbS definition and standards;
- working with IUCN, SPREP and SPC to support the development of policy in PICT and improve CSO capacity in Polynesia and Micronesia specifically; and
- support the development of an agreed knowledge hub.

There are also opportunities to improve the provision of funding and investment to encourage improved outcomes in the NbS space. At present funding is being allocated in a largely ad hoc manner with minimal coordination or strategic planning between funding agencies, donors or government. This is reflected in the geographic and sectoral gaps identified in this project. Bilateral and multilateral donors have the opportunity to improve the provision of funding through carefully considering the limitations placed on funding provided in terms of time-scales or the types of projects targeted. Further investigation is required but there appears to be a role for facilitating or simplifying the linkage between private sector and CSO funding to improve the longer-term sustainability of projects.

At a project level strongly embedding traditional knowledge and community participation were seen as key to the success of an NbS project. A number of implications for project success were identified:

- respect communities and build trust;
- recognise and value different types of knowledge;
- capture and share local folk stories related to NbS;
- strongly embedding traditional knowledge and governance structure in project from design phase throughout implementation;
- collect background information before designing NbS;
- co-design projects with communities;
- design for the social/cultural context;
- empower community implementation and management;

- be inclusive of under-represented groups/community members;
- support youth- and women-led initiatives;
- root initiatives in existing community structures;
- account for traditional land tenure and local interest groups;
- account for culturally appropriate timescales;
- projects should account for and aim to increase resilience to projected climate impacts;
- carefully consider implications of scaling;
- consider the unique geographic, resource and logistical challenges of the Pacific;
- ensure appropriateness of government frameworks; and,
- incorporate social outcomes in addition to ecological outcomes.

The clear message is that NbS success in the Pacific region depends on tailoring project activities to the specific characteristics of the PICT, sector and location. It is critical that the uniqueness of individual islands and nations in the Pacific is recognised and NbS is tailored to the specific local situation it is being implemented in.

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8 References

Basel, B., Goby, G., & Johnson, J. (2020). Community-based adaptation to climate change in villages of Western Province, Solomon Islands. Marine Pollution Bulletin, 156, 111266. https://doi.org/10.1016/j.marpolbul.2020.111266

Carbon Market Institute (CMI) (2021). Nature-Based Investment in the Asia-Pacific Region Scoping Study. A report prepared for the Department of Agriculture, Water and the Environment, June 2021

Deutz, A., et al, J. 2020. Financing Nature: Closing the global biodiversity financing gap.

Douglas, E., Lundquist, C., Luttrell, J., and Ramsay, D. (2019) Opportunities for nature-based solutions to support adaptation in the Pacific region. Report prepared for New Zealand Ministry of Foreign Affairs and Trade by the National Institute of Water & Atmospheric Research Ltd. Report Number: 2019316HN

Fletcher TD, Shuster W, Hunt WF, Ashley R, Butler D, Arthur S, Trowsdale S, Barraud S, Semadeni-Davies A, Bertrand-Krajewski J-L, Mikkelsen PS, Rivard G, Uhl M, Dagenais D, Viklander M (2014) SUDS, LID, BMPs, WSUD and more – the evolution and application of terminology surrounding urban drainage. Urban Water J 12:1–18

Gómez-Baggethun E, de Groot R, Lomas PL, Montes C (2010) The history of ecosystem services in economic theory and practice: from early notions to markets and payment schemes. Ecol Econ 69:1209–1218

IUCN (2020). Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of NbS. First edition. Gland, Switzerland: IUCN.

IUCN. (2022, January 25). Nature-based solutions. Retrieved February 23, 2022, from https://www.iucn.org/commissions/commission-ecosystem-management/our-work/nature-based-solutions#:~:text=Nature%2Dbased%20Solutions%20(NbS),%2Dbeing%20and%20biodiversity%20benefits%E2%80%9D.

Johnson JE, Allain V, Basel B, Bell JD, Chin A, Dutra LXC, Hooper E, Loubser D, Lough J, Moore BR, Nicol S (2020) Chapter 10: Impacts of climate change on marine resources in the Pacific Island region. In: Climate Change Impacts in the Pacific, Lalit Kumar (Editor), Springer, Cham.

Lo, V. (2016) Synthesis report on experiences with ecosystem-based approaches to climate change adaptation and disaster risk reduction, Secretariat of the Convention on Biological Diversity, Montreal. Technical Series, No. 85: 106.

Nunn, P. Kumar, L, Eliot, I and McLean, R. (2016). Classifying Pacific islands. Geoscience letters 3:7 DOI 10.1186/s40562-016-0041-8

Pauleit S., Zölch T., Hansen R., Randrup T.B., Konijnendijk van den Bosch C. (2017) Nature-Based Solutions and Climate Change – Four Shades of Green. In: Kabisch N., Korn H., Stadler J., Bonn A.

(eds) Nature-Based Solutions to Climate Change Adaptation in Urban Areas. Theory and Practice of Urban Sustainability Transitions. Springer, https://doi.org/10.1007/978-3-319-56091-5_3

Reid H (2016) Ecosystem- and community-based adaptation: learning from community-based natural resource management. Climate Dev 8(1):4–9

United Nations. (n.d.). About small island developing states | Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States. United Nations. Retrieved February 24, 2022, from https://www.un.org/ohrlls/content/about-small-island-developing-states

Appendix A – Review Methodology

Step 1: Literature review

The initial phase of this project conducted a desk-top literature review focussed on nine Pacific Island countries that represent a range of socio-ecological contexts, to review and document current and proposed NbS projects.

The nine Pacific Island countries, representing a range of geographic and socio-ecological contexts, were selected using a semi-quantitative approach based on:

- the geography of the nation (e.g. dispersed atolls, high islands);
- the cultural sub-region (Melanesia, Polynesia and Micronesia);
- the degree of urbanisation (based on population density or percentage of urbanised area; Pacific Data Hub, 2021) to give an indication of whether the nation has centralised populated island(s) or a dispersed rural population; and
- a rapid review of existing documented NbS projects.

Other aspects also considered were:

- existing linkages of the review team and WWF with the countries to facilitate access to data and introductions for the participatory engagement;
- whether the Pacific Island countries and territory (PICT) is part of DFAT's Pacific Regional Development program (and thus likely to be the recipient of investment and support by the Australian Government in the future); and
- sovereignty of the PICT (with the assumption that territories under the sovereignty of/governed by another nation are likely to require less WWF investment).

The results of this assessment are summarised in Table A1, with greater focus was given to Melanesia due to the current DFAT and WWF program focus and historic investment. With minimal investment currently in Micronesia, it was felt that two countries were sufficient to document a representation of the types of projects being undertaken in this sub-region.

A high-level systematic literature review was conducted for each of the nine target countries. The list of key search terms used is provided in Appendix B. Some participatory engagement with key stakeholders (e.g. NGOs, CSOs, government, donors) was also undertaken to identify projects that have recently commenced or are in design, and the outcomes and benefits they will deliver. A list of the stakeholders interviewed is provided in Appendix D.

Table A1. ***Country selection***

		Team networks	**WWF linkage/office**	**Examples of NbS**	**Degree of urbanisation**	**World Risk Index classification and score**	**Geography**	**Any factors that would exclude or include a country?**
DFAT investment		(1 = none, 3 = strong)	(1 = none, 3 = strong)	(1=none, 2=some, 3=many)	% urbanised (Source: Pacific Data Hub, 2021)	Based on World risk report 2020	Atoll, volcanic high (avg elevation over 80 m), archipelago	
Melanesia								
*	Fiji	3	3	2	56	Very High (16.00)	High Volcanic	
	New Caledonia	3	2	2	67	Not ranked (incomplete data)	High island	Territory of France so investment from WWF likely to be low
*	Papua New Guinea	3	3	2	13	Very High (21.12)	High Volcanic	
*	Solomon Islands	3	3	2	19	Very High (24.25)	Archipelago	
*	Vanuatu	3	2	3	25	Very High (49.74)	Archipelago	
Polynesia								
	Hawaii	1	1	2	N/A	Not a country so not individually ranked	High Volcanic	USA so investment from WWF likely to be low
	New Zealand	3	1	2	N/A	Low (5.11)	High Volcanic	Investment from WWF AU likely to be low
	Easter Island	1	1	2	N/A	Classified under larger country so not individually ranked	High Volcanic	
	America Samoa	1	1	2	88	Classified under larger country so	High Volcanic	USA so investment from WWF likely to be low

						not individually ranked		
*	Samoa	3	1	3	19	High (5.87)	High Volcanic	
*	Tonga	3	1	2	23	Very High (29.72)	Atoll	
*	Cook Islands	3	1	1	75	Not individually ranked	Atoll	Under NZ free association
*	Tuvalu	2	1	2	63	Not ranked (incomplete data)	Atoll	
*	Tokelau	1	1	1	0	Not individually ranked	Atoll	Dependent territory of NZ
*	Niue	2	1	1	36	Not individually ranked	Atoll	Under NZ free association
	Futuna/Wallis	3	1	1	0	Classified under larger country so not individually ranked	High Volcanic	Territory of France so investment from WWF likely to be low
	Pitcairn Islands	3	1	1	0	Classified under larger country so not individually ranked	High Volcanic	Territory of the UK so investment from WWF likely to be low
	French Polynesia	3	1	2	50	Classified under larger country so not individually ranked	Atolls	Territory of France so investment from WWF likely to be low
Micronesia								
	Guam	1	1	1	94	Classified under larger country so not individually ranked	High Volcanic	USA territory so investment from WWF likely to be low
*	Kiribati	2	1	3	53	High (14.94)	Atoll	
*	Marshall Islands	3	1	1	74	Not ranked (incomplete data)	Atoll	
*	Micronesia (Federated States of)	1	1	2	22	Very High (7.59)	Atoll	

*	Nauru	1	1	2	100	Not ranked (incomplete data)	Atoll	
	Northern Mariana Islands	1	1	1	22	Not individually ranked	Archipelago	USA territory so investment from WWF likely to be low
*	Palau	1	1	2	80	Not ranked (incomplete data)	Archipelago	
	United States remote islands/atolls	1	1	NA	N/A	Classified under larger country so not individually ranked	Atoll	USA territory so investment from WWF likely to be low

Step 2: Workshop 1 – Definitions, guides and standards

A targeted stakeholder workshop held on 28 February 2022 with WWF (Australia and Pacific), IUCN Oceania, the Pacific Community (SPC), and the Secretariat of the Pacific Regional Environment Programme (SPREP) identified opportunities for the CRxN program to engage and participate in activities that are occurring in the Pacific (e.g. contextualising the NbS Global Standards (2020) for the region). The objectives of the workshop were to:

- Gain an understanding of the status of the Pacific NbS definition and standards work and explore opportunities for WWF CRxN to provide input, and
- Discuss current NbS Pacific work to identify any synergies with the proposed CRxN program.

A list of attendees is provided in Appendix C.

Step 3: Workshop 2 – Gaps and opportunities

A second workshop was held on 8 March 2022 with broader participation from key regional stakeholders (NGOs, CSOs, donors) to further explore the gaps and opportunities for future NbS investment in the Pacific region. 42 participants attended the workshop, representing 24 organisations. Participants were also provided with an online survey and projects table to document further details about their experiences with NbS, current projects, gaps and opportunities to supplement the workshop discussions. 13 participants completed the online survey and 6 organisations completed the projects table. A list of attendees is provided in Appendix C.

Step 4: Report compilation

The results of the scoping review outlined in the three steps above were compiled into this report.

Step 5: Feedback

Once the findings of this report are finalised, an information sheet and webinar will be offered to all participants who were involved in the review and a broader suite of organisations who may be interested in the results. This feedback is intended to facilitate ongoing collaboration between agencies active in the NbS space in the Pacific region including WWF CRxN, and support investment in areas identified as gaps.

Appendix B – Systematic literature review search terms

NbS
Nature-based solutions
Ecosystem-based approach
Ecological restoration
Ecological engineering
Forest landscape restoration
Mangrove
Watershed
Ecosystem engineering
Community-based adaptation (sorting for ecosystem-based approaches)
Ecosystem-based adaptation
Food security (sorting for projected related to ecosystem restoration and protection)
Agroecology
Sustainable food systems
Sustainable food production
Reef restoration
Reef protection
Recharge
Wetland(s)
Pollinator
Reforestation
Disaster risk reduction (sorted for ecosystem-oriented projects)
Climate resilience
Natural infrastructure
Nature-based climate solutions
Ecosystem protection
Water harvesting
Riparian
Forest
Biodiversity

Appendix C – Systematic literature review findings key

Habitat NbS to be undertaken in[3]	**Definition***
1. Terrestrial agriculture/created forest	Land planted and used by humans for food, fuel and fibre production including village gardens
2. Natural forest/ grasslands	Continuous stand of vegetation in largely undisturbed condition
3. Wetlands/River	Freshwater areas, either home to submerged vegetation (such as ponds or river channels), or areas with waterlogged soil and emergent vegetation (such as riparian habitat and marshes).
4. Mangrove/estuary/intertidal	Shallow areas close to shore under ocean influence including areas of the seafloor or reef that are accessed on foot, estuaries (where rivers and oceans mix), intertidal zone (the land between high and low tide), saltwater marshes and coastal supratidal area (area directly above the limit of high tide)
5. Offshore marine	Areas accessed by vessel under ocean influence including offshore reef, ocean floor, open ocean.
6. Village/urban	Projects undertaken in the footprint of an urban or village environment (village gardens considered under terrestrial agriculture category)
7. Other (please specify)	Any habitat not listed above

Types of NbS[4]	**Definition***
1. Created ecosystem	Interventions involving the establishment, protection or management of artificial ecosystems, i.e. an ecosystem or habitat framed by the authors as a non-natural system or if it cannot be determined if the intervention involves a natural habitat. This includes non-natural tree stands created or managed to address climatic impacts, artificial grasslands, created wetlands (not restored), etc. This also includes most agricultural. fisheries and livestock farming approaches, including pastoralism.

[3] Broadly based on the IUCN habitat classification scheme (IUCN, 2012) and the amalgamation work undertaken by the CEO Water Mandate (2020)

[4] Categories modified from CEO Water Mandate (2020)

2. Restoration	An active or passive intervention that involves returning degraded, damaged, or destroyed ecosystems to a pre-disturbance state. Considered synonymous with reclamation, reforestation, rehabilitation, revegetation and reconstruction.
3. Management	Natural resource management approaches other than restoration or protection. Examples include ecosystem-based fire management and actions characterized as forestry or forest management.
4. Combination	A combination of NbS types
5. Protection	An intervention that prevents (or greatly limits) overexploitation of natural resources to achieve the long-term conservation of nature with associated ecosystem services and cultural values.
6. Policy/legislation framework	Focus on supporting polices, guidance, tools or frameworks
7. Other (please specify)	Any other type of NbS not listed above

Appendix D – Stakeholders consulted

Interviews

The authors conducted a series of stakeholder interviews with:

- IUCN, Suva, Fiji
- UNDP, Suva, Fiji
- WCS, Suva, Fiji
- Ecosystem Services, New Zealand

Workshop 1 attendees represented the following organisations:

IUCN
WWF (Pacific)
SPC
SPREP
WWF (Australia)
C_2O Pacific
Ecothropic
MCC Environmental

Workshop 2 Attendees represented the following organisations

IUCN
WWF (Pacific)
WWF (SI)
SPC
SPREP
WWF (Australia)
APCP
Save the Children
UNEP
Kyeema Foundation
Ecothropic
World Vision
Kiwa
Conservation International
ActionAid
Aboriginal Carbon Foundation
Nakau
GGGI
CSIRO
LMMA
UNDP
C_2O Pacific
Ecothropic
MCC Environmental