

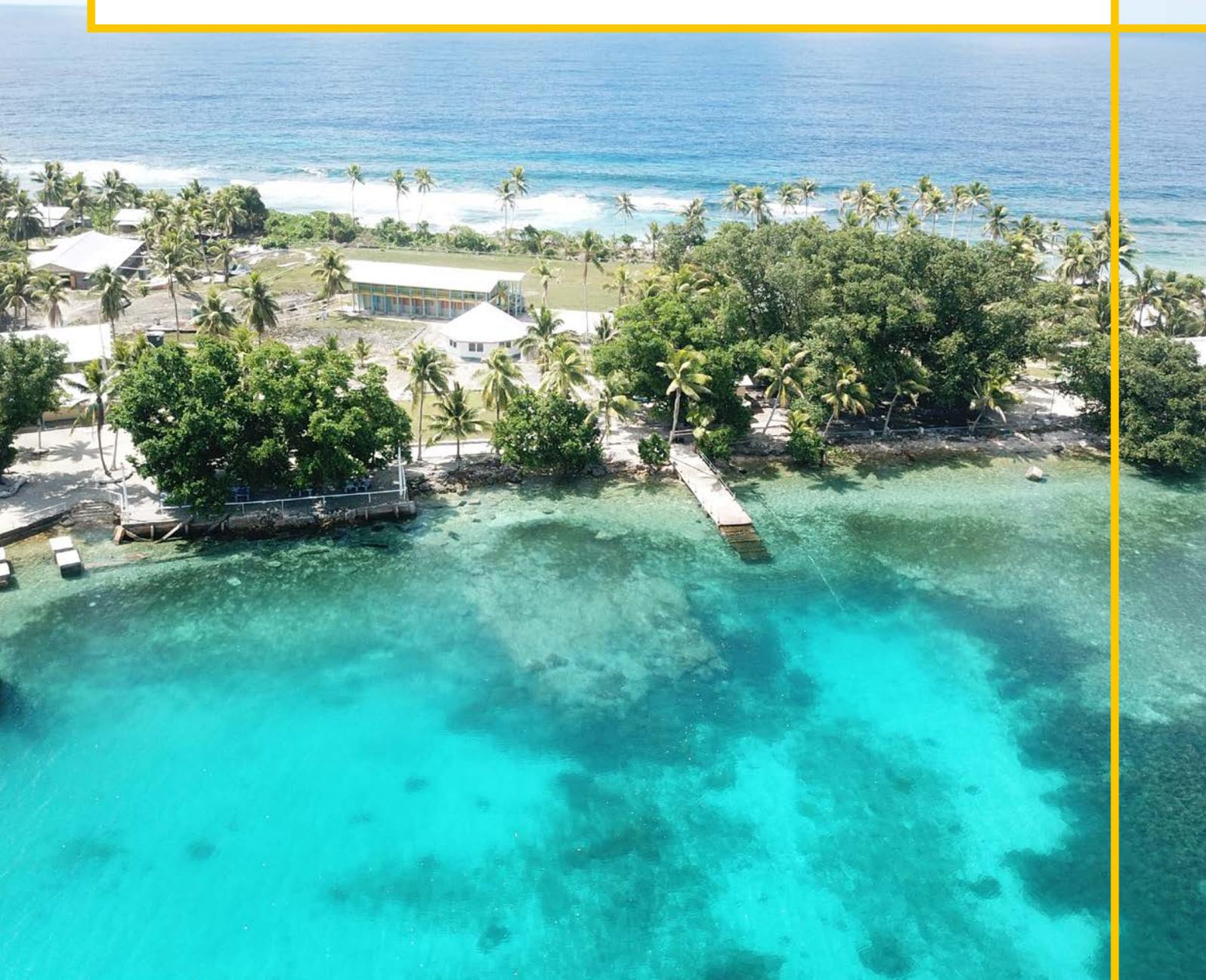


Tuvalu Integrated Vulnerability Assessment Report:

Amatuku Islet, Funafuti

Government of Tuvalu

September 2020



This report is the result of a joint initiative between the Department of Climate Change and Disaster (DCCD) of the Government of Tuvalu and the NAP Global Network.

© Government of Tuvalu, 2020

All rights for commercial/for profit reproduction or translation, in any form, reserved.

Original text: English

Authors: Ian Hay (international consultant), Tomu Hauma, Tuitala Lasifo, Saamu Tui (National IVA Consultants), and Joana Latasi (Tuvalu Integrated Vulnerability Assessment Database Officer).

Recommended citation: Government of Tuvalu. (2020). *Tuvalu Integrated Vulnerability Assessment Report – Amatuku, Funafuti*. Government of Tuvalu and NAP Global Network/International Institute for Sustainable Development (IISD).

Acknowledgements

The Tuvalu Integrated Vulnerability Assessment Report – Amatuku was developed through the United States In-Country National Adaptation Plan (NAP) Support Program in Tuvalu, which is implemented by the International Institute for Sustainable Development (IISD), host to the NAP Global Network Secretariat.

About the NAP Global Network

The NAP Global Network was created in 2014 to support developing countries in advancing their National Adaptation Processes (NAPs), and help accelerate adaptation efforts around the world. To achieve this, the Network facilitates sustained South–South peer learning and exchange, supports national-level action on NAP development and implementation, and enhances bilateral support for adaptation and climate-sensitive sectors through donor coordination. The Network’s members include participants from more than 140 countries involved in developing and implementing National Adaptation Plans, as well as 11 donor members. Financial support for the Network has been provided by Austria, Canada, Germany and the United States. The Secretariat is hosted by the International Institute for Sustainable Development (IISD). For more information, visit www.napglobalnetwork.org.

Any opinions stated herein are those of the author(s) and do not necessarily reflect the policies or opinions of the NAP Global Network, funders or Network participants.



United States In-Country National Adaptation Plan (NAP) Support Program

Gift of the United States Government



Implemented by:



Initial funding for the Network also provided by:



Financial support provided by:

Ce projet a été réalisé avec l'appui financier de :



Table of Contents

1.0 Introduction – Background and context for the Integrated Vulnerability Assessment and Reporting Process	1
1.1 Objectives of This Report.....	1
1.2 What Is the IVA framework and Data Collection Approach?	1
1.3 IVAR Process Methodology and Linkage to the NAP Process	5
2.0 National and Location Summary.....	8
2.1 National Context.....	8
2.2 Climate and Climate Change in Tuvalu.....	8
2.3 Amatuku Summary.....	8
3.0 Amatuku IVA Results and Analysis.....	10
3.1 Identifying and Assessing Amatuku’s Top Five Vulnerability Issues.....	11
3.2 Assessing Sector-Level Scores and Priorities in Amatuku	15
3.3 Summary and Prioritisation of Results and Conclusions.....	22
4.0 Results of the TWG Review	30
4.1 Results of the TWG’s Investigations	31
5.0 Community Validation of IVA Results and TWG Feedback	34
5.1 Community Validation of IVA Results.....	34
5.2 Community Validation of TWG Feedback	34
6.0 Summary of TWG and Amatuku Community Feedback on IVA Results.....	36
6.1 IVA Validation.....	36
6.2 Emerging Themes.....	37
7.0 Conclusions and Next Steps	38
References	40
Appendices	41
A1. Technical Working Group Participants.....	41
A2. Community Information and Feedback Session Agenda	43
A3. Community Information and Feedback Session Participants.....	44

1.0 Introduction – Background and context for the Integrated Vulnerability Assessment and Reporting Process

This report captures the results of the Integrated Vulnerability Assessment (IVA) as conducted on the islet of Amatuku, Funafuti Atoll, Tuvalu. It includes the outcomes of technical and community review stages of the IVA process.

1.1 Objectives of This Report

- Communicate and analyse key results of the IVA in a user-friendly way.
- Inform the national adaptation planning process by providing a gender- and youth-responsive evidence base for sub-national vulnerabilities and community-identified adaptation priorities.
- Reinforce the bottom-up and top-down approach to assessment, prioritisation, and planning to institutionalise national to sub-national linkages (vertical integration).
- Ultimately, inform evidence-based adaptation planning, helping prioritise and direct institutional responses at every level of governance within Tuvalu, including for external funding.

1.2 What Is the IVA framework and Data Collection Approach?

1.2.1 The IVA Framework and Application

The IVA systematically examines how environmental and developmental changes affect local communities and the subsequent impacts of these changes on their ability to meet their basic needs. It provides baseline data about communities' vulnerability through a standardised approach that can be replicated across locations and time periods. The IVA data can be collected, organised, and presented using digital technologies (e.g., tablets, an online database, and dashboards), which facilitates the analysis and sharing of local-level vulnerability data. IVA can be a valuable tool to inform the comparative analysis, issue, and options prioritisation, along with the broader development, implementation, and monitoring and evaluation of the National Adaptation Plan process (Dumar, 2019).

The IVA framework in Tuvalu covers seven sectors and five livelihood assets which in combination create 35 subsectors.¹ See Figure 1.1 for an illustration of this framework.

¹ Sectors are also termed “human security objectives” in the IVA Framework. “Livelihood assets” are also termed “assets.” Subsectors are sometimes referred to as “components.”

Figure 1.1. The IVA framework in Tuvalu: 7 sectors x 5 assets = 35 subsectors

Sectors	Assets					Total (by sector)
	Natural Resources (n)	Infrastructure & Services (i)	Finance (f)	Human Resources (h)	Institutions * Governance (g)	
Ecosystem (E)	E(n)	E(i)	E(f)	E(h)	E(g)	
Water Security (W)	W(n)	W(i)	W(f)	W(h)	W(g)	
Security of Place (P)	P(n)	P(i)	P(f)	P(h)	P(g)	
Energy Security (N)	N(n)	N(i)	N(f)	N(h)	N(g)	
Income Security (I)	I(n)	I(i)	I(f)	I(h)	I(g)	
Community Health (H)	H(n)	H(i)	H(f)	H(h)	H(g)	
Food Security (F)	F(n)	F(i)	F(f)	F(h)	F(g)	
Total (by asset)						(IVA)

35 sub-sectors

1.2.2 The IVA Data Collection Approach

The IVA data is collected using participatory rural appraisals (PRAs) undertaken by members of the National Advisory Council Climate Change (NACCC) agencies together with communities. PRA uses “key informants,” such as community members and leaders, to collect information across a wide range of topics, as per the 35 intersecting components of the IVA framework. These are undertaken as gender- and youth-separated focus groups (referred to as “groups” in this report) with each location having three groups, with the exception of two locations where small population sizes necessitated mixed focus groups. These focus groups followed the methodology outlined in Figure 1.3. There are 38 groups across 14 locations nationally.

Figure 1.2. The IVA being undertaken in Amatuku



Source: Tuvalu Climate Change Department

Figure 1.3. IVA focus group methodology stages.

Step 1	<ul style="list-style-type: none"> • Issue identification. Identify presence of issue from checklist • (647 x possible issues in “TIVA issues checklist.” Approx. 10–20 per subsector) (see section 3.1.1)
Step 2	<ul style="list-style-type: none"> • Sector prioritisation. Prioritise top 2 issues per subsector • 70 issues per group: 35 subsectors with 2 priority issues (See section 3.2.2)
Step 3	<ul style="list-style-type: none"> • Qualitative description* of #1 subsector issues (35 issues) (see TIVA Database) • (see TIVA Database)
Step 4	<ul style="list-style-type: none"> • IVA vulnerability scoring per subsector • 1 = very bad (more vulnerable) to 5 = good (not vulnerable) (see Section 3.2.1)
Step 5	<ul style="list-style-type: none"> • Prioritise top five vulnerability issues overall based on issues identified in step #2 • Five issues per group. 15 issues per location. (see Section 3.1)

**This includes: description of the issue, frequency/duration and location of the issue, magnitude of issue and impacts, affected people, previous adaptation measures and outcomes, and suggested future adaptation measures.*

1.2.3 The IVA Data Collection Instrument

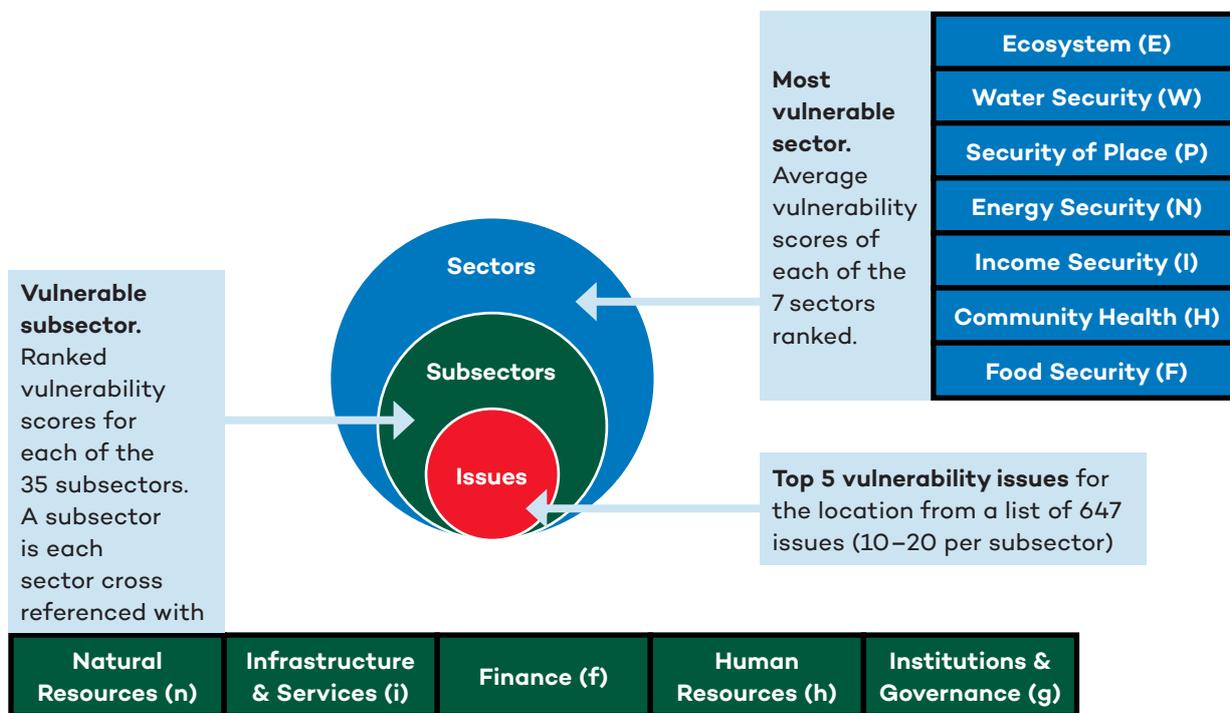
The IVA relies on a detailed set of pre-defined vulnerability “issues” (approximately 650) that form a checklist of possible climate change vulnerability issues present in an island or community (see Table 1.1). These issues have been developed through intensive national engagement. They provide a focus for deliberations in groups and form the basis of later rounds of prioritisation and qualitative description of issues, impacts, and successful and unsuccessful adaptation options.

Table 1.1. Examples of issues from the “water security” and “infrastructure & services” subsector

Sector	Asset	Issue
Water Security (W)	Infrastructure & Services (i)	(Wi.1) Household Water Tank Capacity > Inadequate household water tank capacity
Water Security (W)	Infrastructure & Services (i)	(Wi.2) Household Water Tank Capacity > Inadequate household water tank capacity due to high household size and demand
Water Security (W)	Infrastructure & Services (i)	(Wi.3) Communal Water Tank Capacity > Inadequate communal water tank capacity
Water Security (W)	Infrastructure & Services (i)	(Wi.4) Communal Water Tank Distribution > Unsuitable system from public cisterns
Water Security (W)	Infrastructure & Services (i)	(Wi.5) Faulty Household Water Tanks > Leaking or faulty household water tanks
Water Security (W)	Infrastructure & Services (i)	(Wi.6) Faulty Communal Water Tanks > Leaking or faulty communal water tanks

Each issue in the IVA issues checklist has a code associated with it which corresponds to the subsector it is in (see Figure 1.1). The first capital letter corresponds to the sector, the second lower case letter to the asset, and the number to the order in the issues checklist within that subsector. For example: (Wi.4) is issue #4 in the “water security” + “infrastructure & services” subsector.

Figure 1.4. Summary of different components of the IVA Framework



THE TUVALU IVA DATABASE

The Tuvalu IVA (TIVA) Database is the repository for information collected as part of the IVA process and contains a number of different dashboards to assist users to access and analyse the IVA data. These dashboards have been used to prepare the results in Section 3, and are also available here: <https://www.tuvaluiva.com/dashboards.html>.

1.3 IVAR Process Methodology and Linkage to the NAP Process

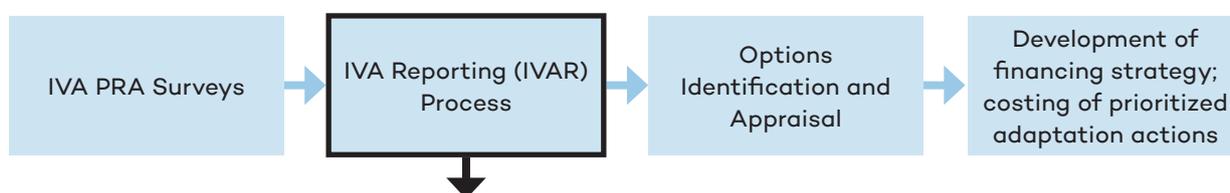
The Integrated Vulnerability Assessment Report (IVAR) Process refers to the process of analysing IVA results, compiling reports and presentations, supporting technical and community review, and completing reports based on the results.

The IVARs are a key input into options identification and appraisal stages that follow data collection and analysis. They will aim to provide a clear roadmap of priority vulnerabilities for the Government to focus on, and point to the supporting studies required for the next stages of climate change adaptation planning.

HOW ARE IVARS LINKED TO THE NAP PROCESS?

The National Adaptation Plan process is a national process to integrate climate adaptation into development planning and budgeting at national, sectoral, and sub-national levels. The ultimate outcome of the NAP process is the reduction of a country's vulnerability to climate impacts in the medium to long term. The IVAR process is part of Tuvalu's NAP process by supporting the climate adaptation options identification and appraisal phase. The **options identification phase** is a process where adaptation alternatives to specific vulnerabilities are proposed and investigated. **Options appraisal** is a process of setting criteria for evaluating the effectiveness, efficiency, and appropriateness of an intervention (an adaptation option) and then systematically rating and ranking them according to those criteria to inform decision making. Tuvalu is currently in the development phase of its NAP process and is formulating the preparatory elements, including this report.

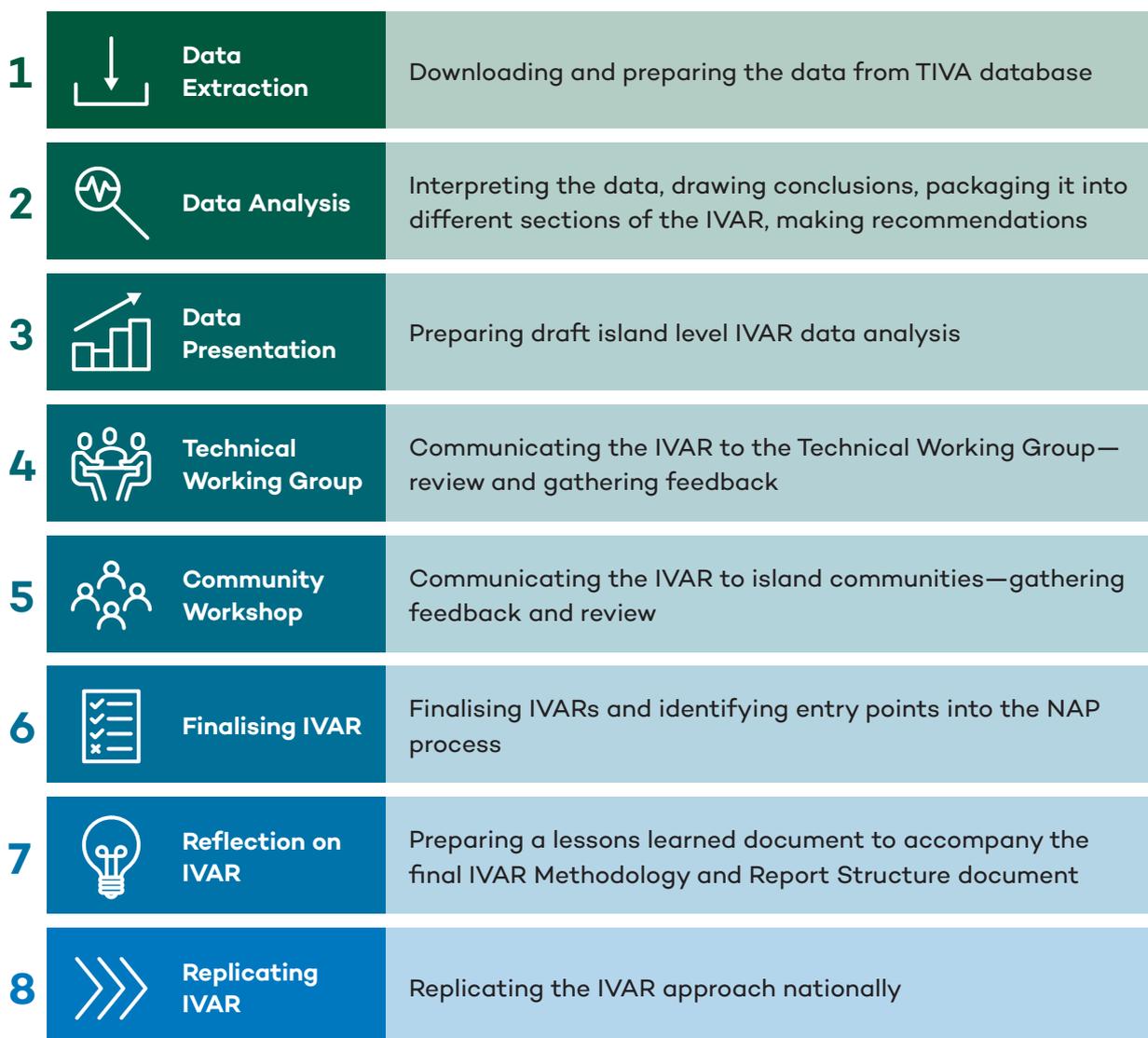
Figure 1.5. The IVARs are a key step within Tuvalu's NAP process



DEVELOPING THE IVARS

The methodology to develop the IVARs consisted of eight distinct steps, as summarized in Figure 1.6.

Figure 1.6. The IVAR process in eight steps



More specifically:

Steps 1–3: Data Extraction, Analysis, and Presentation

First, data was extracted from the TIVA database dashboards. The data was then analysed and interpreted to draw key insights and analysis emerging from the data. The third step was to prepare the data into tables, scorecards, and narratives explain the findings and perform a multi-criteria analysis (MCA). The formatted data was then integrated into the IVAR template report with the addition of accompanying maps and photos. During this step, specific focus questions (such as on sector-specific questions) were identified for the Technical Working Group (TWG) to consider.

Step 4: Technical Working Group Review Session

The TWG, appointed by the National Climate Change Advisory Council, reviewed the results of the IVARs in a series of participatory workshops. The TWG review sessions aimed to

provide the “learned” perspective on the IVA results which came directly from the “lived” experience of the community. The sessions analysed, evaluated, and validated IVA results; provided added technical evidence to shape results, and determined gaps in knowledge to add greater depth to results. The TWG reviewed, considered, and assessed the priorities in a deliberative way informed by their own technical experience, expertise, and their agencies’ strategic priorities. This process identified areas of consensus, areas of difference, and areas where further information was needed from communities.



Step 5: Community Information and Feedback Session

The IVA results and the findings from the TWG were then taken back to communities in location-specific community information and feedback sessions. The first objective of these sessions was to report back the results of the IVA PRA process to the communities who took part in the focus groups. This provided an opportunity to validate results with participants. The workshop also aimed to build knowledge and awareness by communicating the value added analysis of the data and the prioritisation process, which included a comparison of local and national vulnerabilities and how climate-impacted issues are.

Steps 6–8: Finalising the IVAR

Using the IVA data, expert analysis, and prioritization along with the results from the TWG and community consultation, the IVARs were drafted, amended, and finalized to create a suite of reports that cover 14 locations nationally.

2.0 National and Location Summary

2.1 National Context

The nine islands of Tuvalu are situated in the South Pacific Ocean with a combined land area of 26 km². It has a total population of 10,782, with just over half of whom reside in the country's capital of Funafuti. The average height above sea level is less than 3 metres, with the maximum height above sea level being 4.6 m (Government of Tuvalu [GoTV], 2015).

2.2 Climate and Climate Change in Tuvalu

Tuvalu has a tropical climate characterized by two distinct seasons—a wet season from November to April and a dry season from May to October. This seasonal cycle is strongly influenced by the South Pacific Convergence. The mean annual rainfall in the southern islands of Tuvalu is 3,400 mm: in the north is it 2,900 mm. Temperature ranges from 25°C to 30°C all year around. The tropical cyclone season is from November to April. Tuvalu is particularly vulnerable to cyclone-generated winds, storm surges, and swells, as well as spring tides. Since 1993, Tuvalu's sea level has been rising by approximately 5 mm per year (GOTV, 2015, p. viii).

Anticipated climate trends in Tuvalu are as follows (Pacific–Australia Climate Change Science and Adaptation Planning Program [PACCSAPP], 2015, p. 6):

- El Niño and La Niña events will continue to occur in the future, but there is little consensus on whether these events will change in intensity or frequency.
- Annual mean temperatures and extremely high daily temperatures will continue to rise.
- It is not clear whether mean annual rainfall will increase or decrease, the model average indicating little change, with more extreme rain events.
- Incidence of drought is projected to decrease slightly.
- Sea level will continue to rise.
- Ocean acidification is expected to continue.
- The risk of coral bleaching is expected to increase.
- December–March wave heights and periods are projected to decrease slightly.
- Tropical cyclones are projected to be less frequent but more intense.

2.3 Amatuku Summary

Amatuku islet is approximately 10 km north of the capital Funafuti and has an estimated population of 146 people in 2020 representing 1.4% of the national population (see Table 2.1). It

is the smallest locality of Funafuti by population and has the second lowest population density of the six Funafuti localities. The islet is home to a maritime training college and has a mix of teachers and students residing on a permanent and temporary basis.

Table 2.1 Location and population statistics

Total estimated population by place of enumeration (percentage of national)	146 (1.4%)
Area (Km ²) and distance from Funafuti International Airport	0.07 Km ² 10 km
Estimated population density (persons per Km ²)	2,212 per Km ²
Estimated population change 2012–2020 (percentage annual change in period)	18 (1.8%)
Households in 2017 (average household size on Funafuti)	15 (7.9)

Source: Secretariat of the Pacific Community (SPC), 2020; Central Statistics Division, Ministry of Finance, Economic Planning and Industries, Government of Tuvalu (GoTV), n.d., adapted by NAP GN/author.

Map 1. Amatuku islet relative to Funafuti (left) and detail (right).



Source: Google Earth (2020)

2.3.1 The IVA Survey in Amatuku Islet

The IVA survey on Amatuku Islet was conducted on February 5, 2020, from 10 a.m. to 5 p.m. Amatuku has a small population: the smaller number of participants meant a mixed (not gender- and youth-separated) focus group was conducted. The survey included 13 participants: six women, two young people, and five men. The survey followed the process outlined in Section 1.2.2.

3.0 Amatuku IVA Results and Analysis

This report presents and discusses the results of the IVA that was conducted on Amatuku islet in May 2020. It includes presentation and analysis of the top five vulnerability issues, vulnerable sectors, and further analysis of each compared to the national IVA results. One of the differences of this report to other IVA reports is that the Amatuku IVA was undertaken with a mixed group of participants, so there is no gender and youth breakdown in this report.

The results are presented according to the key stages of the IVA including:

	top five vulnerability issues (IVA Step #5)
	sectoral IVA scores and priority issues (Steps #2 and #4)

In examining these results, this analysis explores the following questions:

	How frequently reported are the top five and sector priority issues in this location relative to national results? Frequency is measured by the number of groups reporting an issue. To establish the significance of an issue, different thresholds are set: for example, reported by more than 75% of groups .
	Which are the priority issues either in the top five or at a sector-level?
	Which are the most vulnerable sectors by IVA score , and how do these compare to national results?
	MCA to target the overall priority issues using each stage of the analysis to build a comprehensive picture of locally prioritised and nationally significant issues .

3.1 Identifying and Assessing Amatuku’s Top Five Vulnerability Issues

As part of the IVA survey, participants in the focus groups are asked to prioritise the overall top five vulnerability issues in their location (island or Funafuti locality). This follows a multi-stage process of identifying and prioritising issues at a subsector level (see Box 1). This section presents, analyses, and discusses these top five vulnerability issues.

3.1.1 Overview and Comparison of Top Five Vulnerability Issues With National Results

Table 3.1 lists the top five vulnerability issues in Amatuku. Red highlights show where the top five vulnerability issues in Amatuku are also *frequently reported* in national results. A *frequently reported* top five vulnerability issue is defined as:

- an issue reported >75% in IVA Step #1 for the whole of the IVA survey, suggesting this is a *common issue nationwide*; and
- an issue reported as a top five priority issue by five or more other groups (IVA Step #5), suggesting that this is also a *priority issue amongst communities nationwide*.

Table 3.1 Overview of the top five vulnerability issues reported in Amatuku in May 2020 compared to national results.

Issue rank*	Top five vulnerability issues in Amatuku	% of groups reporting issue nationally**	N. groups reporting issue in the top five*** nationally
1	(Pi.12) Coastal Stabilization Infrastructure > Limited to no access to coastal stabilization infrastructure (e.g., groynes/gabion baskets)	86%	4
2	(Wi.1) Household Water Tank Capacity > Inadequate household water tank capacity	100%	11
3	(Fn.22) Land Food Resilience – Sea-Level Rise/ Saltwater Intrusion > Low resilience of land-based food (crops and tree fruit sources to sea-level rise and saltwater intrusion)	93%	2
4	(Ni.2) Renewable energy access – household > Limited to no household access to renewable energy	79%	2
5	(If.1) Income for Basic Needs > Household income insufficient to meet basic needs and services	100%	7

*1 is ranked as most important. ** IVA Step #1 ***IVA Step #5

Key Insights and Analysis

- All five of the top five vulnerability issues are frequently reported as present by more than 75% of other groups in the survey nationwide.
- Two of these are also prioritised by five or more groups nationwide:
 - *(Wi.1) Household Water Tank Capacity > Inadequate household water tank capacity*
 - *(If.1) Income for Basic Needs > Household income insufficient to meet basic needs and services*
- These results suggest that all of Amatuku's top five vulnerability issues are common to those reported by other groups, with two being frequently prioritised. This shows they are not unique to this location, and are high priority across multiple areas, and may represent a justification for prioritisation in the NAP Process.
- See Map #2 for location of top five vulnerable issues in Amatuku.* This shows, for example, where the number #1 issue (Pi.12) is present.

** Note that some issues, e.g., "insufficient household income" may not have a relevant spatial dimension (i.e., are not meaningfully "mappable") to them and/or were not captured as part of the mapping stage.*

3.1.2 Subsector Comparison of Top Five Vulnerability Issues – Hotspot Subsectors

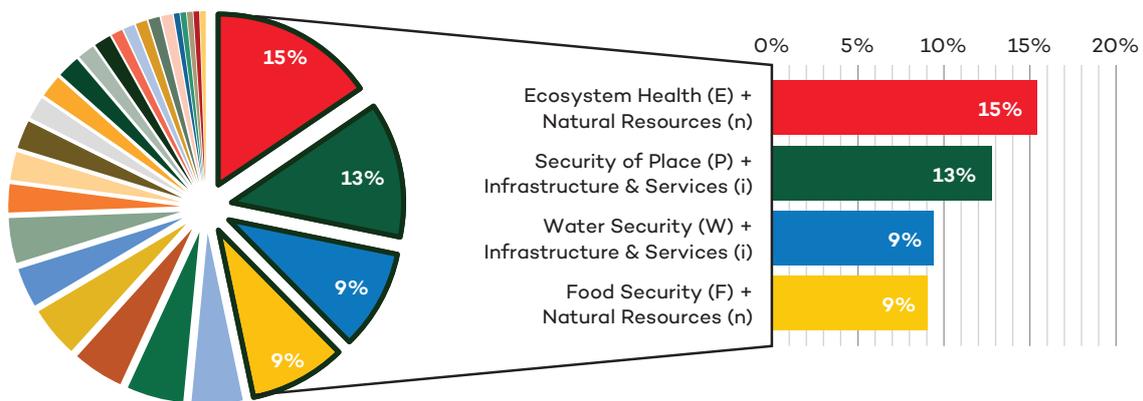
This section examines how the top five vulnerability issues reported in Amatuku compare to the national results at a subsector level. We see that almost half of all top five vulnerability issues fall within four subsectors: we will call these "hotspot subsectors" (see definition in Box 1).



Box 1. Defining “Hotspot Subsectors”

Analysing the top five vulnerability issues by subsector can show where both *related* and *frequently reported* issues occur in a given subsector. Thus, it shows clusters of top five priority issues (henceforth “hotspot subsectors”). These are defined as subsectors that, nationally, have 9% or more of the top five vulnerability issues. Combined, close to half (47%) of all (n. 191) top five vulnerability issues fall into these four hotspot subsectors.

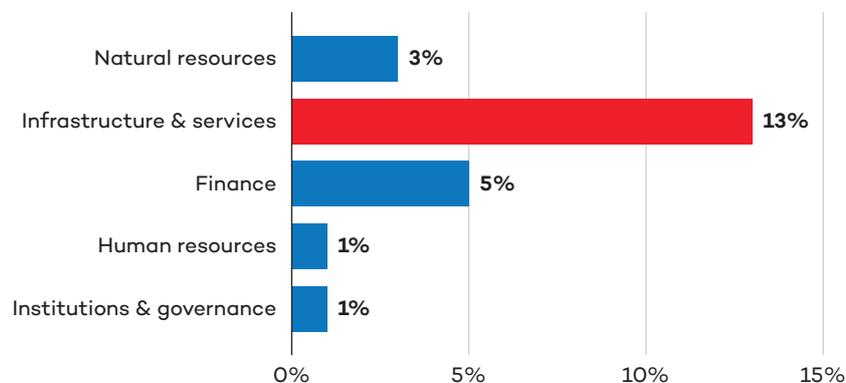
Figure 3.1. Hotspot subsectors in the Tuvalu national IVA survey (2018, 2020).



The figures that follow show where a top five issue in Amatuku (red highlight) falls into a hotspot subsector (bars show national results). For all charts on the subsectors of the top five vulnerability issues, go to <https://www.tuvaluiva.com/dashboards.html>

The #1 issue in Amatuku (Pi.12) is in the “security of place + infrastructure & services” subsector, which has **the second highest proportion of top five issues** (13% of top five vulnerability issues).

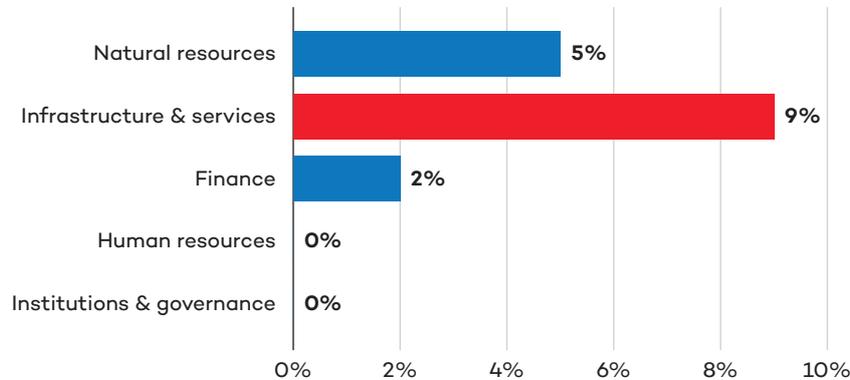
Figure 3.2. Percentage of top five vulnerability issues in “security of place” by subsector nationally. Red highlights show Amatuku’s top five issue subsector(s).



Note: Bars show national results. Red highlight shows the subsector(s) that Amatuku’s top five vulnerability issues fall into.

The #2 issue in Amatuku (Wi.1) is in the “water security + infrastructure & services” subsector, which has the third highest proportion (10%) of top five vulnerability issues.

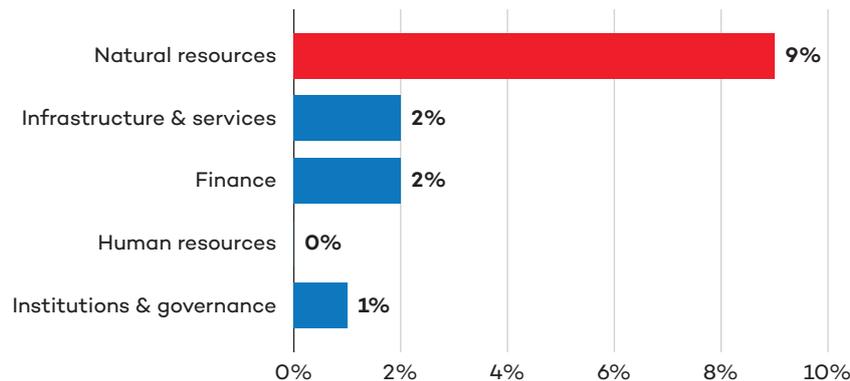
Figure 3.3. Percentage of top five vulnerability issues in “water security” by subsector nationally.



Note: Red highlights show Amatuku’s top five issue subsector(s).

The #3 issue in Amatuku (Fn.22) is in the “food security + natural resources” subsector. This subsector has the fourth highest proportion (9%) of top five vulnerability issues.

Figure 3.4. Percentage of top five vulnerability issues reported in the “food security” sector by subsector with Amatuku top five issue subsector(s) highlighted.



Key Insights and Analysis

- Three of Amatuku’s top five vulnerability issues fall into hotspot subsectors:
 - (Pi.12) Coastal Stabilization Infrastructure > Limited to no access to coastal stabilization infrastructure (e.g., groynes/gabion baskets).
 - (Wi.1) Household Water Tank Capacity > Inadequate household water tank capacity.
 - (Fn.22) Land Food Resilience—Sea-Level Rise/Saltwater Intrusion > Low resilience of land-based food (crops and tree fruit sources to sea-level rise and saltwater intrusion).
- Further investigations into these hotspot subsectors in Amatuku can inform national responses, and likewise national investigations in these subsectors may bring insights and solutions for Amatuku. A focus on hotspot subsectors may be justified given the high proportion of top five vulnerability issues in these subsectors. These may be a basis for locally relevant, but nationally scalable, investigations as part of the NAP process.

Map 2. Location of reported top five vulnerabilities and existing adaptation responses in Amatuku as of May 2020



Source: Amatuku IVA survey (2020)

3.2 Assessing Sector-Level Scores and Priorities in Amatuku

The IVA approach provides information on the sectors and subsectors that are particularly vulnerable as perceived by participants. The results are captured using the IVA score. This section examines the results according to vulnerable sectors, vulnerable subsectors (IVA Step #4) and the prioritised issues within those subsectors (IVA Step #2).

3.2.1 Assessing Sector-Level Vulnerability Scores

This section examines the overall vulnerability scores reported by the participants in the IVA process. This aims to provide information on:

- How a selected location/group's vulnerability scores compare across sectors & subsectors? ("local vulnerability")
- How does this compare to the national total? ("national vulnerability")

The results are presented below in tables according to sector and subsector grouping (see Box 1 for further information). In these tables, 1 = high reported vulnerability and 5 = not reported as vulnerable. See colour coding below.

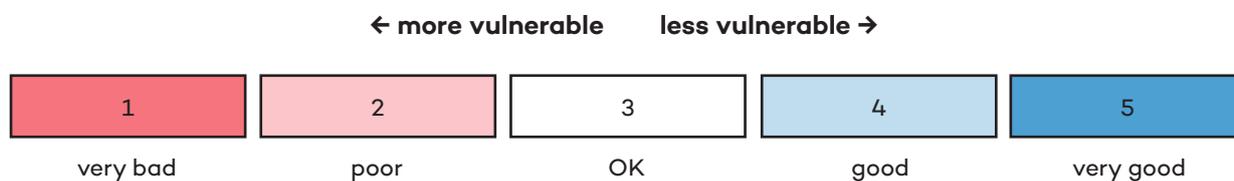


Table 3.2 shows the IVA vulnerability scores for Amatuku.

Table 3.2. IVA vulnerability scores reported for Amatuku in May 2020 from 1 = “high vulnerability” to 5 “not vulnerable”

Sector	Subsector					Total (Avg.)
	Natural resources	Infrastructure & services	Finance	Human resources	Institutions & governance	
Ecosystem health	1	1	1	1	1	1
Water security	1	1	1	1	1	1
Security of place	1	1	2	2	2	1.6
Energy security	2	2	1	2	1	1.6
Income security	1	1	3	2	2	1.8
Community health	4	5	5	1	4	3.8
Food security	2	2	1	3	2	2
Total (Avg.)	1.7	1.9	2	1.7	1.9	1.8

Note: (1 = high reported vulnerability – 5 = not reported as vulnerable)

Table 3.3 shows the overall national average IVA scores for each sector and subsector.

Table 3.3. National average IVA vulnerability scores

Sector	Subsector					Total (Avg.)
	Natural resources	Infrastructure & services	Finance	Human resources	Institutions & governance	
Ecosystem health	1.4	1.5	1.7	1.7	1.7	1.6
Water security	2.0	2.3	1.9	2.4	2.4	2.2
Security of place	1.4	1.6	2.0	2.7	2.4	2.0
Energy security	2.2	1.9	1.9	2.1	1.9	2.0
Income security	1.8	1.8	1.9	1.9	2.1	1.9
Community health	2.0	2.3	3.2	1.8	2.5	2.4
Food security	2.1	2.2	2.1	2.6	2.5	2.3
Total (Avg.)	1.8	1.9	2.1	2.2	2.2	2.1



Photo: [Silke von Brockhausen/UNDP](#) (CC BY-NC-ND 2.0)

Table 3.4 shows the difference between the average IVA scores the Amatuku and the overall national average IVA scores for each sector and subsector according to the colour coding below.

← more vulnerable than comparison area less vulnerable than comparison area →



Table 3.4. Difference between Amatuku and national average vulnerability scores.

Sector	Subsector					Total (Avg.)
	Natural resources	Infrastructure & services	Finance	Human resources	Institutions & governance	
Ecosystem health	-0.4	-0.5	-0.7	-0.7	-0.7	-0.6
Water security	-1.0	-1.3	-0.9	-1.4	-1.4	-1.2
Security of place	-0.4	-0.6	0.0	-0.7	-0.4	-0.4
Energy security	-0.2	0.1	-0.9	-0.1	-0.9	-0.4
Income security	-0.8	-0.8	1.1	0.1	-0.1	-0.1
Community health	2.0	2.7	1.8	-0.8	1.5	1.4
Food security	-0.1	-0.2	-1.1	0.4	-0.5	-0.3
Total (Avg.)	-0.1	0.0	-0.1	-0.5	-0.3	-0.3

Note: the differences indicate that community health in Amatuku is substantially less vulnerable compared to national results, and “water security” is substantially more vulnerable. Water sector vulnerability is particularly acute in the subsectors of “infrastructure & services,” “natural resources,” and “institutions and governance.”

Examining tables 3.2 and 3.3 together, we see that there are certain sectors where a) either local and national vulnerability are high (IVA score <2), and b) both are at least high-medium (IVA score >2 <3). Table 3.5 illustrates how local and national vulnerability intersect to highlight sectors of particular priority based on IVA vulnerability scoring.

Table 3.5. Comparison of high-vulnerability sectors in Amatuku with the average vulnerability from the whole IVA survey

Sector	Amatuku high vulnerability (<2 IVA Score)	National high vulnerability (1-2 IVA Score)	Priority based on IVA scoring
Ecosystem health	1 (high)	1.6 (high)	very high
Water security	1 (high)	2.2 (high/med)	high/med
Security of place	1.6 (high)	2.0 (high/med)	high/med
Energy security	1.6 (high)	2.0 (high/med)	high/med
Income security	1.8 (high)	1.9 (high)	very high
Community health	3.8 (med)	2.4 (high/med)	med/low
Food security	2 (high/med)	2.3 (high/med)	med

Priority key: “very high” = both local and national IVA score of < 2. “high” = local IVA score 2–2.9 and national <2. “high/med” = local IVA score < 2 and national 2–2.9. “med” = both local and national IVA score of 2–2.9.

Key Insights and Analysis

When looking at Tables 3.2, 3.3, and 3.4, three key findings emerge in terms of local vulnerability and national vulnerability.

Local vulnerability:

- “Ecosystem health” and “income security” are rated as the most highly vulnerable sectors, followed by “water security,” “security of place,” and “energy security.”
- “Water security” is rated as more vulnerable relative to the total, particularly in the subsectors of “natural resources,” “infrastructure & services,” and “institutions & governance.”
- “Community health” is rated as the least vulnerable relative to the total, particularly in the subsectors of “natural resources,” “infrastructure & services,” and “finance.”

National vulnerability:

- “Ecosystem health” and “income security” were rated the most vulnerable of all sectors.

Combined vulnerability:

- Looking at both national and local vulnerability together it shows that “Ecosystem health” and “income security” followed by “water security” “security of place” and “energy security” are the most vulnerable sectors.

3.2.2 Identifying Amatuku’s Sector Priority Issues Compared to the National Level

This section examines what the overall sector priority issues are in Amatuku and how they compare to most prevalent national-sector priority issues (IVA Step 2). This analysis looks at which sector priority issues are *frequently reported* both in Amatuku and nationally. This examines issues according to four criteria, which are:

1. **Locally prioritised:** Are listed as a sector priority issue in Amatuku.
2. **High vulnerability score:** Are in the medium to high categories of vulnerability (“very high,” “high,” or “high/med” from Table 3.5).
3. **Nationally prioritised:** Are in the top 10 of all sector priority issues nationwide.
4. **Nationally prioritised:** More than 10% of groups nationwide report this issue.

This is a measure of issues that are both nationally significant and a local priority. Table 3.6 shows the sector priority issues that meet these criteria. Figure 3.5 shows an example from “water security” showing the top 10 sector priority issues with those reported in Amatuku highlighted in red. (All charts are [linked here](#)).

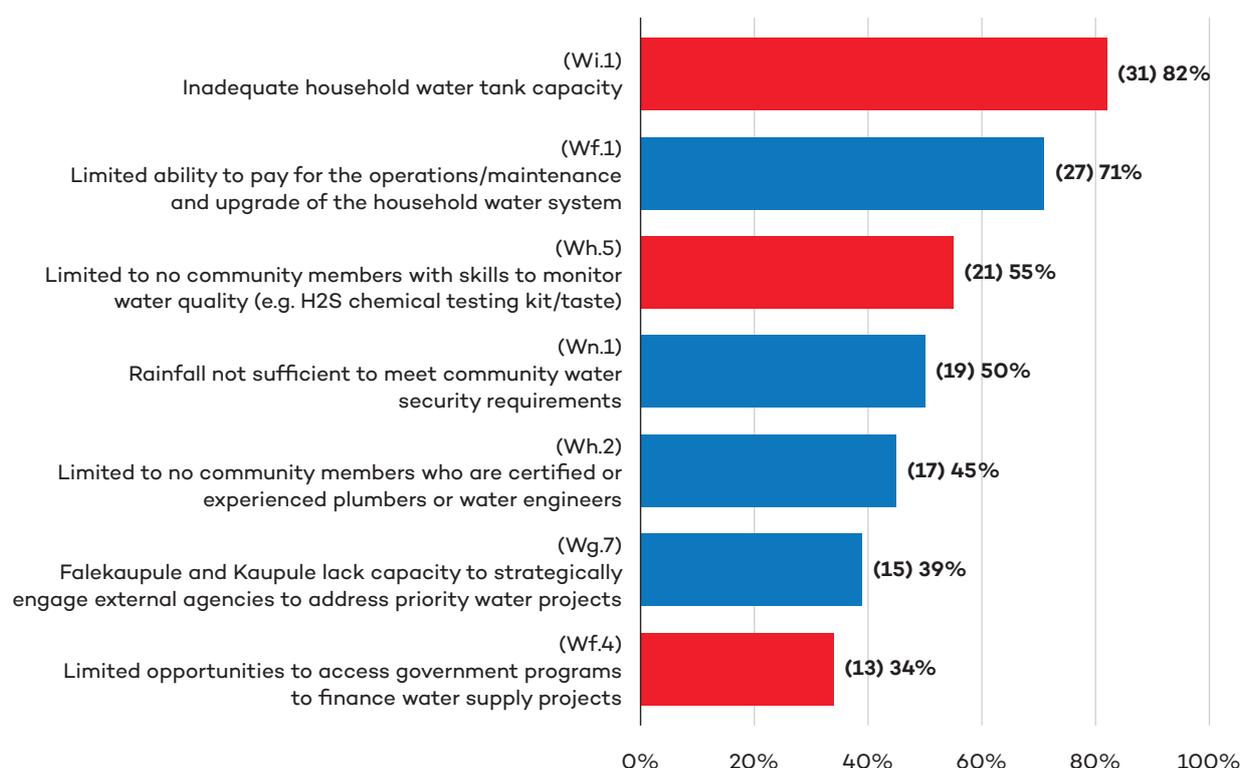
Table 3.6. List of issues that are both reported in Amatuku and in the top 10 sector priority issues across all locations:

Sector	Sector priority issue (in top 10 nationally reported and >10% of groups report)	% of groups reporting as a sector priority issue nationally
Ecosystem health	<i>(Ef.3) Marine Conservation > Limited or no means to pay for various marine and land-based environmental protection or conservation activities (e.g., protected areas)</i>	58%
Water security	<i>(Wi.1) Household Water Tank Capacity > Inadequate household water tank capacity</i>	82%
	<i>(Wh.5) Skills to Monitor Water Quality > Limited to no community members with skills to monitor water quality (e.g., H2S chemical testing kit/taste)</i>	55%
	<i>(Wf.4) Government Water Financing Projects > Limited opportunities to access to government programs to finance water supply projects</i>	34%

Sector	Sector priority issue (in top 10 nationally reported and >10% of groups report)	% of groups reporting as a sector priority issue nationally
Energy security	(Nn.4) Petroleum Reliance > At least 50% of the community relies on petroleum (kerosene/benzene/diesel/LPG)	68%
	(Nf.4) Energy Technology Upgrade Affordability > Limited to no access to a trust or other fund source to upgrade and maintain energy equipment and technology	34%
	(Ni.11) Power Backup Energy System > Limited or faulty community power supply backup energy system	32%
Income security	(If.1) Income for Basic Needs > Household income insufficient to meet basic needs and services	53%
	(In.2) Soil Fertility for Commercial Agriculture > Limited soil fertility for commercial agriculture	42%
	(Ih.1) Limited to no community members trained in financial literacy (e.g., basic budgeting skills)	39%

*None of the “Security of place” sector priority issues reported in Amatuku are in the top 10 and/or >=10%

Figure 3.5. Example from “water security” top sector priority issues nationally with Amatuku sector priority issues highlighted red (% of groups reporting issue).



Key Insights and Analysis

- This analysis shows that of the 70 sector priority issues in Amatuku, 10 meet the criteria above, illustrating they are both locally relevant and nationally significant.
- Issues in the “water security” sector are particularly nationally significant, with two issues reported in Amatuku also reported by more than 50% of groups nationally.
 - *(Wi.1) Household Water Tank Capacity > Inadequate household water tank capacity (82%)*
 - *(Wh.5) Skills to Monitor Water Quality > Limited to no community members with skills to monitor water quality (e.g., H2S chemical testing kit/taste)(55%)*
- The “energy security” and “income security” sectors have three issues that are reported by more than 30% and one issue in each sector (Nn.4 & If.1) reported by more than 50% of groups.
 - *(Nn.4) Petroleum Reliance > At least 50% of the community relies on petroleum (kerosene/benzene/diesel/LPG) (68%)*
 - *(If.1) Income for Basic Needs > Household income insufficient to meet basic needs and services (53%)*
- The “ecosystem health” sector had one issue (Ef.1) reported by more than 50% of groups.
- These highlight specific issues that are both local priorities as well as being nationally significant and may be given particular attention in the IVAR—and potentially in later stages of the NAP Process more broadly.

3.3 Summary and Prioritisation of Results and Conclusions

The IVA is a national survey, and it is important to identify key emerging results that reflect priorities at both the local and national levels. As such, this section seeks to prioritise the IVA issues according to a combination of local and national priorities using a series of MCAs to further prioritise IVA results. These MCAs build on the analysis in this report to further prioritise vulnerability issues according to a series of prioritisation criteria. These analyses highlight which issues may be further prioritised in the context of the whole IVA survey results, particularly those that are *frequently reported* in other locations, are particularly *vulnerable*, and/or that are highly climate related.

These MCAs focus only on a narrow range of criteria derived primarily from the results of the IVA itself. This is a narrow focus for prioritisation, relying only on the patterns in the results themselves, and thus should only be considered an aid to later consultative and technical prioritisation processes. This cannot be considered a true multi-dimensional assessment that may draw on, for example, expert knowledge, secondary literature, and targeted studies.

3.3.1 MCA of Top Five Vulnerability Issues

This section is an MCA of indicators linked to the top five vulnerability issues, namely whether they are: widespread, nationally and locally prioritised, in a hotspot subsector, in a vulnerable sector, and/or highly climate related. The criteria used for this analysis are:

	<p>1. Frequently reported issue. (Indicator: more than 75% of groups nationally report the issue [from Section 3.1.1])</p>
	<p>2. Frequently reported top five issue. (Indicator: Five or more groups report this issue in their top five [from Section 3.1.1])</p>
	<p>3. Frequently reported sector priority issue. (Indicator: issue is also in the top 10 survey wide sector priority issues [from Section 3.2.2])</p>
	<p>4. Is in a hotspot subsector. (Indicator: issue is in one of the four subsectors which, nationally, have 9% or more of the top five vulnerability issues [from Section 3.1.2])</p>
	<p>5. High local vulnerability (Indicator: rated as a highly vulnerable sector by IVA score in Amatuku [from Section 3.2.1])</p>
	<p>6. High national vulnerability. (Indicator: rated as a highly vulnerable sector by IVA score at the national level [from Section 3.2.1])</p>
	<p>7. Highly climate related. This refers to the extent to which extreme weather events are connected to this issue, either as a result of direct exposure to a hazard or demonstrably clear sensitivity to hazards. For example, many issues are likely to be primarily development issues, whereas others have a much more direct connection to extreme weather events</p>

Table 3.7 shows the results of the MCA of the top five vulnerability issues in Amatuku.

Table 3.7. MCA of Amatuku's top five vulnerability issues according to prioritisation criteria.

Issue and rank*	Meets criteria							Total no. criteria met	Priority
	1	2	3	4	5	6	7		
1. (Pi.12) Coastal Stabilization Infrastructure > Limited to no access to coastal stabilization infrastructure (e.g., groynes/ gabion baskets).	Y	Y		Y			Y	4	high
2. (Wi.1) Household Water Tank Capacity > Inadequate household water tank capacity.	Y	Y	Y		Y		Y	5	very high
3. (Fn.22) Land Food Resilience – Sea-Level Rise/ Saltwater Intrusion > Low resilience of land-based food (crops and tree fruit sources to sea-level rise and saltwater intrusion).	Y			Y			Y	3	high/ med
4. (Ni.2) Renewable energy access – household > Limited to no household access to renewable energy.	Y					Y		2	med
5. (If.1) Income for Basic Needs > Household income insufficient to meet basic needs and services.	Y		Y					2	med

* The rank of these issues in the original top five.

Key Insights and Analysis

- It is likely that two issues in the top five in Amatuku (Wi.1 and Pi.12), may be particularly high-priority considerations at the national level as they meet several of the criteria including being.
 - *Widespread*
 - *Locally and nationally prioritised*
 - *In identified climate vulnerable sectors and subsectors*
 - *Highly climate related.*
- Issue (Fn.22) is also worthy of attention of due to the fact it is widespread, in a hotspot subsector, and highly climate related.
- Issues (Ni2) and (If.1) are also commonly reported issues; however, they may be considered underlying development issues that potentially create sensitivity to climate change, either directly or indirectly.
- High-priority issues should be considered for further investigation as part of the IVAR process and potentially the NAP Process more broadly.

3.3.2 MCA of Sector Issues by Vulnerability

Similar to the section above, this section performs an MCA on the sector priority issues using four indicators of whether an issue is: in a vulnerable sector, widespread, frequently prioritised, and/or climate related. Having already been prioritised in Section 3.2.2, this section prioritises according to four criteria listed below:

1. **High frequency reporting as a sector priority issue** (Indicator: % of groups reporting issue. From Section 3.2.2, Table 3.6).
2. **Priority of sector** according to vulnerability score (Indicator: high/med/low score – from Section 3.2.1 Table 3.5).
3. **Top five issue** (Indicator: whether the issue was also mentioned in the top five list by any group; Indicator: Yes/No).
4. **Highly climate related.** This refers to the extent to which extreme weather events are connected to this issue, either as a result of direct exposure to a hazard, demonstrably clear sensitivity to hazards. (Indicator: high/med/low. Also defined in Section 3.3.1).

Each of these ratings is weighted to a series of weightings² to identify the priority. Through this analysis, the following ranking of issues emerges (see Table 3.8). Like those identified above, may be particularly high-priority considerations for the NAP process.

² 1) Sector vulnerability: Very High = 4. High = 3. High/Med = 2. Med = 1

2) High frequency reporting (%): >59% = 3. 45-59% = 2. <45% = 1

3) Top five list: Yes = 2. No = 0 (blank)

4) Highly climate related: High = 5. Med = 3. Low = 1

Resulting priority: P<6 = Low. <8 = Med. <10 = High/Med. <12 = High. >12 = Very High

Table 3.8. MCA of Amatuku’s sector priority issues according to prioritisation criteria

Sector* priority issues in Amatuku	Ranking against criteria				Priority
	1	2	3	4	
<i>(Wi.1) Household Water Tank Capacity > Inadequate household water tank capacity</i>	82%	high/med	Y	high	very high
<i>(Ef.3) Marine Conservation > Limited or no means to pay for various marine and land-based environmental protection or conservation activities (e.g., protected areas)</i>	58%	very high	Y	med	high
<i>(If.1) Income for Basic Needs > Household income insufficient to meet basic needs and services</i>	53%	high/med	Y	med	high/med
<i>(Nn.4) Petroleum Reliance > At least 50% of the community relies on petroleum (kerosene/ benzene/diesel/LPG)</i>	68%	very high		low	high/med
<i>(Ni.11) Power Backup Energy System > Limited or faulty community power supply backup energy system</i>	32%	very high	Y	low	high/med
<i>(Wf.4) Government Water Financing Projects > Limited opportunities to access to government programs to finance water supply projects</i>	34%	high/med	Y	med	high/med
<i>(Wh.5) Skills to Monitor Water Quality > Limited to no community members with skills to monitor water quality (e.g., H2S chemical testing kit/taste)</i>	55%	high/med		med	med
<i>(In.2) Soil Fertility for Commercial Agriculture > Limited soil fertility for commercial agriculture</i>	42%	high/med		med	med
<i>(Nf.4) Energy Technology Upgrade Affordability > Limited to no access to a trust or other fund source to upgrade and maintain energy equipment and technology</i>	34%	very high		low	med
<i>(Ih.1) Financial Literacy > Limited to no community members trained in financial literacy (e.g., basic budgeting skills)</i>	39%	high/med		low	low

Key Insights and Analysis

- This analysis shows that of the 10 sector priority issues in Amatuku, two issues: (Wi.1 and Ef.3) are high or very high priority, and should be considered for inclusion in further investigations as part of the IVAR and NAP process.
- Further consideration should be given to further investigation into the high/medium/ranked issues (If.1, Nn.4, Ni.11 and Wf.4) either through the IVAR process and or in sector-specific NAP Process investigations.
- Medium-ranked issues (Wf.4, If.1, In.2) should be factored into considerations by relevant sector agencies in relation to Amatuku.

3.3.3 Conclusions and Implications

This section combines all the previous analysis into a summary of the highest priority issues and most vulnerable sectors by IVA score.

The aim of the MCA above has been to give progressively more prioritised list of issues and high-vulnerability sectors in Amatuku that are also nationally relevant. This targeted list is likely to be relevant to the IVAR process and potentially later to the NAP process. Therefore, the main point of this analysis has been to identify issues and sectors that are:

- **Locally relevant**, in that they have been identified as priorities by communities themselves.
- **Widespread and nationally significant**, in that they are frequently mentioned as issues and prioritised as key issues nationwide.
- **In sectors rated as vulnerable** by participants in the IVA, both locally in Amatuku and nationally.
- **Climate relevant**, i.e., there is a close link between extreme weather events and this issue.

KEY VULNERABLE SECTORS AND SUBSECTORS

As a result, key vulnerable sectors identified here are:

- “Ecosystem health,” particularly in subsectors of “institutions & governance,” “human resources,” and “natural resources”
- “Income security” particularly in subsectors of “natural resources” and “infrastructure & services.”

Following this are the sectors of

- “Water security” particularly in the subsectors of “infrastructure & services” and “institutions & governance”
- “Energy security” particularly in subsectors of “finance” and “institutions & governance”
- “Security of place” particularly in subsectors of “infrastructure & services” and “human resources”

KEY VULNERABILITY THEMES AND ISSUES

This section combines the top priority issues from the MCAs in the sections above and identifies some common emerging themes. Table 3.9 shows the top priority issues, the emerging themes, and where they have been prioritised, either in the MCAs or the hot spot subsectors. The key emerging themes in the Amatuku are:

- Local water infrastructure and skills
- Shoreline protection infrastructure
- Environmental management
- Continuous energy supply
- Agriculture and farming



Table 3.9. Top priority emerging issues according to the MCAs they have been derived from and presence in a hotspot subsector.

Emerging theme	Key issues	MCA #1	MCA #2	Hotspot subsector
Local water infrastructure and skills	<i>(Wi.1) Household Water Tank Capacity > Inadequate household water tank capacity</i>	Yes	Yes	Yes
	<i>(Wh.5) Skills to Monitor Water Quality > Limited to no community members with skills to monitor water quality (e.g., H2S chemical testing kit/taste)</i>		Yes	
Shoreline protection infrastructure	<i>(Pi.12) Coastal Stabilization Infrastructure > Limited to no access to coastal stabilization infrastructure (e.g., groynes/gabion baskets).</i>	Yes		Yes
Environmental management	<i>(Ef.3) Marine Conservation > Limited or no means to pay for various marine and land-based environmental protection or conservation activities (e.g., protected areas)</i>		Yes	
Continuous energy supply	<i>(Ni.11) Power Backup Energy System > Limited or faulty community power supply backup energy system</i>		Yes	
Agriculture and farming	<i>(Fn.22) Land Food Resilience – Sea-Level Rise/ Saltwater Intrusion > Low resilience of land-based food (crops and tree fruit sources to sea-level rise and saltwater intrusion).</i>	Yes		Yes

IMPLICATIONS FOR THE IVAR AND NAP PROCESS

The key implication of these results is that they provide an evidence base for technical and community review as part of the IVA Reporting Process. This review will focus on key areas of investigation, including the following:

- What is the current awareness of, and knowledge about, the issues and vulnerable sectors reported above? This applies both to knowledge of these issues in Amatuku specifically and in the context of climate change more broadly.
- What further information is needed, and what planning considerations should inform decision making?
- How much do these IVA results align with technical/institutional understandings of the issues and sectors?
- What improvements can be made to the IVAR process and outputs to enhance value and policy relevance for the NAP and sector planning processes?

There are further implications of these results for the IVAR and the NAP process which are also discussed in more detail in Section 5.

4.0 Results of the TWG Review

This section covers the results of the TWG review of the IVA results above. The TWG was comprised of members of the National Advisory Council on Climate Change (NACCC). A full-day workshop was undertaken on June 10, 2020 with the NACCC TWG.

The agenda was:

PART 1: Introduction and Presentation of Results (morning session)

1. Introduction to team, project, and workshop
2. Overview of IVAR process
3. Overview of IVA
4. Results of the IVA in Amatuku and Funafuti Community

PART 2: NACCC Review of Results (afternoon session)

Technical specialist analysis of IVAR report and issues (from Section 3.3.3 above)

1. Is this a known issue?
2. What do we already know about this issue, including in this place?
3. What do we already know or need to know about this issue in the context of climate change generally?
4. What further information is necessary to be able to make planning decisions?
5. Do vulnerability scores align with institutional understandings of priority vulnerabilities?
6. What may account for gender differences in top five priority issues?
7. Do you have suggestions or comments, on the IVA results, reporting, and process?

The workshop was led by the NAP GN Regional Advisor's national counterpart, Feue Tipu, with sections delivered by three National IVA Reporting Consultants (part 1.4) and the National IVA Coordinator (part 1.3). The workshop covered the IVA results from two locations: Amatuku islet and Funafuti community.

Workshop participants are listed in Appendix A. Not all TWG members attended the workshop, so some relevant technical specialists were not present to enable technical investigation of several issues. The coverage of the issues in the workshop as per the presence of technical subject matter experts is listed in Table 4.1.

Table 4.1. Key IVA issues and coverage in the TWG

Emerging theme	Key issues	Covered in TWG review
Local water infrastructure and skills	<i>(Wi.1) Household Water Tank Capacity > Inadequate household water tank capacity</i>	Yes
	<i>(Wh.5) Skills to Monitor Water Quality > Limited to no community members with skills to monitor water quality (e.g., H2S chemical testing kit/taste)</i>	Yes
Shoreline protection infrastructure	<i>(Pi.12) Coastal Stabilization Infrastructure > Limited to no access to coastal stabilization infrastructure (e.g., groynes/gabion baskets)</i>	No
Environmental management	<i>(Ef.3) Marine Conservation > Limited or no means to pay for various marine and land-based environmental protection or conservation activities (e.g., protected areas)</i>	Yes
Continuous energy supply	<i>(Ni.11) Power Backup Energy System > Limited or faulty community power supply backup energy system</i>	No
Agriculture and farming	<i>(Fn.22) Land Food Resilience – Sea-Level Rise/ Saltwater Intrusion > Low resilience of land-based food (crops and tree fruit sources to sea-level rise and saltwater intrusion)</i>	No

4.1 Results of the TWG’s Investigations

The following section outlines the results of the TWG review process. It is organised according to the priority issues in Table 4.1.

4.1.1 Local Water Infrastructure and Skills

This emerging theme includes two related issues:

- *(Wi.1) Household Water Tank Capacity > Inadequate household water tank capacity*
- *(Wh.5) Skills to Monitor Water Quality > Limited to no community members with skills to monitor water quality (e.g., H2S chemical testing kit/taste)*

The technical review session confirmed these are ongoing issues in Amatuku and nationally and thus endorsed the results of the IVA in relation to these issues. The IVA scores in relation to these subsectors were also endorsed as an accurate reflection of their vulnerability.

CHARACTERISTICS OF THE ISSUE

Workshop members noted that the household-level water shortage is caused by various factors including poor water storage, poor water catchment/gutters, number of household members, and poor water management at the household level. Participants reported that there is a tendency in the community for household water consumption to increase when

people have enough water stored. It was reported that people tend to use water wisely only during drought periods.

Participants confirmed there are limited water storage facilities in Amatuku. Living on an isolated island, they do not have access to government water supply as on mainland Funafuti. It was also noted that the Amatuku community depends entirely on rainwater, as opposed to the Funafuti mainland which also has desalination supplies.

Workshop members noted that the construction of a new water cistern is currently underway in Amatuku.

Some workshop members raised an issue in relation to water quality testing. The Water Department within the Public Works Department trains its water officers and employees. Yet some of the people sent to do testing have not been trained. It was noted that non-technical people may conduct water quality tests incorrectly and often inaccurately label water sources as low or bad quality. This affects public perception and use of those water stores. This has a significant impact during drought as the public may be reluctant to use these (incorrectly assessed) reserved water stores.

Participants noted that older people, people with a disability, infants, and children are the most vulnerable groups to water shortages and water quality issues.

CHARACTERISTICS OF THE ISSUE IN THE CONTEXT OF CLIMATE CHANGE

Typically, when there is no rainfall for about five or six weeks, the Water Department will warn the public about possible drought.

FURTHER INFORMATION NEEDED AND KEY PLANNING CONSIDERATIONS

In relation to water quality testing, participants suggested it was very important to retrain and monitor those employees who have been previously trained. They said trained officers should also be the only ones who test water quality in household water tanks.

Participants suggested that adaptation measures should seek to increase awareness among the public and workers of the Water Department within the Public Works Department, especially to those who test household water tanks.

A participant reported that there are potential health risks of using PVC water tanks. They stated that plastic water tanks can undergo a chemical reaction when exposed to sunlight that can potentially increase the risk of cancer and other diseases. It was noted that further scientific study is required to investigate this concern.



Participants stated it is important to make gender analysis an integral part of water management planning.

4.1.2 (Ef.3) Marine conservation > Limited or no means to pay for various marine and land-based environmental protection or conservation activities (e.g., protected areas)

The TWG participants did not believe this issue poses a significant concern for the reasons noted below.

CHARACTERISTICS OF THE ISSUE

Participants noted that they did not hold significant concerns regarding this issue since the Environment Department works together with projects such as Ridge to Reef (R2R) to manage marine conservation and protected areas. However, workshop participants noted that there is no protected area on Amatuku so were unclear why this would be a specific concern.

CHARACTERISTICS OF THE ISSUE IN THE CONTEXT OF CLIMATE CHANGE

Participants reported environmental issues such as increasing sea temperature and ocean acidification affecting the marine environment such as corals, also affect the Amatuku marine environment.

FURTHER INFORMATION NEEDED AND KEY PLANNING CONSIDERATIONS

Workshop participants noted that financial information on this issue, i.e., who will pay for what, needs to be factored in to address this issue.

Participants noted that the Government (through the Planning and Finance Department) should conduct more awareness raising at the community level about the Government's financial support for community projects related to the environment. Participants clarified that this form of Government funding is in the form of grants which require a proposal and/or application from communities and need to go through a formal assessment and approval process. This was contrasted with donations which are freely given by the Government to communities with no specific need for proposals and/or applications.

5.0 Community Validation of IVA Results and TWG Feedback

A validation workshop was held with the Amatuku community on June 20, 2020. The purpose of the workshop was to review and validate the IVA results and TWG's feedback with the community. The workshop agenda and participant list are at Appendix A1 and A2.

The workshop provided the community with an opportunity to seek clarification about the IVA process and results, verify the IVA findings, and raise issues for further consideration. It also sought the community's comments on the TWG's analysis of the priority issues.

5.1 Community Validation of IVA Results

The community said that the results of the MCA did partially, but not fully, align with their priorities. They agreed with the results and scores for the following issues:

- Water Security Wi.1 – Very High
- Environmental Management Ef.3 – High
- Water Security Wh.5 – High

However, the community disagreed with the scores given to other priority issues because they believed they should all be scored as very high priorities. These issues are:

- Agriculture & Farming – (Fn.22) – Med/high
- Shoreline Protection – (Pi.12) – High
- Energy – (Ni.11) – High

The community suggested reconsidering the assessment of local priorities against national priorities. They said this weighting process meant that local issues were given a lower priority.

5.2 Community Validation of TWG Feedback

The Amatuku community provided comments on the TWG analysis of the priority issues as follows:

5.2.1 Local Water Infrastructure and Skills

This emerging theme includes two related issues:

- *(Wi.1) Household Water Tank Capacity > Inadequate household water tank capacity*
- *(Wh.5) Skills to Monitor Water Quality > Limited to no community members with skills to monitor water quality (e.g., H2S chemical testing kit/taste)*

Participants from the Amatuku community agreed with the TWG that these issues are ongoing issues in Amatuku and nationally.

GENERAL CHARACTERISTICS OF THE ISSUE

Overall, participants agreed with the TWG's analysis; however, they strongly disagreed with the TWG's comments that water consumption varies seasonally and that when more water is stored more water is consumed. The community said they always use their water wisely as they know that water shortage is a constant issue on the islet given the limited water storage facilities available for them. Another issue that the community wanted to put forward was the "maintenance of water storage" (Wh.6). They believe this contributes to the issue of not having enough water tank capacity.

CLIMATE CHANGE ISSUES

Participants agree with the TWG regarding their current understanding of the issues (Wi1 & Wh.5) in the context of climate change.

Participants said a period of three weeks without rainfall will cause water shortages based on their experience on Amatuku islet, not five or six weeks as identified by the TWG. Thus, it has become a practice that staff of the Tuvalu Maritime Training Institute located on Amatuku issue their own alerts to the Amatuku community of a possible drought.

FURTHER INFORMATION NEEDED AND PLANNING CONSIDERATIONS

Participants noted the comments about a desalination plant on the mainland and said the installation of a desalination plant on the islet should be a key priority in water management planning.

In relation to water quality testing, they recommended that water quality testing should be done regularly to avoid health implications resulting from the use of contaminated water.

The community also requested further information about the potential health risks of PVC water tanks that was raised by the TWG. If this concern is substantiated, they think it is best to reapply the former practice of having a water cistern for each household.

5.2.2 (Ef.3) Marine Conservation > Limited to no means to pay for various marine and land-based environmental protection or conservation activities (e.g., protected areas)

Participants agreed with the TWG's comments on the general characteristics of the issue, climate change issues, and the further information needed and planning considerations. However, workshop participants requested the Tuvalu Coastal Adaptation Project (TCAP) project consider investigating the vulnerabilities of Amatuku's coastal area particularly with respect to shoreline protection.

Participants said there is a need to have qualified technical advisers/experts in important sectors such as agriculture and coastal protection. They recommended the Tuvalu Government use qualified and retired Tuvalu civil servants as technical advisors given that they understand the local context and can communicate well with local communities.

6.0 Summary of TWG and Amatuku Community Feedback on IVA Results

6.1 IVA Validation

Overall, both the TWG and Amatuku community agreed with the IVA results for (Wi.1) Household Water Tank Capacity and (Wh.5) Skills to Monitor Water Quality, as illustrated in Figure 6.1. The community also supported the prioritisation and vulnerability scores for (Ef.3) Limited or no means to pay for various marine and land-based environmental protection or conservation activities.

The community did not fully agree with the scoring results of the MCA. They believed higher vulnerability scores should have been given to (Pi.12) Coastal Stabilization Infrastructure, (Fn.22) Land Food Resilience and (Ni.11) Power Backup Energy System.

Information was not available regarding the TWG’s validation of (Pi.12) Coastal Stabilization Infrastructure, and only limited consideration was given to (Ef.3) Limited or no means to pay for various marine and land-based environmental protection or conservation activities.

Figure 6.1. TWG and Community validation of IVA results

Priority	TWG	Amatuku Community
<i>(Wi.1) Household Water Tank Capacity > Inadequate household water tank capacity</i>	Validated issue and vulnerability score	Validated issue and vulnerability score
<i>(Wh.5) Skills to Monitor Water Quality > Limited to no community members with skills to monitor water quality (e.g., H2S chemical testing kit/ taste)</i>	Validated issue and vulnerability score	Validated issue and vulnerability score
<i>(Pi.12) Coastal Stabilization Infrastructure > Limited to no access to coastal stabilization infrastructure (e.g., groyne/gabion baskets)</i>	Information not available	Validated issue Said vulnerability score should be higher
<i>(Ef.3) Limited or no means to pay for various marine and land-based environmental protection or conservation activities (e.g., protected areas)</i>	Information not available	Validated issue and vulnerability score

6.1.1 (Wi.1 and Wh.5) Local Water Infrastructure and Skills

Both the TWG and the community workshop had significant discussion of the causes of water shortages in Amatuku. The community strongly disagreed with the TWG’s comments that when more water is stored, more water is consumed. They argued households use water wisely given water shortages are a constant issue.

There was disagreement between the TWG and the community over the number of weeks of no rainfall that leads the Water Department to issue a drought alert. The TWG suggested it was five to six weeks whereas the community said it was three weeks.

Both the TWG and the community commented on the desalination plant in Funafuti, and the community suggested it should be a key priority in water management planning.

Both the TWG and the community requested further information about the potential health risks of PVC water tanks and mentioned the need for regular water quality testing. The TWG suggested there should be increased awareness raising and training of Water Department officers who test household water tanks.

6.1.2 (Ef.3) Marine Conservation

The TWG noted the issue is not of high concern due to current work managing protected areas, such as the R2R project. They recommended considering the financial impacts of the issue and increasing awareness within the community on financial support or projects related to the environment.

The community participants agreed with the TWG's comments, although it is noted that the community may have had an understanding of marine environmental protection different to that used in the IVA given they requested the TCAP project investigate shoreline protection aspects of marine areas.

6.2 Emerging Themes

This report reveals a series of cross-cutting themes emerging from the discussions, which are outlined below.

- **Climate impacts and contributing factors.** Climate impacts and contributing factors emerged as key themes, specifically:
 - **Rainfall and water security:** Fluctuating rainfall, water storage, and water usage patterns were noted as a combination of factors affecting overall water security.
 - **Marine environments:** Increasing sea temperatures and acidification is impacting marine environments.
- **Awareness raising.** Increasing the knowledge of the community as well as technical staff was discussed in relation to environmental projects, funding, and drought adaptation measures.
- **Scoring.** While the TWG and community workshop agreed on the water-related IVA results, the TWG did not agree that marine conservation (Ef.3) was a priority concern, and the community believed that other issues should have been given higher vulnerability scores.

7.0 Conclusions and Next Steps

This section examines the key results of the IVAR process contained in this report and identifies key outcomes, limitations, and options for next steps.

The IVAR process has enabled bottom-up local priorities of the lived experience of climate change to be brought up to the national level for consideration, appraisal, and verification.

The outcomes of the technical review were then reported back to the communities for clarification and consideration. As such, the IVAR process has achieved the overall objectives of clearly communicating the priority issues in the national context and demonstrates a workable process for bottom-up/top-down vulnerability assessment and information sharing. As this process meets the needs of both groups and has achieved a consolidated set of vulnerability priorities, it is likely to be suitable as a future model for joint prioritisation.

KEY OUTCOMES

Several of the key outcomes emerging from this report include:

- Data analysis shows local priority issues are also nationally widespread, clearly demonstrating that these issues are both nationally and locally significant and relevant. Specifically, these are issues around local water infrastructure and skills.
- With some important exceptions, the majority of priority issues were corroborated by technical subject matter experts as key issues. The exception relates to marine conservation and shoreline protection in which further information is needed to reconcile community and technical specialist perspectives.
- Communities generally accepted and corroborated the technical specialists' perspectives on the issues. Where there were differences, these pointed to specific gaps in knowledge or key divergences in how an issue is assessed. Further communication of evidence may help bridge this gap.

LIMITATIONS OF THE IVAR PROCESS

There are some key limitations to the IVAR process that should be acknowledged. They include the following:

- **IVAR is not a strategic planning process.** The IVAR process is not a planning process that is intended to set strategic priorities for action—it simply identifies the issues and the extent of consensus between communities and national stakeholders on these issues. National stakeholders are able to use the IVARs in a way they see as appropriate to their own priorities.
- **IVAR is not an options identification and appraisal process.** While ideas came up incidentally during the consultation process, the IVAR process has not actively identified adaptation options for the NAP process. Thus, while the IVAR process does not specifically

tell us what to do, it is effective in showing us what to do something about in specific locations.

- **IVAR is not a comprehensive gender analysis.** The reasons for and implications of gender differences in priorities, while touched on, have not been comprehensively examined through this process. Further investigation into gender differences and implications (e.g., including an analysis of national data) may inform a gender-responsive NAP process.

KEY NEXT STEPS

- **Dissemination.** It is recommended that the IVA reports are shared with the National Advisory Council on Climate Change for their full consideration and comment. The IVAR results may also be included in executive reporting to cabinet. IVARs may also inform national development coordination functions and donor engagement. Importantly, as reports on community-level priorities, they should be disseminated to communities.
- **Further research.** There are several areas where further research should be considered. In many cases, short literature reviews and key stakeholder interviews may be effective ways to flesh out key detail not possible through a multi-sectoral NACCC TWG. In other instances, there is significant work already underway that should contextualise any further investigations to avoid duplication. For example, national assessments that have been done through TCAP should be properly considered alongside (and possibly integrated with) the IVAR results. For other issues, there exist good practice primary research projects on specific issues, e.g., an audit of rainwater harvesting systems conducted on South Tarawa, Kiribati, that may be considered/adapted by Tuvalu.
- **Options identification and appraisal.** The results in the IVARs should inform the next stages of options identification and appraisal as envisaged in the NAP Process.

Supplementary uses for these reports beyond the NAP process include the following:

- **Review through sector planning.** While not prioritised as the very highest priority issues for the IVAR and NAP process, the results presented in Sections 3.1 and 3.2 (and lower-priority results in Section 3.3) are nonetheless likely to be relevant to specific sector-level activities. As part of regular sector planning, national practitioners in the public, private, and not-for-profit sectors may use these results as a resource in planning. These results can provide current and specific understanding of climate change issues and may inform adaptation responses in Amatuku and more broadly.
- **Community review and mobilisation.** Island councils and local community and civil society groups are likewise encouraged to use the results here as a means of targeting local climate change adaptation planning. Many issues mentioned here may rely on a level of community mobilisation and ownership of solutions. As such, these results may provide a robust and comparable evidence base for building partnerships for adaptation action.

References

- Central Statistics Division, Ministry of Finance, Economic Planning and Industries, Government of Tuvalu (GoTV). (n.d.). *Tuvalu population & housing mini-census 2017*. GoTV.
- Dumaru, P. (2019). *How integrated vulnerability assessments Support NAP processes in the Pacific region*. NAP Global Network. <http://napglobalnetwork.org/>
- Government of Tuvalu (GoTV). (2015). *Second National Communication of Tuvalu to the United Nations Framework Convention on Climate Change*. GoTV Funafuti.
- Pacific-Australia Climate Change Science and Adaptation Planning Program (PACCSAPP). (2015). *Current and future climate of Tuvalu*. https://www.pacificclimatechange.net/sites/default/files/4_PACCSAP-Tuvalu-1Opp_WEB.pdf
- Secretariat of the Pacific Community (SPC), Statistics for Development Division (2020). *PopGIS 2.0 Tuvalu census data platform*. <http://tuvalu.popgis.spc.int/>

Appendices

A1. Technical Working Group Participants

Name	Position Title	Sex	Organisation	Email Address
1. Luka Seelu	Community Disaster Resilience Management Specialist (CDRMS)	M	National Disaster Management Office (NDMO)	lukaselu1@gmail.com
2. Alimau Pugameau	Economic Advisor	F	Planning and Budget Aid Coordination Department	alimaupuga@gmail.com
3. Auiluma Lotoala	Project Officer	F	Tuvalu Association of non-government organisations (TANGO)	lloto12@gmail.com
4. Limoni Mativa	TMS Senior Officer	M	Tuvalu Meteorological Service (TMS)	mativano94@gmail.com
5. Sokotia Kulene	Policy Advocacy coordinator	M	Gender Affairs Department (GAD)	skulene@gov.tv
6. Pisi Seleganiu	Water Supervisor	M	Public Works Department (PWD)	afaaso80@gmail.com
7. Soseala Tinilau	Director	M	Department of Environment	butchersn@gmail.com
8. Tuitala Lasifo	National IVA Reporting Consultant (NIVARC)	M	Climate Change Department	tlasifo@gmail.com
9. Tomu Hauma	NIVARC	M	Climate Change Department	haumat01@wairaka.com
10. Saamu Tui	NIVARC	M	Climate Change Department	mataakapau@gmail.com

Name	Position Title	Sex	Organisation	Email Address
11. Vaiaoga Lameko	Tuvalu Readiness 1 Project Coordinator	F	Climate Change Department	vaiaogal@gmail.com
12. Joanna Latasi	TIVA Data Analyst	F	Climate Change Department	jlatazi@gmail.com
13. Pepetua Latasi	Director	F	Climate Change Department/ Acting Assistance Secretary of the Ministry of Finance	PLatasi@gov.tv
14. Feue Tipu	NAP GN Regional Advisor national counterpart	M	MLG&A	tipu1304@gmail.com
15. Fafetai Namoto	Tuvalu Survival Fund Coordinator	F	Climate Change Department	avatahi@gmail.com
16. Faatupu Simeti	National IVA Coordinator (NIVAC)	F	Climate Change Department	4tupu.s@gmail.com

A2. Community Information and Feedback Session Agenda

**Community Information and Feedback Sessions: #1 Amatuku and #2 Funafuti community
Kilogafou Funafuti Community Dining Hall, Senala, Funafuti
Agenda (Saturday 20 June, 2020)**

PART 1: INTRODUCTION AND UPDATE

10 a.m. – 10:10 a.m. Introduction to team, project, and workshop

- General
- Overview of the NAP process

10:10 a.m. – 10:30 am Overview of the IVAR process

- 8 steps briefly outlined
- The importance of bringing together the lived and the learned experiences
- The importance of harmonising the local and the national through a prioritisation process
- Outline of the workshop

PART 2: LIVED EXPERIENCE – WHAT YOU SAID

10:30 a.m. – 11:15 a.m. Location-specific results

- Top five vulnerability issues
- Most vulnerable subsectors
- Most vulnerable sectors
- Explanation of the multi-criteria prioritisation process – analysis that looked at whether issues were frequently reported in other locations, are particularly vulnerable, and/or that are highly climate related
- Show results from the multi-criteria prioritisation process

11:15 a.m. – 12:00 p.m. Small group discussion

12:00 p.m. – 1:00 pm Lunch

PART 3: LEARNED EXPERIENCE – WHAT THE TECHNICAL WORKING GROUP SAID

1:00 p.m. – 1:45 p.m. Technical Working Group mandate and process

1:45 p.m. – 3:15 p.m. Small group discussion - harmonising the lived and learned experience

PART 4: INFORMATION SESSION CLOSE

3:15 p.m. – 3:45 p.m. Close

- Cover next steps – including the process for harmonising the “lived” and “learned” experiences to create a comprehensive IVAR
- Reiterate what the data will be used for – who will have access to it and how it will be used
- Conclude by saying it’s a iterative process that they will continue to be a part of

A3. Community Information and Feedback Session Participants

Name	Position Title	Sex	Organisation	Email address
1. Toromon Timion	Amatuku community member	M	Amatuku community representative	N/A
2. Logomalie	Amatuku community member	M	Amatuku community representative	N/A
3. Teawa Toromon	Amatuku community member	F	Amatuku community representative	N/A
4. Senitua Semi	Amatuku community member	F	Amatuku community representative	N/A
5 Louise Leitonga	Amatuku community member	F	Amatuku community representative	N/A
6. Enele Opeta	Amatuku community member	M	Amatuku community representative	N/A
7 Tekafa Kutimeni	Amatuku community member	F	Amatuku community representative	N/A
8. Kim T	Amatuku community member	M	Amatuku community representative	N/A

Project Staff Participants

Name	Position Title	Sex	Organisation	Email address
Tuitala Lasifo	National IVA Reporting Consultant (NIVARC)	M	Climate Change Department	tlasifo@gmail.com
Tomu Hauma	NIVARC	M	Climate Change Department	haumat01@wairaka.com
Saamu Tui	NIVARC	M	Climate Change Department	mataakapau@gmail.com
Vaiaoga Lameko	Tuvalu Readiness 1 Project Coordinator	F	Climate Change Department	vaiaogal@gmail.com
Joanna Latasi	TIVA Data Analyst	F	Climate Change Department	jlatazi@gmail.com

Name	Position Title	Sex	Organisation	Email address
Feue Tipu	NAP GN Regional Advisor national counterpart	M	MLG&A	tipu1304@gmail.com
Faatupu Simeti	National IVA Coordinator (NIVAC)	F	Climate Change Department	4tupu.s@gmail.com

