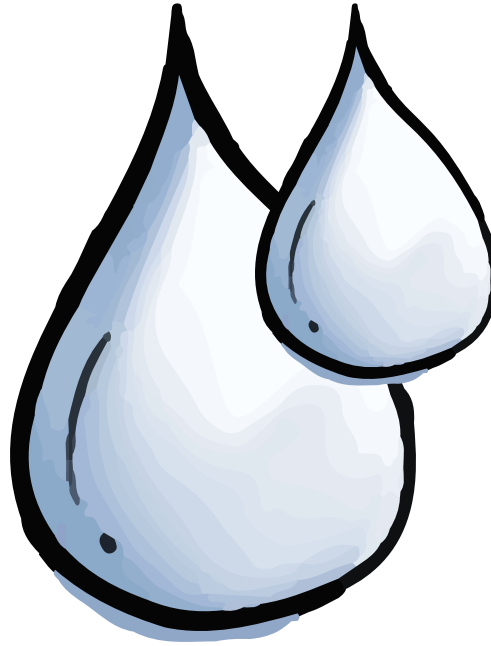


**SCALING UP PACIFIC ADAPTATION (SUPA)**



**SNAPSHOT 2021:**

**Water Security Measures,  
Federated States of Micronesia**

**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	FEDERATED STATES OF MICRONESIA (FSM)
Capital	Palikir
Population	102,000 people (2018).
Inhabited islands	65 out of 607 islands
Land area	A tropical 2,700 km (1,678 mi) long island chain consisting of some 600 islands grouped into four states: Kosrae, Pohnpei, Chuuk (Truk) and Yap. Total land area of 702 km <sup>2</sup> .
Max. height above sea-level	782 m, Mount Nahnalud, Pohnpei
Physiography	FSM varies from high mountainous islands to low, coral atolls to volcanic outcroppings.
Location	FSM's jagged borders stretch from 136°E to 166°E longitude (from Kosrae to Yap) and from just north of the Equator at Kapingamarangi Island to approximately 12°N of the Equator near Guam.
EEZ	2,978,000 km <sup>2</sup>
Climate	Tropical
Rainfall	Annual rainfall is 3403 mm
Mean temperature	averages 27.7 °C   82 °F.
Economy	Mainly government services and is largely reliant on external grants, with only a modest private sector (tourism). A narrow range of natural resources, and vulnerability to external shocks, present challenges to growth. Fishery licensing fees account for nearly half of domestic budget revenue. The basic subsistence economy comprises cultivation of tree crops (primarily breadfruit, banana, coconut and citrus) and root crops (primarily taro and yam), supplemented by fishing. Small-scale agriculture and various traditional fishing practices continue today.
GDP per capita	\$2,400
Currency	US \$
Exchange rate	N/A
Languages	Pohnpeian, Chuukese, Yapese, Kosraean (Ulithain, Woleaian, Nukouro, Kapingamarangi)
Government	Democratic
National focal point	Climate Change Unit at the FSM Department of Environment, Climate Change, Emergency Management (DECEM).

Figure 1. Country profile for Federated States of Micronesia.

## In Context:

Federated States of Micronesia (FSM) is one of the four countries that cooperated with the field testing of an impacts analysis methodology, to profile recent history of climate change adaptation work sourced from recently completed projects. These efforts are part of the European Union funded Global Climate Change Alliance Plus – Scaling Up Pacific Adaptation (GCCA+ SUPA) project. FSM like most island countries is experiencing the impacts of climate change with rising temperatures, varying rainfall patterns and prolonged period of extreme dry conditions. These exacerbate the vulnerability of communities to freshwater scarcity, drought, vector-borne diseases and cyclones.

With support given to the national consultant working with the adaptation focal point of contact, Correy Abraham, Department of Environment, Climate Change and Emergency Management (DECHEM), the period taken to plan, and field test the drafted Impacts methodology was about 6 months.

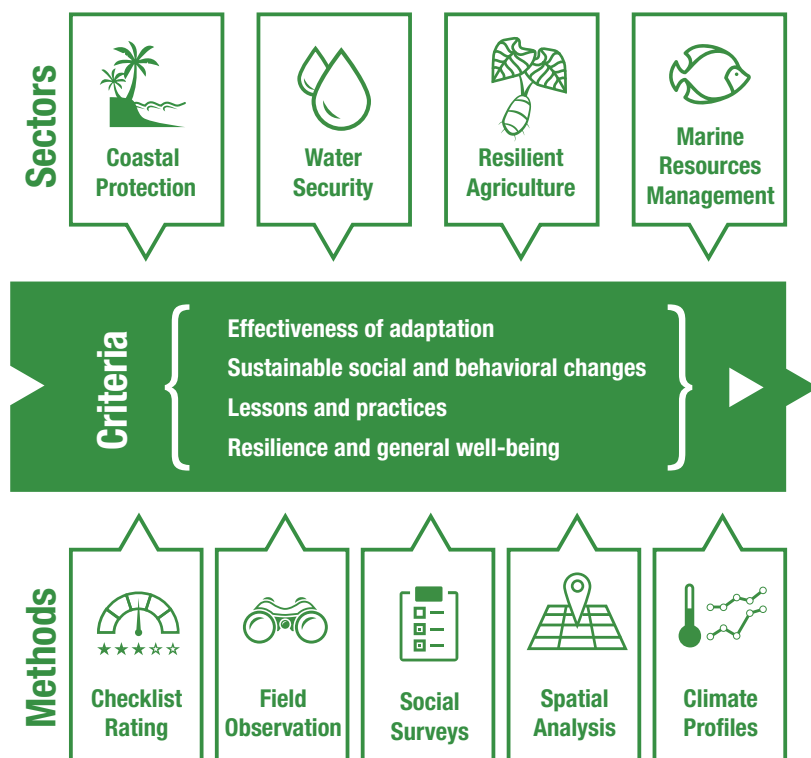


Figure 2. Pathway for Adaptation Impacts Analysis Methodology.

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 Figures 2 & 3) be 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.

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	Ascertain 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. Tracks investment in water security measures at one place over time. (W7).

Figure 3. Criteria for measuring impact of adaptation interventions.

The residual impact of the 1998 drought and depleted water supplies, set off the prioritization of water security for future interventions. Since that history, three projects: the GCCA PSIS, Adaptation Fund (AF), Readiness for El Nino (RENI) focused on the water resources sector. The GCCA PSIS (2013-2015) interest activities in outlying islands of FSM States, were aimed at increasing access to quality water with the improvement of existing catchment, storage, emergency services.

<sup>1</sup>Additional 54,000 gallons of rainwater storage provided in Fais, benefited 65 residential compounds resulting in community members, particularly women spending less time and distance to access reliable and clean water supply. However, a solar pump installed at Sahagow Well in Fais proved an essential alternative water supply following the Typhoon Maysak during April 2015.

1. Global Climate Change Alliance: Pacific Small Island States Evaluation Report. 23 May 2016. PREA.

The RENI project (2017-2020) actioned on enhancing sustainable water use in the outer islands of Yap and Pohnpei, through the refurbishment of community rainwater storage systems, catchments and instalment of solar pumps and environmental purification systems. The AF project (2018-2022) actioned on aspects of strengthening community-based water and livelihood security measures with the construction of self-composting toilets across the states of Yap, Chuuk and Pohnpei; Kosrae state activity was on coastal protection.

Groundwater resources are susceptible to sea water intrusion and surface pollution. There was ongoing repair work of communal water tanks by a project implemented through the state government agency, DECEM. Field observations counted that 87% of households had private water storage tanks of sizes between 600 -5000 gallons. Although with very little baseline data on community water resources, the refurbishment of and new communal rainwater catchments increased volume capacity for water storage.

Initial profiling of archived projects (Figure 4) suggested that 500 people (2010 census) benefited from water security measures implemented on Kapingamarangi, Pohnpei and 210 people on Nukuoro island. At the time of field visit to Nukuoro, there were 96 people living within 39 households.

## 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. Micronesia Conservation Trust is the national consultant engaged and together with the FSM focal point, Department of Environment, Climate Change & Emergency Management (DECEM), mapped a history of completed, project-funded interventions with data search for ease of tracking its measured results.

Adaptation measure	Title of project	Funding agency	Year completed
<b>WATER SECURITY MEASURES</b>			
Repair and install household/communal water tanks at Nukuoro.	AF: Repair and install household/communal water tanks at Nukuoro.	Adaptation Fund	2018 - current, supported by AF
Refurbishment of community rainwater catchments *	Readiness for El Nino (RENI): Community rainwater catchments refurbished and replaced in Kapingamarangi, Pohnpei.	European Union	2019

\* Due to field logistical issues to gain entry to the atoll at the time of widening reef channel, field testing was not done at Kapingamarangi.

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 if any)	<ul style="list-style-type: none"> <li>• Observations &amp; use impact Checklist that include physical attributes of local environment.</li> </ul>
	W2	Assesses the improved state of water facilities and increase in water availability.	<ul style="list-style-type: none"> <li>• Observations &amp; use of impact Checklist.</li> <li>• Spatial mapping of water infrastructure elements with extent water tanks coverage.</li> </ul>
Social-behavioural change	W3	Level of improvement to existing water harvesting storage systems.	<ul style="list-style-type: none"> <li>• Observations &amp; use of impact Checklist.</li> </ul>
	W4	Tracks the capacity to either operate, maintain and or local management of the water supply system.	<ul style="list-style-type: none"> <li>• Meta data from the social surveys of household and focus group be treated for comparative analysis.</li> </ul>
	W6	Level of participation, awareness, and sense of improved sanitation standard.	<ul style="list-style-type: none"> <li>• Observations &amp; use of impact Checklist.</li> <li>• Meta data from the social surveys of household and focus group be treated for comparative analysis.</li> </ul>
Lessons and practices	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"> <li>• Focus group interviews.</li> </ul>
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.	Liaise for with national CC focal point for cost details on fiscal budget of built structures, project expenditure reports.
		Tracks investment in water security measures at one place over time.	

Figure 5. Indicator description and tools, for water security (W) measures in Federated States of Micronesia (FSM).

## Impacts at glance

Preliminary data collected using a survey of 37 households (71% of the island population) and interviews of 3 focus groups comprising of council members, youth, and women. The rate of communicable disease infection is high, and people have noticed reduced rainfall. However, residents believe they are prepared for events and perceive the risk to be medium-high.

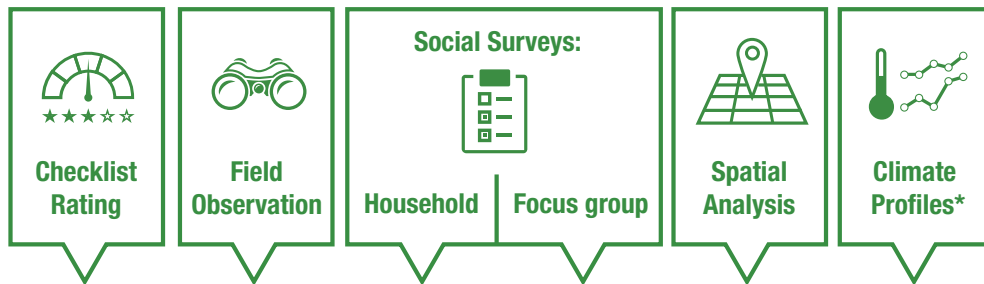
**Social survey** highlighted that most households owned rainwater tanks, so it is not possible to determine where the differences in preparedness and risk perception are because of pre-existing tanks before the ongoing efforts to refurbish with new tanks. However, this survey data will provide a useful baseline to measure the impact of any future intervention in the area.

All three focus groups communicated similar message that they appreciated the additional water storage but thought

it should be a priority to repair existing household tanks rather than the new community facilities. The Nukuoro local government council members felt that the community is resilient to drought and remembered how quick the community recovered from previous drought. Youth group thought work to refurbish took a while and believed that community could repair their own tanks if they had proper materials. The women were concerned about the state of their own home water tanks and that the well pump is difficult to use, as additional water source for emergencies.

In refining the survey tools, it would be useful to collect information about actions households have already taken and probe the extent to which the perceived adaptation impacts affect life satisfaction or other measures of wellbeing.

Year built:  
2020



## Water Security

Repair and install household/communal water tanks at Nukuoro.

## IMPACT ANALYSIS METHODOLOGY: Tools applied out at the field

\*Records from Pohnpei climate monitoring station

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

**Field observations.** The Nukuoro households are smaller, thatched and most homes have their own rainwater tanks. Location of tanks using a handheld Garmin GPS unit was marked with condition of the water system (tank, piping and gutter) on each element was recorded.



Figure 7. Photographs of homes and water tanks set up on Nukuoro.

**Spatial imagery analysis** will be conducted to map coverage and distribution of water tanks and infrastructural elements of water storage on Nukuoro.

**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, there were 6 drought events with the most extreme occurred during November 2018 until July 2019. Within that prolonged dry period, 3336.8mm of rainfall was recorded.

## SAMPLED AREA: NUKUROR, POHNPEI.

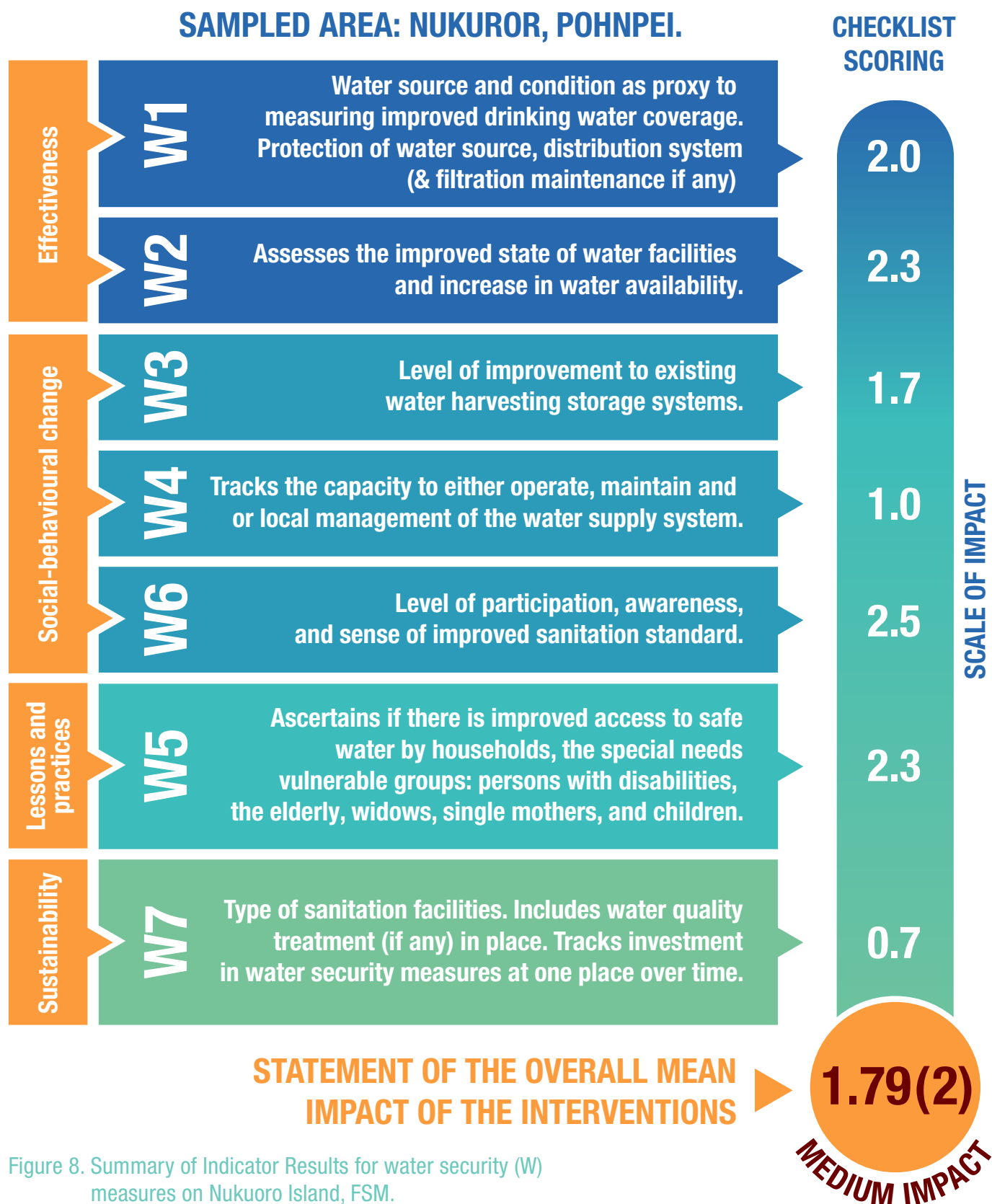


Figure 8. Summary of Indicator Results for water security (W) measures on Nukuoro Island, FSM.

Figure 8 sums up scores with the use of a **Checklist** for a range of characteristics rated during field observation of the water situation at Nukuoro. Overall mean impact rating was medium.

**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

Using the impact rating approach permits a quick assessment of and comparison between different sector-based adaptation interventions. Checklist datasets provides a rapid summary of different elements and characteristics to measure impact of an intervention that typically categorize information along geographic, sector, people's perspectives, or some combination of the three.

Figure 9 below illustrates the field trial experience of the impacts analysis methodology at Nukuoro, Pohnpei FSM.

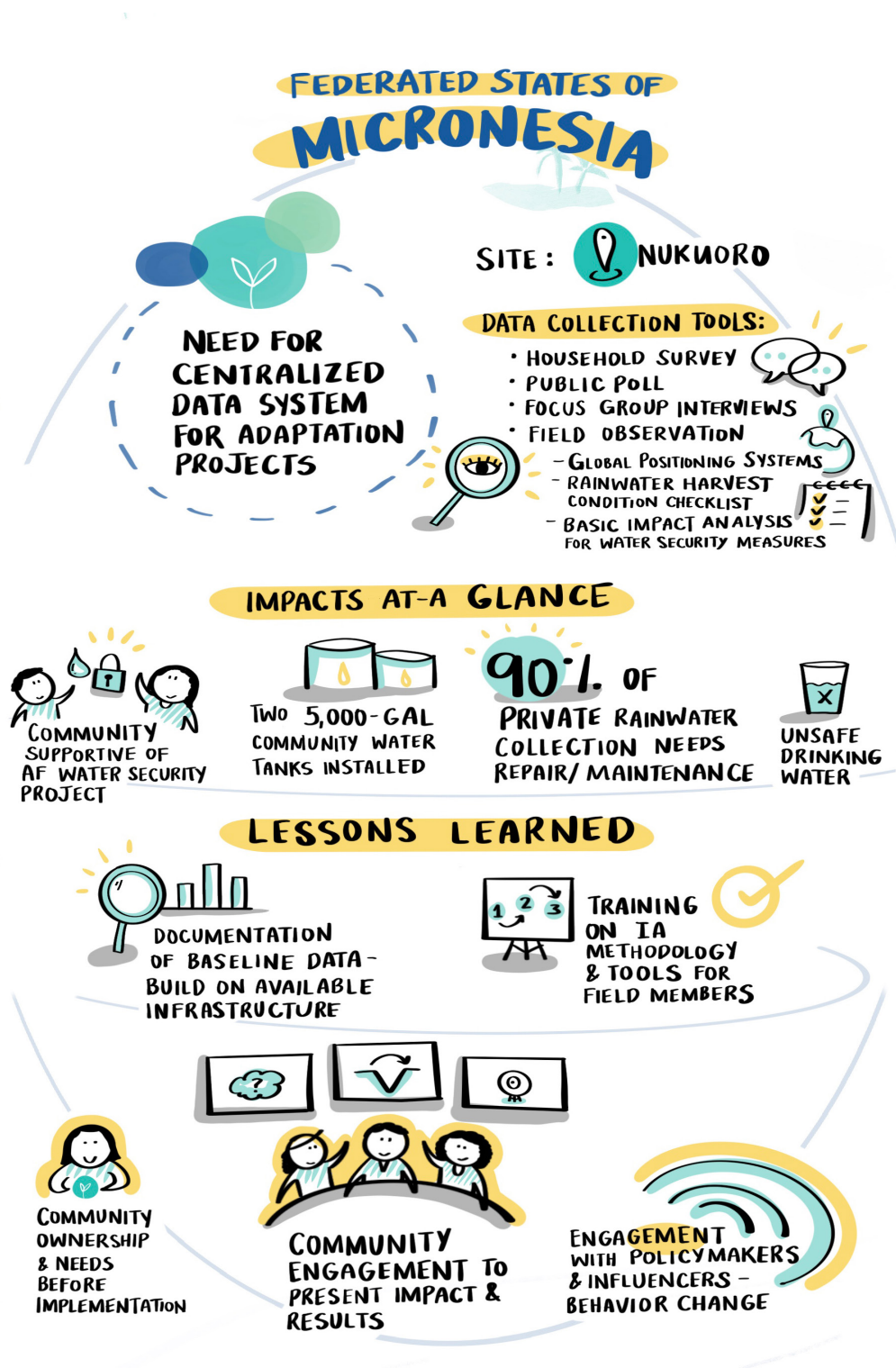


Figure 9. Impact Methodology, Federated States of Micronesia.

## Annex I.

# Key Reference Documents for Federated States of Micronesia

1. Adaptation Fund, Project design document, 2017
2. Adaptation Fund, Inception Report
3. Adaptation Fund, Progress Report
4. Adaptation Fund, Pohnpei Southern Islands Mission Report, 2021
5. Adaptation Fund, Water tank capacity assessment in Mortlocks
6. Adaptation Fund, WASH in Mortlock schools
7. Global Climate Change Alliance (GCCA) Pacific Small Island States (PSIS), Evaluation Report
8. GCCA PSIS, Project design document, 2014
9. GCCA PSIS, Project planning Workshop report
10. GCCA PSIS Project Summary sheet
11. RENI, first steering committee meeting report
12. RENI, Impact assessment methodology factsheet
13. RENI, Project factsheet
14. RENI, Project concept note
15. RENI, Project design document
16. RENI, Project consultation report
17. DECEM Adaptation Fund Project Team. (2020). Kapingamarangi Water Tanks that Were Repaired and Still Need to be Repaired. Pohnpei.
18. FSM Department of Environment, Climate Change and Emergency Management (FSM DECEM). (2021). Mission Report. Pohnpei.
19. NIWA. (2022). Initial analysis report of HOUSEHOLD FOCUS GROUP Knowledge Attitudes Perceptions SURVEY in Federal States of Micronesia (FSM).
20. Pohnpei AF Project, Pohnpei State EPA. (2020). Nukuoro Household Assessment Rehabilitation Component 2. Pohnpei.
21. Pohnpei State Adaptation Fund Project. (2021). Status Report. Pohnpei.
22. SPREP. (2018). Inception Workshop Report: Enhancing The Climate Change Resilience of
23. Vulnerable Island Communities in Federated States of Micronesia. Pohnpei.
24. SPREP. (2021). Enhancing the Climate Change Resilience of Vulnerable Island Communities in the Federated States of Micronesia: Second Implementation Support Mission. Apia: SPREP.

## Annex II. Standardised Rating for Water Security

LEVEL OF IMPACT	RATING SCALE	PERCENTAGE SCALE	STANDARDISED DESCRIPTION
Low Impact	1	0-25%	<p><b>Not improved:</b> <i>(Water supply straight from unprotected dug wells, unprotected spring, cart with small tank/drum, bottled water)</i></p> <ul style="list-style-type: none"> <li>• Water source protection - low.</li> <li>• If roof is thatched, roof needs repair- no collection of water, state of water source.</li> <li>• Plan developed, neglected state of water system. No water committee.</li> <li>• Low or no participation in water management planning, limited awareness, and no improvement in sanitation standard.</li> <li>• Drinking water coverage - low; SPATIAL distribution of water tanks.</li> <li>• Measure of basic sanitation – all homes share sanitation facilities; still evidence of open defecation.</li> </ul>
Medium Impact	2	26-50%	<p><b>Somewhat improved:</b> <i>Increase in storage capacity for communal use.</i></p> <ul style="list-style-type: none"> <li>• Water source protection: moderate. Well, is walled and tank with roof.</li> <li>• Half of the homes have good roof (needing no repairs) with screen on tanks.</li> <li>• Plan in place with a sustainable financing system on how to manage operation. Inactive water committee.</li> <li>• At least one member of the water committee are women, inclusive of disability persons.</li> <li>• Drinking water coverage- medium; spatial distribution of water tanks, tap stands.</li> <li>• Measure of basic sanitation - Shared sanitation facilities rated high, at least 3-4 homes share a toilet. With at least 25-50% of respondents seem satisfied with their current sanitation standard.</li> <li>• Demonstration of some water safety measures in place.</li> </ul>
High Impact	3	51-75%	<p><b>Mostly improved:</b> <i>Piped supply to half of the homes.</i></p> <ul style="list-style-type: none"> <li>• Water source protection: high eg. roof over well. Buffer zone along source.</li> <li>• Families with disability, elderly, and single mothers own water tanks for direct access</li> <li>• Majority of homes own water storage capacity in good condition. Tank openings are screened. First flush diverters in place with screen on tank</li> <li>• Plan in place with a sustainable financing system on how to manage operation</li> <li>• Water committee in place but not fully active. At least one member of the water committee are women, inclusive of disability persons.</li> <li>• Drinking water coverage- spatial distribution of water access points.</li> <li>• Measure of basic sanitation – shared sanitation facilities rated medium, for 2-3 homes share a toilet.</li> <li>• With at least 51-75% of respondents seem satisfied with their current sanitation standard.</li> <li>• Safe water quality standards.</li> </ul>
Very high Impact	4	76-100%	<p><b>Fully improved:</b> <i>Standpipes built for drinking stations in community with piped water supply to all homes &amp; &lt; 75% of households own water tanks</i></p> <ul style="list-style-type: none"> <li>• First flush diverters in place with screen on tank</li> <li>• Plan in place to include training, water safety with financing of repair work.</li> <li>• Water committee is fully active. High participation with equal ratio of men/women, inclusive of disability, youth.</li> <li>• Direct access of piped water into the homes of the elderly &amp; disability.</li> <li>• Drinking water coverage- spatial mapping of water access points.</li> <li>• Measure of basic sanitation – shared sanitation facilities rated low, for majority of homes own a toilet.</li> <li>• More than half of respondents expressed the need to improve sanitation standard with an increased access to water supply.</li> <li>• Safe water quality standards.</li> </ul>

Figure 10. Standardised Rating for Water Security.

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