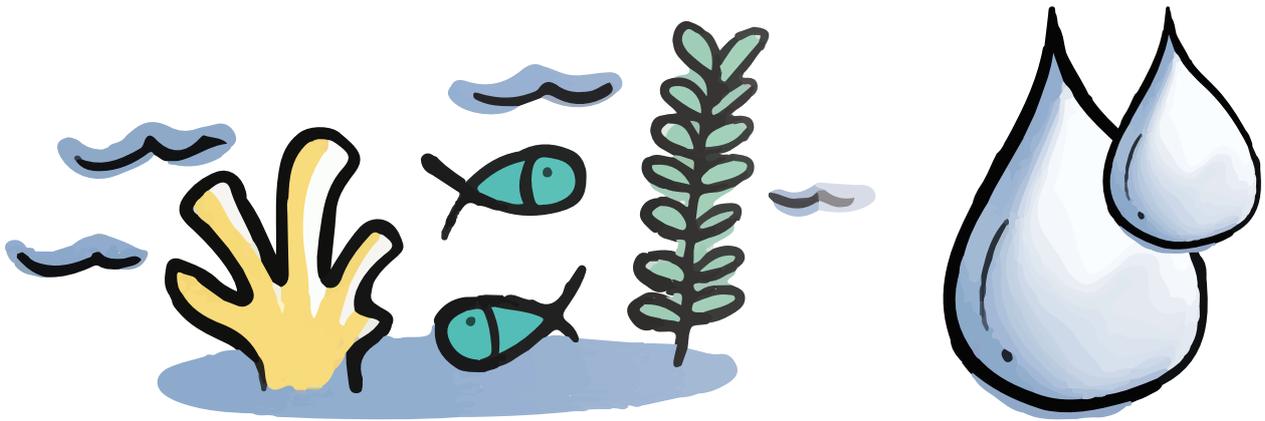


SCALING UP PACIFIC ADAPTATION (SUPA)



SNAPSHOT 2021:
**Ra'ui Marine Conservation
& Water security measures**
Cook Islands

ASSESSING IMPACT AT INTERVENTION LEVEL

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Our vision:

***A resilient Pacific environment sustaining our livelihoods
and natural heritage in harmony with our cultures.***

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COUNTRY	COOK ISLANDS
Capital	Avarua
Population	17,600
Inhabited islands	15 islands
Land area	240sq km
Max. height above sea-level	24.8m (81ft) above sea-level.
Physiography	The 15 islands are geographically divided into two groups, commonly referred to as the Northern and Southern Group islands. The Northern Group consists of six low-lying, sparsely populated, coral atolls, while the Southern Group consists of nine raised atolls and volcanic islands.
Location	Located between 8.0° and 23.0° south latitude and 156.0° and 167.0° west longitude.
EEZ	The Cook Islands Exclusive Economic Zone (EEZ) extends for 200nm (370km) from each island, except where a neighboring country’s land is within 400nm (740km) of the Cook Islands land area.
Climate	Sub-tropical and tropical oceanic, moderated by trade winds. It has two distinct seasons. Temperatures ranges between 18°C and 28°C in the southern winter, which is May to October, and between 21°C and 29°C in the summer, which spans from November to April. The wet season is normally January to early May.
Rainfall	Rainfall in the Cook Islands is strongly influenced by the South Pacific Convergence Zone. The average rainfall is between 2,000 and 3,000 mm per year.
Mean temperature	The mean annual temperature is 24°C with little seasonal variation.
Economy	The Cook Islands economy has expanded significantly with the real annual growth rates of 6.0%, 6.8% and 8.9% from 2016 to 2018 respectively. Such growth, fueled mostly by the tourism sector.
GDP per capita	\$29,943
Currency	NZ\$
Exchange rate	UD, TT sell 0.9103
Languages	Cook Islands Maori, Pukapuka, Cook Islands Maori and English.
Government	Representative democracy with a parliamentary system in an associated state relationship with New Zealand.
National focal point	Department of Climate Change, Cook Islands +(682) 25 494 ext. 7016 fax: +(682) 20 856 Private Bag Avarua, Rarotonga, Cook Islands

Figure 1. Country profile for Cook Islands.

In Context:

Mangaia is one of three islands in the Cook Islands remains governed by the traditional leaders and part of the southern group of islands in the Pa Enua where water supply systems are more established. Results of a recent impact assessment field trip to Mangaia call attention to the important role local indigenous knowledge factored in complimenting tangible on-the-ground actions as an exemplar of people resilience to tackling adverse impacts of climate change.

Like many island countries, the Cook Islands is experiencing the effects of climate change with rising temperatures, warmer seas, varying rainfall patterns, prolonged period of extreme dry conditions and coral bleaching events. These exacerbate the vulnerability of local communities to freshwater scarcity, vector-borne diseases as well as food insecurity.

Cook Islands is one of four countries that cooperated with the field testing of an impacts analysis methodology as part of the European Union funded Global Climate Change Alliance Plus – Scaling Up Pacific Adaptation (GCCA+ SUPA) project. In November 2021, a team consisting of a local consultant, contracted enumerators and representatives from Climate Change Cook Islands conducted the field trial of survey tools with tailored questions refined to the Mangaia context.

The sounder the information about the impacts of adaptation measures, the better it is for planning future adaptation activities that focus on efforts which have the desired, measurable impact. In the context of climate change and climate variability, data and indicators reflecting impact are location-specific and time-sensitive.

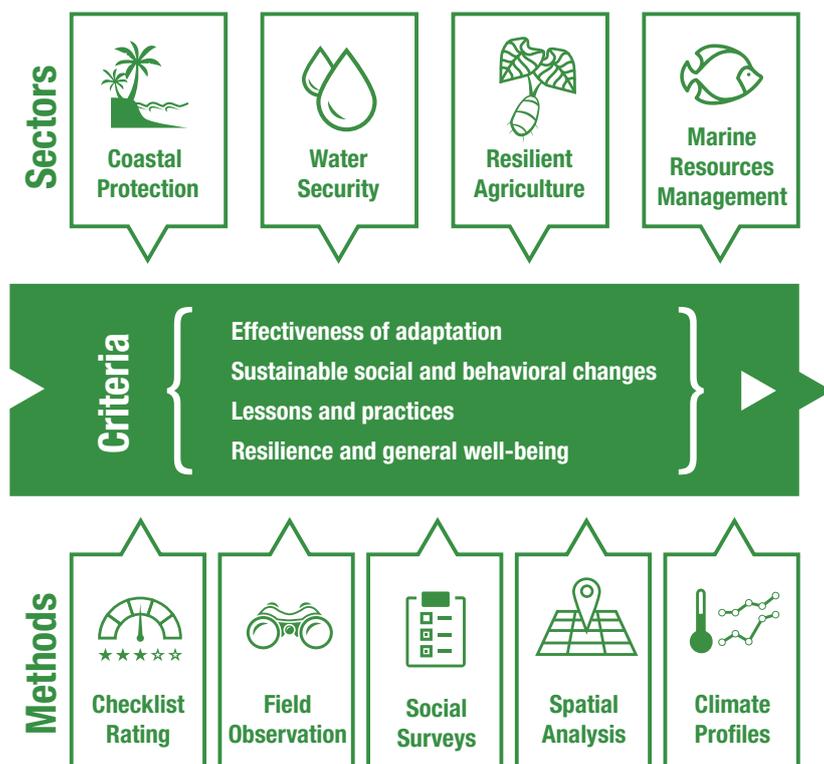


Figure 2. Pathway for Adaptation Impacts Analysis Methodology.

CRITERIA	FRESHWATER SECURITY
Effectiveness	In improving drinking water coverage. Water source and condition as proxy to measuring improved drinking water coverage. (W1). Assess the improved state of water facilities and increase in water availability (W2).
Social-behavioural change	Level of improvement to existing water harvesting storage systems. (W3). Tracks the capacity to either operate, maintain and or local management of the water supply system. (W4). Level of participation, awareness, and sense of improved sanitation standard. (W6).
Lessons and practices	Ascertains if there is improved access to safe water by households, the special needs vulnerable groups: persons with disabilities, the elderly, widows, single mothers, and children. (W5).
Sustainability	If structural measure is still intact, the extent to which it has/not been maintained, and whether natural assets were enhanced or damaged. Water treatment options available. Tracks investment in water security measures at one place over time. (W7).
CRITERIA	MARINE RESOURCES MANAGEMENT
Effectiveness	Conservation value
Social-behavioural change	Anthropogenic impacts from tourism/recreational activities, coral damage, sewage pollution, sedimentation.
Lessons and practices	Extent of ownership and management actions for area and species conservation, community education and awareness outreach
Sustainability	Level of protection (statutory or other governance), training for monitoring effectiveness of Ra'ui.

Figure 3. Criteria for measuring impact of adaptation interventions.

With support given to the national consultant working with the adaptation focal point of contact, Celine Dyer, Department of Climate Change at the Office of the Prime Minister, the period taken for planning and field test the drafted Impacts methodology was about 8 months.

This snapshot describes the field experience in-country and results from tested tools. It is relevant to note that not all elements of the criteria (in Figure 2) were captured cause of data limitations, scientific uncertainty, or a lack of robust monitoring program in place since completion of these adaptation interventions. Selection of interventions to be assessed were based on relevance and available data from archived record of projects that implemented these adaptation actions.

Selection of sites

Factors considered in the selection of benefited areas from a history of adaptation interventions were based initially on the availability of relevant information and data archived from past projects, in-country consultation with key people directly involved in those actions who may be able to shed institutional memory. Elder Teariki Rongo, the national consultant engaged who worked with the Cook Island climate change focal point, based at the Office of the Prime Minister, in the search to provide an inventory of recently completed (within the last 6 years at most) project-funded interventions for ease of tracking its measured results.

Adaptation measure	Title of project	Funding agency	Year completed
WATER SECURITY MEASURES			
Water security -reticulated water supply.	CI Infrastructure Project No: 18IC29. Water supply improvement for Tamarua village.	CI Infrastructure agency / PACCSAP	2018/19
MARINE RESOURCES MANAGEMENT MEASURES			
Marine resources management, marine conservation areas.	R2R: Mangaia ra'ui marine protected areas, Pa Enea	UNDP GEF/Adaptation Fund funded signage. Traditional leadership.	2018

Figure 4. Sample of past interventions treated with the impact assessment methodology.

Impact Indicators

The indicators are varied in nature. With the use of a checklist structure to conduct a first level impact assessment, there are several caveats which concern the validity of the assessment results. Some responses were qualitative and took the form of 'yes' or 'no' answers or graded from 'low' to 'some' to 'a large amount'. For others, numerical data were available which could have been used in their raw state. But even for the numerical data, scales were heterogeneous occurring on a sliding linear or non-linear scale or having different maximum and minimum values. To deal with this heterogeneity, we chose to map the possible responses to each indicator on a simple scale to allow for a reasonable amount of spread among the possible values of the data.

The approach permits the processing of binary data, where only a 'yes' or 'no' answer is possible. In this case a 'yes' answer could be assigned the maximum value of the given score range per sector adaptation criteria and a 'no' answer the minimum value of 1, or some values in between. Utilizing a scale of 1-4 or 1-5 also has a central score which means that the well understood concepts of average, maximum and minimum can be used to anchor the responses for non-numerical data as in some results.

CRITERIA	INDICATOR CODE	INDICATOR DESCRIPTION	METHODOLOGY
Effectiveness	W1	Water source and condition as proxy to measuring improved drinking water coverage. Protection of water source, distribution system & filtration maintenance	<ul style="list-style-type: none"> • Observations & use impact Checklist that include physical attributes of local environment.
	W2	Assesses the improved state of water facilities and increase in water availability.	<ul style="list-style-type: none"> • Observations & use of impact Checklist. • Spatial mapping of water infrastructure elements with extent water tanks coverage.
	M1	Conservation Value; Control access to protected zones and management actions for species conservation	<ul style="list-style-type: none"> • Observations and use of Impact Checklist • Focus group interviews
Social-behavioural change	W3	Level of improvement to existing water harvesting storage systems.	<ul style="list-style-type: none"> • Observations & use of impact Checklist.
	W4	Tracks the capacity to either operate, maintain and or local management of the water supply system.	<ul style="list-style-type: none"> • Meta data from the social surveys of household and focus group be treated for comparative analysis.
	W6	Level of participation, awareness, and sense of improved sanitation standard.	<ul style="list-style-type: none"> • Observations & use of impact Checklist. • Meta data from the social surveys of household and focus group be treated for comparative analysis.
	M2	Anthropogenic impact; Boating & recreation activities, signs of sandmining, coral harvesting/bleaching and sedimentation.	<ul style="list-style-type: none"> • Observations and Impact Checklist
Lessons and practices	M3	Extent of ownership/enhanced community consultation; Environmental awareness programme in place, training activities for monitoring and a form of protection put in place (statutory or other)	<ul style="list-style-type: none"> • Focus group interviews • Household Survey
	W5	Ascertains if there is improved access to safe water by households, the special needs vulnerable groups: persons with disabilities, the elderly, widows, single mothers, and children.	<ul style="list-style-type: none"> • Focus group interviews • Household Survey
Sustainability	W7	If structural measure is still intact, the extent to which it has/not been maintained, and whether natural assets were enhanced or damaged; derived co-benefits if any. Tracks investment in water security measures at one place over time.	Liaise for with national CC focal point for cost details on fiscal budget of built structures, project expenditure reports.
	M4	Level of protection (statutory or other governance), training for monitoring effectiveness of Ra'ui	<ul style="list-style-type: none"> • Focus group interviews • Observations and use of Impact checklist

Figure 5. Indicator description and tools, for marine resources management (MR) and water security (W) measures at Mangaia Island, Cook Islands (CI).

Impacts at glance

Social surveys coupled with field observation.

33 households were interviewed with a sample of 154 people, constituting 30 percent of the resident population on Mangaia as per the 2016 census.

The first six focus group discussions on water and sanitation were conducted in Oneroa village with a total of 56 participants aged 17 to above 70-year-olds. The discussions highlighted that most of the people use the treated village drinking water stations and own at least a water tank. The island was assisted with the upgrading of the Tamarua water system (Tamarua is another village on the island) with new pipes and a new water intake to ensure a reliable potable water supply.

The second set of group discussions focussed on the marine environment with 57 people aged between 15 to above 70-year-olds. In Mangaia, marine resources are the most important source of food security and income. A recent nearshore marine assessment by the Cook Islands Ministry of Marine Resources highlighted that the Ra'ui, a traditional method of conservation and preservation of natural resources was effective at allowing marine species to recover between harvests.

A discussion with the traditional leaders also confirmed that the allocated Ra'ui conservation area around the island was in good condition but there was still a need for greater community-based monitoring of the resource.

IMPACT ANALYSIS METHODOLOGY: Tools applied out at the field

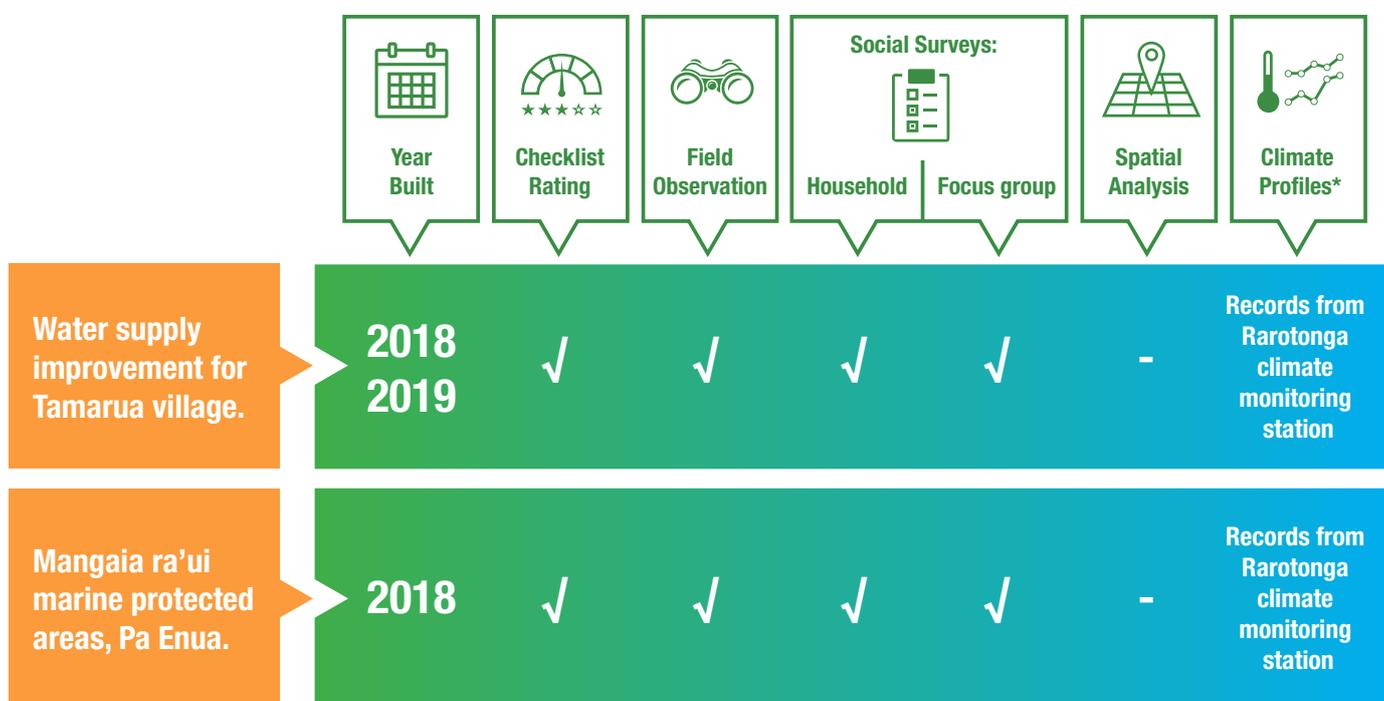


Figure 6. Overview of applied tools: field observation, surveys, interviews with additional data layer from the nearest climate monitoring station.

Climate profiles sourced from the Pacific Meteorological Desk (situated at SPREP) demonstrable of available climate data and knowledge tools, which adds value in adaptation planning. For the period 2016-2021, Cook Islands experienced 4 major drought events with the most extreme drought occurring in 2016 from March to August. Rainfall during the most extreme drought event is recorded as 570.7mm of rain¹.

1. Pacific Meteorological Desk, 2021.

SAMPLED AREA: TAMARUA VILLAGE.

CHECKLIST SCORING

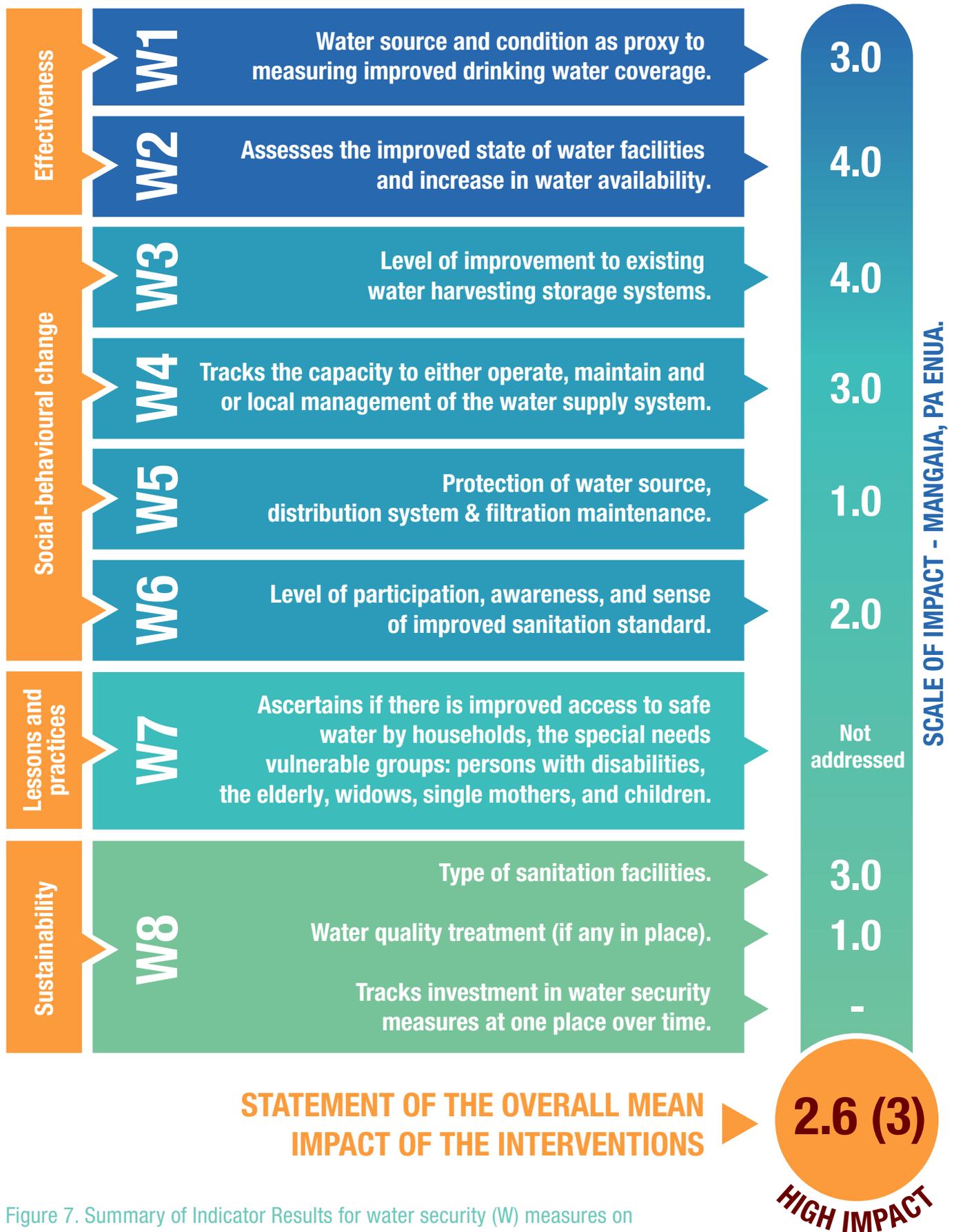


Figure 7. Summary of Indicator Results for water security (W) measures on Mangaia Island, Cook Islands.

Impact rating scale: **1** Low impact, 0-25%, **2** Medium impact, 26-50%, **3** High impact, 51-75%, **4** Very High impact, 76-100%

SAMPLED AREA: KEI'A RAUI.

CHECKLIST SCORING

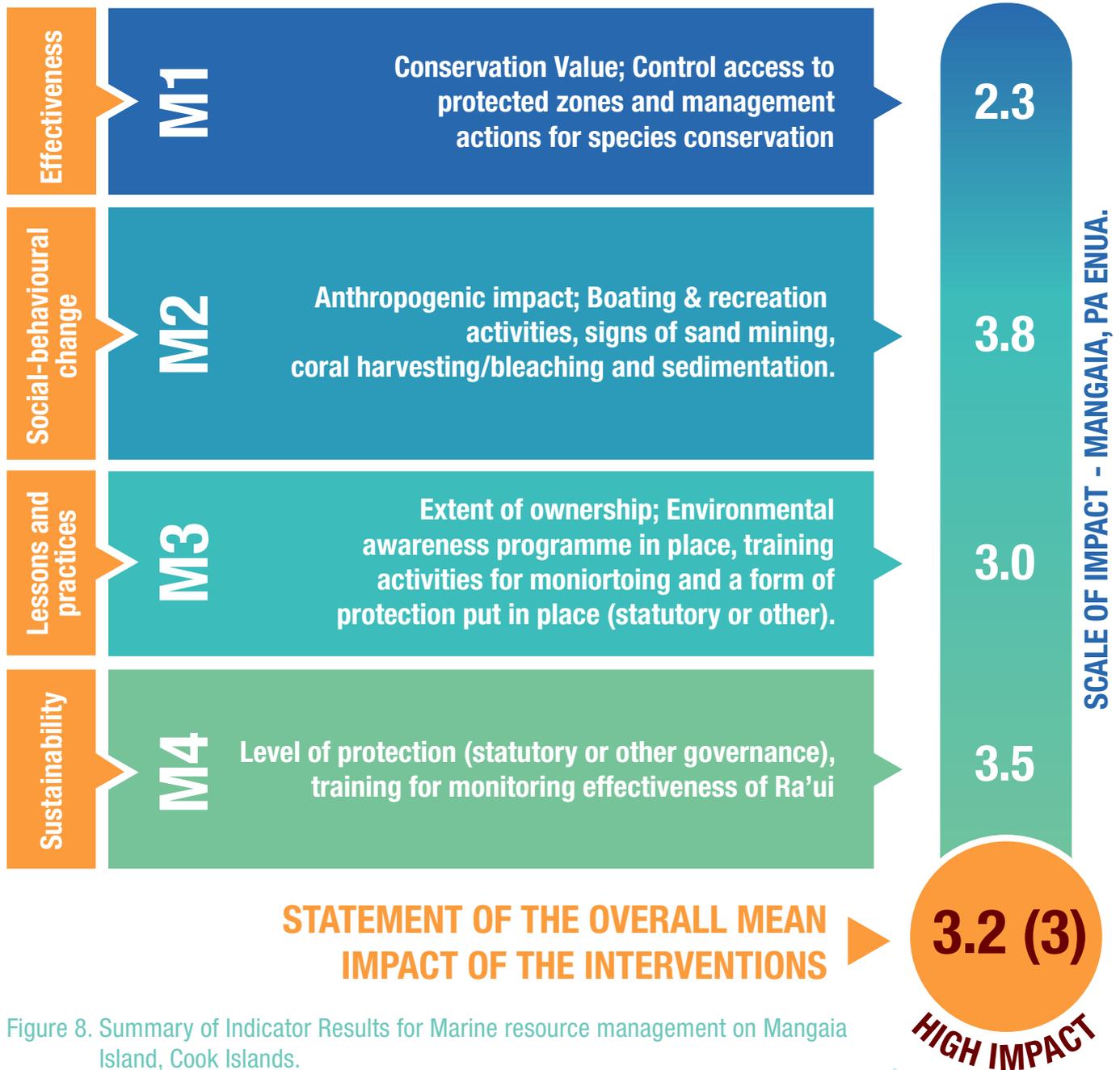


Figure 8. Summary of Indicator Results for Marine resource management on Mangaia Island, Cook Islands.

- Impact rating scale:**
- 1 Low impact, 0-25%
 - 2 Medium impact, 26-50%
 - 3 High impact, 51-75%
 - 4 Very High impact, 76-100%

In Summary



Figure 9. Lessons from the field trial of the applied impact assessment methodology, Mangaia Cook Islands.

Annex I: Water Security Impact - Assessment Summary Table

The following assessment used the information gained during the Focus Group discussion, meeting with the traditional leaders of Tamarua and interview with the Executive Officer for the Island Government. The table was taken out of the Checklist Impact assessment Form for the Tamarua Water project.

INDICATORS	LEVEL RATING ²			COMMENTS ³
	YES	NO	RATING ⁴	
Public Water Main				
Surrounding Area	✓		3	
Water Source	✓		3	
Water filtration	✓		3	No public health report for tests and no maintenance report. EO reports, if there is a problem, he is advised, no report but work is done.
Protection of water source		✓		No protection from wandering animals and unauthorized personnel
Impact Assessment 1			High	Positive Impact
Water piped from source				
Distribution	✓	✓	3	No sign of leakages and pump is used
Metered		✓		
Control Valve	✓		4	
Leakages				
Impact Assessment 2			High	Positive Impact
Water Treatment				
Water Treatment	✓		1	Water is dirty and not used for drinking, explained by meeting of traditional leaders
Impact Assessment 3			Low	Negative Impact
Increased Facility				
Increased Facility	✓		3	
Impact Assessment 4			High	Positive Impact
Operations and Maintenance Capacity				
Operations and Maintenance Capacity			3	
Impact Assessment 5			High	Positive Impact
Overall Level of impact			HIGH	Average Rating Value⁵

Figure 10. Impact Rating (Impact of the intervention).

2. Averaged rating or common rating

3. Any outstanding comments, does not include focus group interviews and surveys

4. Based on average rating values

5. High Impact (positive)=4-3; Medium Impact=2; and Low Impact (negative)=1

Note:

Public Water Main – Although the impact assessment showed the intervention have a high impact (positive), there are some shortfalls in the area of supporting documentation with reports from the health department and the water utility division on maintenance. The reporting process through the annual business plan process for budgetary reasons is not specific enough and clear.

Water Piped from Source – Although the project is incomplete with the header tank foundation and installation of header tanks to improve distribution as per project document, the intervention thus far has a high impact (positive). No sign of leakages and pump is used.

Water Treatment – Impact assessment showed a low impact (negative) water is dirty and not used for drinking.

Increased Facility – Impact assessment showed a high impact (positive), the intervention has increased the water supply to the households compared to before the intervention.

Operations and Maintenance Capacity – The impact assessment showed a high impact (positive) rating. The Island Government have a water utility comprised of trained plumbers who carry out maintenance work, and also, they are the ones that review the water utility annual business plans. There is a need to have clearly defined involvement of the community, traditional leaders and trained people in the management of water facilities.

Overall, with the issues identified, the intervention has a high positive impact on the community of Tamarua

Ra'ui Impact Assessment Summary Table

The following assessment used the information gained during the Focus Group discussion, meeting with the traditional leaders of Tamarua and knowledge gained from meeting with the Island Council. The table was taken out of the Checklist Impact assessment Form for the Kei'ā Rā'ui.

INDICATORS	LEVEL RATING ⁶			COMMENTS ⁷
	YES	NO	RATING ⁸	
Conservation Values				
Controlled access	✓		2	No entrance sign
Fishing Intensity by fishing methods	✓		1	7 methods identified, 1 impact, clam harvesting
Surface Impacts		✓		
Level of Impact 1			Low	
Anthropogenic Impact				
Tourist diving		✓		
Boating and recreational activities		✓		
Coral damage or coral bleaching	✓		3	
Sewage pollution		✓		
Industrial pollution		✓		
Sedimentation		✓		
Level of Impact 2			High	
Extension of Ownership				
Management action for species conservation	✓		3	
Management conservation for area conservation	✓		3	
Environmental awareness programme	✓		3	
Form of protection (statutory or other)	✓		3	
Training activities for monitoring	✓		4	
Impact Assessment 3			High	
Overall Level of impact			HIGH	Average Rating Value⁹

Figure 11. Impact Rating (Impact of the intervention activity on the resources).

6. Averaged rating or common rating

7. Any outstanding comments, does not include focus group interviews and surveys

8. Based on average rating values

9. High Impact (positive)=1; Medium Impact=2; and Low Impact (negative)=3-4

Note:

Conservation Values – The impact rating is low as there is no controlled access to the rā'ui site when it is closed, and there is no control on the most sought-after species, the clam.

Anthropogenic Impact – The impact rating is high as there are no tourist and boating activities, minimal pollution sources due to low population and no industrial pollution in the proximity of the area.

Extension of Ownership – The impact rating is high due mainly to the strong advocating by traditional leaders of the importance of their rā'ui.

The overall impact rating for this intervention is high (positive). There is strong advocacy work on the importance of the rā'ui by traditional leaders.

Annex II.

Key Reference Documents for Cook Islands

1. Adaptation Fund (AF), Project document
2. AF, Revised proposal
3. AF, Midterm evaluation report
4. AF, Concept note
5. AF, End of project report
6. GCCA+ SUPA Output 1, Cook Islands National consultant, Methodology report, 2022
7. GCCA+ SUPA Poutput 1, NIWA Analysis of Social survey on Managaia Island Report, 20228. Pacific Meteorological Desk, 2021. Climate profiles, Time period, 2016-2021
8. GCCA+ SUPA Poutput 1, NIWA Analysis of Social survey on Managaia Island Report, 20228. Pacific Meteorological Desk, 2021. Climate profiles, Time period, 2016-2021
9. Mangaia nearshore marine assessment, Ministry of marine resources, 2018
10. Cook Islands marine ecosystem services valuation, R2R 2021

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