PaCWaM+

PACIFIC COMMUNITY WATER MANAGEMENT-PLUS

RESEARCH & PRACTICE BRIEF

Improving water management in rural communities in Solomon Islands and Fiji - Synthesis of research findings (Phase 1 PaCWaM+)

SEPTEMBER 2021

International WaterCentre

Griffith UNIVERSITY Queensland, Australia

Water For Women

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Published September 2021

Suggested citation: Love, M., Beal, C., Gonzalez-Botero, D., Bugoro, H., Panda, N., Roiko, A., Benjamin, C., Hagabore, J., Ooi, J., Magreth, C., Pene, S. and Souter, R.T. (2021). Improving water management in rural communities: Synthesis of Phase 1 findings, Solomon Islands and Fiji. Research Brief, December 2021. International WaterCentre / Griffith University: Brisbane, Australia; Solomon Islands National University: Honiara, Solomon Islands; University of the South Pacific: Fiji.

https://watercentre.org/research/research-impacts/pcwm/

Cover image: D Gonzalez Botero, International WaterCentre

ACKNOWLEDGEMENTS

The authors would like to thank the communities where the research was undertaken and also the following people and organisations:

Solomon Islands:

The Solomon Islands government, Solomon Islands National University and numerous other enabling actors who made this research possible. In particular, we thank the staff from the following organisations and departments who constructively participated in project meetings and stakeholder workshops: Ministry of Health and Medical Services - Environmental Health Division and RWASH, Ministry of Mines Energy and Rural Electrification (Water Resources), UNICEF, Live & Learn Environmental Education-Solomon Islands, and Plan International-Australia.

Fiji:

The Fijian Government, The University of the South Pacific – especially those who worked closely on this project from the Institute of Applied Science We thank the staff from the following organisations and departments who constructively participated in project meetings and stakeholder workshops and interviews: Ministry of Health and Medical Services - Environmental Health Department, iTaukei Affairs Board, Department of Water and Sewerage, Mineral Resources Department, Water Authority of Fiji, Habitat for Humanity Fiji, UNICEF Pacific, Partners in Community Development Fiji and Rotary Pacific Water for Life Foundation.

Background & Purpose

In many Pacific Island countries, including the Solomon Islands, the ongoing management of water systems in rural communities is the responsibility of community members. One critical outcome of community water management (CWM) is its influence on whether community members are able to enjoy sufficient and safe water supply for domestic needs and support good sanitation and hygiene practices (i.e., good WASH).

Government and private sector water services to the rural populations in PICs are limited and likely to remain so. Consequently, community-based water management (CWM) will remain the dominant model for rural water service delivery into the future, as reflected in many Pacific government WASH policies. However, evidence from the Pacific and elsewhere indicates that basic models of CWM, in which communities bear full responsibility to manage water systems after their installation, typically have low sustainability and limited scalability (Clarke et.al., 2014; Bond et.al., 2014; Hutchings et al., 2015; World Bank, 2017). This leads to poor WASH outcomes, such as inadequate accessibility, quality, and reliability of water and compromised hygiene practices (Hutchings et al., 2017).

The **community water management plus** (CWM+) model is considered a viable improvement to the basic CWM model (Baumann, 2006; Hutchings et al., 2015, 2017; Souter and Schuch, 2017). The CWM+ model includes long-term support from external organisations or people following the initial hand-over of water infrastructure to a community. Pacific governments appreciate that further support is required to support CWM. Previous CWM+ research has identified a range of generic intrinsic and extrinsic factors that influence 'good' CWM outcomes. But while some lessons can be gleaned from other parts of the world, the unique context of PICs requires rigorous place-based evidence about which approaches are most feasible and effective. PaCWaM+ PHASE 1 research sought to identify what the 'plus' factors might look like in two Pacific Island countries – what type of support is needed by communities, and how that support might be achieved. PHASE 2 activities focused on further exploring and – where possible – trialling some potential 'plus' approaches.

The Pacific Community Water Management Plus (PaCWaM+) research objective is to ***investigate how Civil Society Organisations (CSO) and governments can better enable rural community water management to improve SDG6 outcomes***: specifically WASH outcomes that **are resilient** to natural hazards and disasters, that are **sustainable** (exist for the long-term), and that are **inclusive** (meet the needs of everyone).

This study provides regionally-appropriate evidence about what kinds of support are needed to complement and improve community capacities for water management across different village, island and country contexts in the Pacific islands.

Tap stand, Solomon Islands (Photo C. Benjamin,

Research Approach

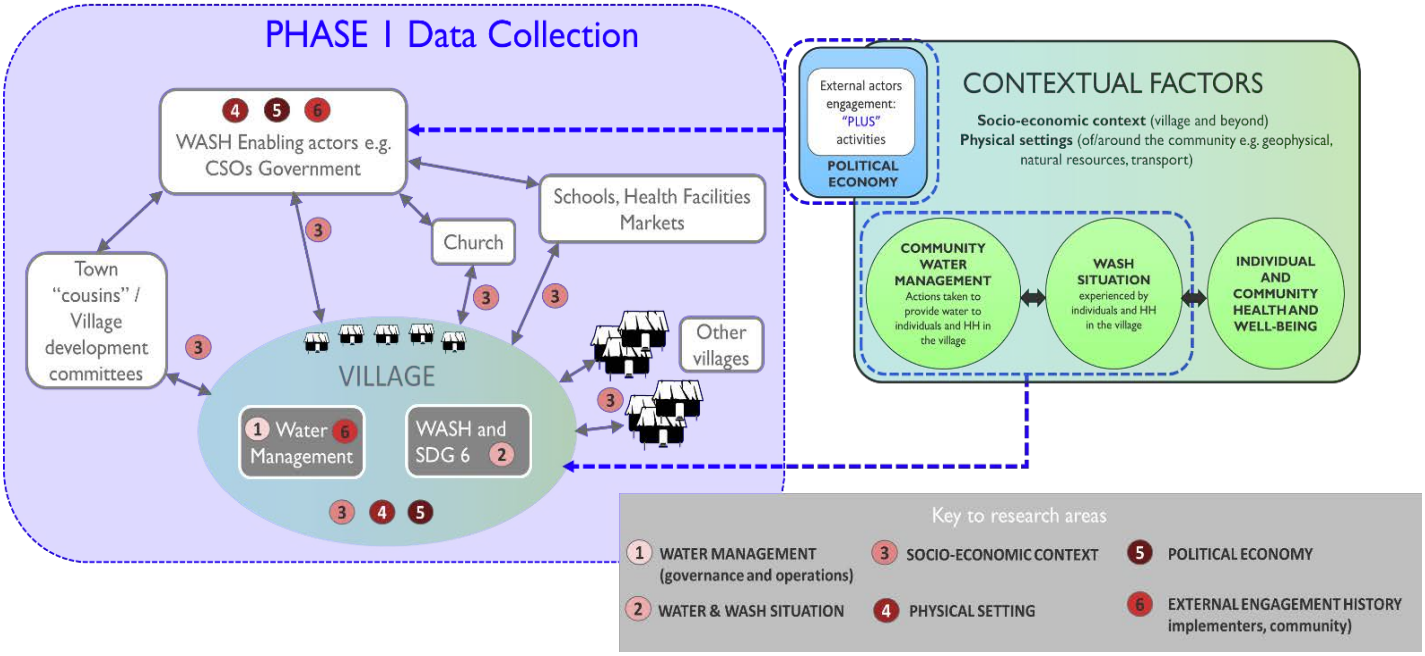

Figure 1: PaCWaM+ Research Approach and Phases

The key concepts underpinning the PaCWaM+ research are shown on the right side of Figure 1 which identifies key influencers of community water management and WASH, including 'plus' activities by external actors. Phase 1 data collection and the key research areas are shown on the left side of the figure. Two key research questions and associated activities were formulated to address the research objective. These research questions were aligned with the phases of the research program.

PHASE 1: What can be learned from evaluating CWM across diverse community contexts, especially about which community governance, engagement, and support features are most aligned with inclusive, integrated and resilient SDG6, including WASH, outcomes?

PHASE 2: What approaches and tools, that are sensitive and responsive to local context and improve inclusion, can CSOs/Governments use, to strengthen these community engagement, support and governance features?

This research brief is a summary of the Phase 1 findings for both Fiji and the Solomon Islands. For detailed descriptions of the methods and findings for each country, please refer to Solomon Islands Country Synthesis Report 2020 and the Fiji Country Synthesis Report 2020 from the PaCWaM+ website www.watercentre.org/research/pcwm/.

Methods

Community Selection

The data for this research was collected from 8 communities across the Solomon Islands and 8 communities across Fiji (Fig 2.) as part of the formative research component of the wider PaCWaM+ project. Site selection was designed to encompass different bio-cultural contexts (e.g. socio-cultural, economic and geographic) and various CWM arrangements, including differing types/amounts of external support.

The selection criteria included:

- Communities in rural settings with a diversity of climate and geographic locations

Village-level data collection

The primary indicator used to assess good water management was the WASH situation, in particular, the water services achieved, and also people's attitudes about the WASH and CWM situation.

A strengths-based approach entails identifying ways that communities have worked to successfully manage their water systems.

Figure 2 Location of study sites for Solomon Island (top) and Fiji (bottom)

Below left: Western Province, Solomon Islands (Photo C. Beal.) Below right: Researcher recording community timeline from Elder, Solomon Is. (Photo Credit: D Gonzalez);

Table 1a Demographic summary for Solomon Islands case studies

Village	Province	Population (approx.)	No. households	Religion	Tribes	Zone/ Group
Manakwai	Malaita	540	80-100	SSEC-Estate / Kingdom; SSEC (original)	9	5-6
Gounabusu	Malaita	170	44 (30 occupied)	SSEC; 1 HH SDA	3	4
Hovi	Isabel	120	25	SDA	3	4
Kolosori	Isabel	320	52	Anglican; 1 HH other	2	4
Bareho	Western	300-500	78	SDA	12	3
Dadala	Central	130-150	31	Anglican; 1 HH other	4	2 (4)
Sumate	Guadalcanal	300-400	70-80	Catholic; few HHs other	4	4
Hulavu	Guadalcanal	300-400	80-86	Catholic; few HHs other	4	4

Table 1b Demographic summary for Fiji case studies

Community name	Type of community	Division, Province & island	Population (approx.)	No. Households	Religion	No. Mataqali
Bavu	*Koro* (registered village)	Western Division, Nadroga, Viti Levu	300	57[1]	Main: Methodist Other: SDA, Jehovah Witness, AoG, Evangelist	5
Cobue	iTaukei settlement	Northern Division, Bua, Vanua Levu	125	26	Main: Methodist; Other: Prayer Ministry, SDA	6
Daviqele	*Koro* & iTaukei settlements	Eastern Division, Kadavu	356	88 (65 in *koro*)	Main: Methodist; Other: All Nations, Catholic	3
Galoa Island	*Koro*	Eastern Division, Kadavu	180	40 (occupied)	Main: Methodist; Other: AoG	4
Nabubu	*Koro*	Northern Division, Macuata, Vanua Levu	73	20	Methodist	5
Narara	Indo-Fijian settlement	Western Division, Ra, Viti Levu	74	16	Main: Hinduism; Other: Methodist	n/a
Rukuruku	*Koro*	Eastern Division, Lomaiviti, Ovalua	375	77	Main: Methodist; Other: Catholic, AoG, SDA (another 4)	8
Wailotua-two	*Koro*	Central Division, Tailevu, Viti Levu	~120	20 (6 unoccupied)	Main: Methodist; Other: CFF; Pentecostal; ANCF	5

[1] Research was conducted in the Bavu *koro* only; Bavu settlement – located on the other side of the Queens Highway – is much larger (370 pop./71 HHs).

Community Data collection

The research methodology comprised a mixed-methods approach, drawing on a range of quantitative and qualitative techniques. These are summarised in Figure 3. Sample sizes for each of the methods are shown in Figure 4.

Figure 3 Phase 1 formative research methodology comprised a mixed-methods approach, drawing on a range of quantitative and qualitative research techniques

QUALITATIVE DATA

The qualitative data consisted of key informant interviews (KIIs) and group interviews (GIs) and household surveys (HHS) (Fig 2). Participants were identified based on a mix of targeted and snowball sampling strategies and typically included: youth group representatives, religious leaders, customary leaders, life histories, women's group members, project actors, water committee members, people with disabilities, health workers, and teachers.

Research teams spent one week (typically 5-6 days) in each village. Teams consisted of one male and one female Associate Researcher (AR) from either Solomon Islands National University (SINU) or University of the South Pacific USP), a minimum of two community research assistants (VRAs) – one male, one female – from each host village, and in four cases a member of the Brisbane team (International WaterCentre/Griffith University). All qualitative data was entered and coded in NVivo™.

Key domains of information collected:

- Community Water Management
- WASH situation
- Social and economic context
- Physical setting
- External engagement and political economy

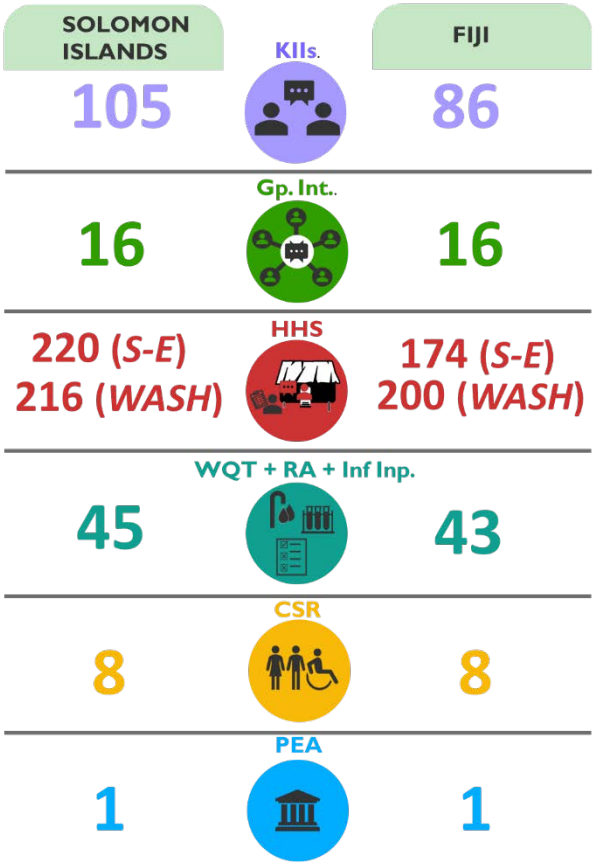

Figure 4 Phase 1 data collection sample sizes

QUANTITATIVE DATA

Quantitative HHS data collection was undertaken on tablets linked to the mobile data collection platform SurveyCTO® then entered into MS Excel™ and summarised using Excel and SPSS™.

Water quality sampling and testing - Aquagenx

Water quality testing was undertaken using the portable Aquagenx® CBT (compartment bag test) that is based on matching a colour pattern in the water sample with a corresponding score to ascertain the most probable number (MPN) of *E. coli* colonies per 100 millilitres of sample liquid. All the Associate Researchers were trained prior to community visits in the correct procedures to obtain water quality samples and subsequent water quality testing.

Types of drinking water sources tested included: surface water (dams, tap stands, storage tanks), spring water, rainwater and household containers

Water quality samples (blue liquid indicates presence of E. coli) (Photo credit: S Pene)

It is important to note that water quality tests were a one-off sampling event only and was not intended to provide a detailed and accurate indicator of day-to-day risks to human health from the community's drinking water supply.

The test is for presence and absence of *E.coli* only; as such, the origins of the *E. coli* cannot be definitively inferred (although a good site risk assessment can help with this).

Faecal contamination is also not distributed evenly throughout all components of a water system (dam, tank, pipes, taps etc) so presence in one part of the system does not necessarily mean presence in another part of the water system. This is one of the reasons why testing was conducted at a range of water sources and, as best as possible, across all parts of the water source system.

Sanitary inspections and risk assessments

These assessments were usually carried out at the time of water quality testing. A risk assessment score sheet was completed, which included prompts to take photographs and notes on general observations, such as weather, infrastructure, animal and human contamination sources, and slope and vegetation description. There were two scores as part of the risk assessment, with a low number representing a lower risk:

1. A drinking water (DW) score that considered risks to the sources of drinking water (e.g. from animals,

humans, and including microbiological and chemical)

2. An overall health risk score that included the DW scores plus risks to human health from water-based disease vectors (i.e. mosquitoes).

Infrastructure inspections

Inspections on key water supply infrastructure were also undertaken during the water quality testing and site risk assessment. The current condition of water sources (dams/wells), storage tanks, tap stands and associated pipes and parts was considered alongside other qualitative and quantitative data in assessing 'good' community water management.

COMMUNITY ENGAGEMENT

In addition to securing ethical approval and permissions to conduct research in each village, the following engagement activities were undertaken:

- Community meeting on arrival
- A community gift (e.g. aerial/satellite image of the community and surrounds)
- Identification and training of VRAs
- Research participants were not individually rewarded for participation
- Water testing and risk assessment – accompanied by some community members
- Water testing results were shared with the community before the research team departed, orally and in a short, written report
- Community report: a 4-page summary of key and relevant findings from each village, as well as key findings from all study communities, was shared with communities once the analyses were completed.

COUNTRY-LEVEL POLITICAL ECONOMY ANALYSIS

A political economy analysis (PEA) for both countries regarding the water and sanitation sector was undertaken, with a focus on understanding the power dynamics in government bodies at provincial and national levels that inform water and sanitation plans, projects, and management.

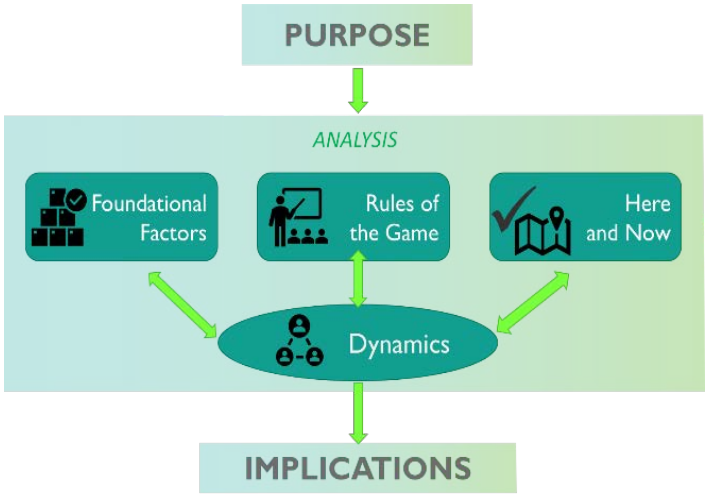

Figure 5: USAID's PEA framework *(Menocal et al., 2018)*

The approach to the political economy analysis was drawn from the USAIDs PEA framework (Fig 5) (Rocha Menocal et al., 2018). This framework uses four pillars to investigate the structures influencing aid implementation:

- **Foundational (or structural) Factors**: the long-term structures that actors need to work within and around, because foundational factors either need a complete restructure of the way things are done to overturn, or are impossible to do so (the broader research program has adopted the more conventional term of Structural).
- **Rules of the Game**: the policies structures and power dynamics that governance systems work through.
- **The Here and Now**: addresses current events and changes that impact how governance is done.
- **Dynamics**: Refers to the interactions between the other three pillars and how the effects reinforce or work against each other (Rocha Menocal et al., 2018).

ETHICS

All required Ethics documentation was completed and approved before commencement of data collection. Approval was granted from the relevant research institutions and agencies. In addition, permission was sought from relevant community leaders from each community prior to site visits and data collection. Informed consent was obtained from all respondents before participating in community data collection activities (surveys and interviews).

"Good" Community Water Management - our framework for assessment

Based on existing literature and the results of the research – both strengths observed and problems encountered with community water management (e.g., evidenced by inadequate WASH, or factors identified by community members) – we identified a suite of key features of what constitutes 'good' management of community water systems.

These features are clustered under three core areas:

i) **Actions by a water management group** (e.g. water committee);

ii) **Actions by all water users in the community** (across different socio-spatial levels); and

iii) **Enabling actors' roles** (in each community relating to WM) (Table 3).

Table 3 provides a summary of the case-study communities' Community Water Management status. These are the key features that we determined most influence CWM outcomes in our case studies (either because of their presence aligning with good CWM, or their absence/weakness aligning with weaker CWM outcomes and supported by other evidence). We have deduced that these features constitute and support 'good' water management in the Solomon Islands and Fiji.

Table 3: Features of 'good' water management

FEATURES OF 'GOOD' WATER MANAGEMENT
Actions by a water committee / dedicated group of water in the community (water managers): • Maintenance (proactive, timely, innovative and responsive when needed) • Use of risk-based management to prioritise actions & mitigate hazards (e.g., promote sanitation, maintenance, treatment/promoting the treatment of poor water) • Planning and managing supply (multiple sources, storage capacity, plan for future demand and changes) • Managing demand (e.g., fit-for-purpose water use with multiple water sources, water conservation) • Socially-inclusive governance processes • Use of policies and rules (formal, informal) • Managing finances transparently and competently • Monitoring to guide improvements and communication with the community • Communications with community, that are regular, two-way and inclusive, to elicit feedback, provide guidance and report to community for transparency and accountability • Cooperation and leverage between community committees/groups • Motivate and coordinate collective action of community members • Opportunity and capacity to access and use external support
Actions by all water uses (Collective action, as individuals, or other levels of organisation within the community such as households, families, social groups, or zones) • Financial contributions • Maintenance: either conducting regular smaller-scale maintenance, or reporting maintenance needs to the management group, as agreed • Operating / using the water system as agreed e.g., conserving water use and using multiple sources
Enabling actors, village-level actions: • Provide technical advice at appropriate times and in appropriate formats, such as for specific maintenance problems, or with other water management group activities listed above • Supplement finances: assist with financial costs, such as with capital costs, and potentially some maintenance costs • Provide access to appropriate spare parts • Monitoring of WASH outcomes ***Note:*** *There are many additional actions that enabling actors undertake to support community water management at a sector-wide level, such as developing standards and regulations, implementing and assessing policy, etc. However, here we focus on the actions of enabling actors (government, civil society, private sector businesses) that are required at the community-level.*

SOLOMON ISLANDS: KEY FINDINGS

WASH SITUATION IN COMMUNITIES

This study explicitly sought communities that reportedly had good WASH situations, and thus they are not considered to be representative of the range of situations found across the country and are likely to have better WASH situations than many other communities. No communities achieved the highest level of service or conditions across all aspects of WASH (Table 4). While this is the aspiration, it was not expected that communities would achieve highly in all of these dimensions, particularly given that communities receive no regular ongoing support to manage their water systems.

There was considerable variability between the communities, however, some key patterns were observed:

- Despite all study communities generally having a range of water resources available, shared water systems were rarely delivering water services that were reliable and available throughout the year, especially across the whole village.
- Accessibility and reliability experiences varied within a single village, with considerable differences depending on location (most commonly relating to water pressure). Low water pressure at certain times of the day or year resulted in some access points providing no water and requiring residents to walk further to cart water.
- Females were responsible for around 90% of water collection, including when the access point was further away (outside the household yard).
- Householders and communities managed multiple water sources, demonstrating seasonal usage and, in many cases, fit-for-purpose usage patterns (using water perceived to be less safe for non-drinking activities whilst conserving water considered safer for drinking and cooking). Women, in particular, articulated balancing the use of different water sources for different purposes to increase the availability of drinking water.
- There was a disconnect between perceived and actual water safety in many communities. All villages had a presence of the microbial indicator *E. coli* in at least one, if not all, their drinking water source types though most households across all villages perceived their drinking water supply to be “very safe” or “mostly safe”.
- In some communities, there were positive associations between perceived drinking water safety and water treatment practices, whilst in others (e.g. Hulavu, Sumate, Hovi) perceptions of safety were low and treatment practices were uncommon; in Bareho, perceptions of safety were high but many people still treated their water.
- High satisfaction with the water system usually coincided with higher accessibility and higher water point functionality, while perceptions of water quality were usually not linked to satisfaction.
- Accessibility remained less than desired in every community, with women in all sites identifying aspirational water systems that supported internal house connections. This was associated with improved privacy when bathing, and convenience for cooking, cleaning and washing.
- As a general observation, water users were more concerned with the accessibility, availability and reliability of water and prioritised water system improvements that would further these outcomes. This included prioritising water systems that would not necessarily deliver the safest water (according to their own perceptions of safe water supplies).
- Sanitation and hygiene (handwashing), assessed using SDG 6.2 indicators, were both inadequate across all communities.
- High rates of open defecation were reported, with some households reporting open defecation even when they owned a toilet.
- Generally, people prioritised improvements to water systems *before* sanitation and hygiene. There was a common preference for improving water systems to enable water-based sanitation (and a suspected aversion to improving sanitation until water-based sanitation could be supported).

Shared water systems were rarely delivering water services that were safe, reliable and available throughout the year

Table 4: Overview assessment of WASH situation and community water management in the eight case-study communities. The criteria listed include a range of measures used to indicate WASH situations, and to indicate the features of "good" CWM as outlined in the methods[2].

		Hulavu	Sumate	Bareho	Dadala	Gouna-busu	Hovi	Kolosori	Manakwai
WASH SITUATION	SDG6.1 - Drinking water	🟡	🟡	🟢	🟡	🟢	🟢	🟠	🟢
	SDG 6.2 – Sanitation	🔴	🔴	🟠	🟠	🟡	🟡	🟡	🟠
	SDG 6.2 – Hygiene	🟠	🟠	🟡	🟠	🟠	🟠	🟠	🟠
	Water quality (drinking)	🟠	🟡	🟠	🟡	🟢	🟡	🟢	🟡
	Drinking water risk assessments	🟡	🟡	🟠	🟢	🟡	🟠	🟠	🟡
	Perceived water quality (%HH responding "very safe or safe")	🟠	🟠	🟢	🟡	🟡	🟡	🟡	🟠
	Water treatment (%HH that reportedly treat water)	🟠	🟠	🟡	🟢	🟢	🟠	🟡	🟡
	Drinking water availability and reliability	🟡	🟡	🟢	🟡	🟢	🟡	🟡	🟢
	Water Accessibility (%HH with people with difficult access)	🟠	🟢	🟠	🟢	🟢	🟡	🟢	🟢
	Water point functionality	🟡	🟡	🟠	🟢	🟡	🟢	🟢	🟢
	Satisfaction with water situation (%HH "happy")	🟠	🟠	🟡	🟢	🟢	🔴	🟢	🟢
COMMUNITY WATER MANAGEMENT ASSESSMENT	Water committee / nominated people (recognised,	🟡	🟠	🟡	🟢	🟡	🟢	🟢	🟢
	Water infrastructure functionality	🟡	🟡	🟡	🟡	🟡	🟡	🟢	🟢
	Maintenance activity	🟡	🟠	🟡	🟡	🟠	🟠	🟢	🟢
	Drinking water risk assessments (scores)	🟡	🟡	🟠	🟢	🟡	🟠	🟠	🟡
	Risk management (awareness, actions)	🟠	🔴	🟡	🟡	🟢	🟠	🔴	🟡
	Supply management	🟢	🟡	🟡	🟡	🟠	🟡	🟢	🟠
	Demand management actions	🟠	🟠	🟢	🟠	🟠	🟢	🟡	🟢
	Inclusion (processes, actions etc)	🟡	🟠	🟡	🟡	🟡	🟢	🟡	🟢
	Policy/ rules/ norms	🟠	🟠	🟡	🟠	🟡	🟢	🟢	🟢
	Monitoring	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🟢
	Consulting, reporting to community	🔴	🔴	🔴	🔴	🔴	🟡	🔴	🟢
	Linkages to other committees/ groups	🔴	🔴	🔴	🔴	🔴	🟢	🔴	🔴
	Collective action: financial	🟡	🟠	🟠	🟠	🟡	🟢	🟡	🟢
	Collective WM action - other	🟡	🟡	🟡	🟡	🟡	🔴	🟠	🟡

[2] The colour-coded ratings for most WASH and CWM criteria in the table represent a summary assessment of both qualitative and quantitative data. The ratings applied to the SDG 6.1 indicator results were based on the proportion of population accessing basic and safely-managed water services. SDG 6.1 indicator results were based on the location, type of facility and water quality of the primary source of drinking water identified by the household. However, water tests were conducted at one point in time (wet season), and water quality was not tested at every household surveyed but rather from a sample of 'types' of water supplies and extrapolated to all of similar types (e.g. results from 1 or more rainwater tanks were applied to all households using rainwater as the primary drinking water source). In addition, some households indicated different primary drinking water sources for wet and dry season; in these cases, the lower service level was used to represent overall service level. Therefore, the colour codes given in this table may vary throughout the year.

COMMUNITY WATER MANAGEMENT

The objective of this research was to learn lessons from communities where community water management (CWM) was considered to be 'good' (as listed in Table 3). However, it is clear that, although there were some strengths in particular aspects of community water management, all study communities were struggling with some aspects of CWM. This is not a surprise; global evidence suggests that communities left to manage water systems on their own will typically struggle to sustainably deliver inclusive, reliable, available and safe water systems.

Water management institutions

Water management can be broadly defined as people being organised to undertake water management activities. We deliberately did not assume that a water committee was an essential component of water management but rather were interested in what forms of organisation existed and how they worked.

- The frequent collapse of water committees reiterates that CWM through committees is a challenge: Redundancy through inconsistent activity (often driven by the presence or absence of external actors), the burden of role sharing (creating fatigue and excess responsibility) and homogeneity in age and gender were identified as factors in poor water committee longevity.

Gender equality and social inclusion

- Despite the women's group representative in each community generally presenting an affirmative expression of their role and agency within the village, in terms of CWM a few explicitly noted that they had never been directly consulted about water management issues.

> Women are more likely to have greater agency at zone/group level than village-wide level

- There is a clear age disparity in water committee membership that does not reflect the national reality: Youth are valued as "muscle" through providing physical assistance, but they are not valued as potentially constructive contributors to CWM more widely. Given the acute demographic 'youth bulge' in Solomon Islands this deficit merits attention: How might both Government and CSOs better engage young people in water management into the future?
- In terms of equity of access to water, most community respondents felt that everyone had equal access to water and those who did not were either vulnerable or marginalised (e.g. older, infirm woman), or had unequal access due to poor function (low water pressure) or reduced access, sometimes related to socio-cultural issues (status, religious denomination).

Water management operation and maintenance activities

- Some communities had clear policies or guidelines for operating and maintaining their water system, but others had no formal procedures in place, working on an ad-hoc, reactive basis.
- Small groups of people (not always recognised members of a water committee), and particularly youth (specifically younger males), were generally central to maintenance tasks across all the sites.
- Levels of maintenance activities varied across the communities; all had evidence of some *reactive* maintenance activities, such as cleaning-out dams after heavy rain or flood events, cleaning and flushing the storage tank and fixing leaking, burst, or blocked pipes.

> Some water committees engaged in proactive maintenance such as regular dam cleaning and keeping tap stands free of rubbish and weeds

- There is some suggestion that there is a level of dependency on RWASH that is not in line with current community-led water-management policy (e.g. the reactive versus the proactive operation and maintenance approaches used by most Water Committees).
- Only a few communities showed evidence of households actively fixing taps on their own.
- Most Water Committees displayed limited awareness of risk mitigation measures, with risk management and risk awareness observed to be generally poor across all the communities.
- Where "good" risk management was observed, it was usually associated with cultural/religious beliefs and social norms (e.g. 'purity' and taboos).

Water management community engagement and collective action

- Beyond the water committee alone, high or very high levels of wider collective action was not in evidence and there clearly needs to be greater mobilisation of community wide collective action – particularly in the post-construction phase of water projects where there was very little evidence of structured, ongoing co-operation.
- A lack of water fee sustainability is a critical issue and further reinforces the need for community consultation, good financial literacy and regular reporting.

- There is a critical need to strengthen water committee linkages and communication with other committees or groups in communities (particularly Health committees and possibly Church [esp. in the SDA communities]).

Broken pipe between dam and community storage tank, Bareho, Solomon Islands (Photo credit: C. Beal)

Links between 'good' water management and WASH outcomes

When there was a strong **nominated water group** (Manakwai, Hovi and Kolosori), we are more likely to also observe:

- Higher accessibility to water services, including from a social inclusion perspective.
- Higher water point functionality
- More maintenance activities
- Higher satisfaction with the water system as a whole
- Greater water infrastructure functionality

CWM satisfaction

In contrast to what was expected, it was observed that the communities with comparatively 'better' water management (Manakwai, Kolosori and Hovi) recorded ***lower management satisfaction levels than the other communities.*** One potential explanation for this may be that past experience with better and/or worse water systems shapes people's expectations, evaluations and motivations. In the communities where people had living memories of a bad water situation, such as scarcity or difficulty in accessing water, or communities that had previously had better water systems, people had low levels of satisfaction with the existing water management situation.

STRUCTURAL FACTORS INFLUENCING CWM PLUS

Structural factors include the ***physical setting*** (water resources, geography, climate, community size) and ***social context*** (socio-cultural, economic, historical and religious particulars). These structural factors influence how "good" community water management is, and can be, achieved in each village. Importantly, structural factors usually cannot be purposefully changed or influenced in the life of a WASH or other intervention.

Some key structural factors identified include:

Physical Setting

- Topography affected inclusive access to gravity-fed systems
- Sources can be on land where non-community residents have primary rights
- The environment influences livelihood activities, which in turn influences social dynamics
- Communities close to urban centres (and with ready public transport) tended to have weaker collective action

Political Economy of WASH projects

All support for CWM is delivered through projects, with a start and end to the engagement. Although projects can and have delivered many benefits to communities, they are not without disadvantages, such as:

- project dependency and disempowerment
- the constraints of budget/time-limited engagement
- the tendency for pre-determined project activities and outputs to be non-adaptive and not take contextual specifics into consideration.

Community history

- Experience of water projects, including failures and disruptions, influence expectations and satisfaction, and likely the ability to mobilise for water actions
- Extant community tensions (especially relating to logging, land and chiefly disputes) make mobilising for collective action difficult

Demography, socio-economics and social cohesion:

Population and size of the village; number of tribes; socio-spatial dynamics (zones/groups); number and type of religious denomination(s); and mobility and livelihood particulars, all influence social cohesion and collective action, informing CWM outcomes:

- Smaller levels (e.g. zone/area) can have a greater capacity for action than village-wide levels

- Wealth was not a driver of good CWM outcomes - Manakwai was amongst the economically 'poorest' of the case-study communities but had good, long-term (8 years) CWM

Community Governance: Leadership specifics, dynamics, tensions; community committee numbers and activeness; ability (and willingness) to potentially link with WM group

Government and CSO engagement in the sector needs to focus on factors that can be influenced in the short-medium term but also to try and work with the structural factors that cannot be changed…..to do this, these factors need to be assessed through a diagnostic (rapid community assessment) PRIOR to implementation of a WASH or CWM project

Toilet in mangroves, Bareho, Solomon Islands (Photo credit: C. Beal).

FIJI: KEY FINDINGS

Bavu, Fiji (Photo credit: M Love)

WASH SITUATION IN COMMUNITIES

As in Solomon Islands, no communities in Fiji achieved the highest level of service or conditions across all aspects of WASH (Table 4). Notwithstanding the expected variability between the communities, some key patterns were observed:

- All communities relied upon at least two water sources for drinking, and used additional sources for non-drinking needs. The predominant water supply model consisted of piped water into the homes or within the property boundaries. The water systems were generally delivering water services that were reliable and available throughout the year, with some seasonal variability.
- Accessibility and reliability experiences varied within a single community, with considerable variations depending on location (most commonly relating to water pressure).
- When water had to be collected outside the house, water collection was the responsibility of both females and males.
- In most communities, householders and the Water Committee managed multiple water sources. However, there was evidence that the preferred drinking water source was also widely used for non-drinking purposes throughout the year, despite the increased scarcity of the primary source in the dry season.
- In all the communities there was a presence of the microbial indicator *E. coli* in at least one, if not all, of their drinking water source types with spring and rainwater sources typically having lower most-probable-numbers of *E. coli*.
- There was a disconnect between perceived and actual water safety in many communities:
- Most households across all communities perceived their drinking water supply to be “very safe” or “mostly safe”, with the exception of Bavu, where 45% of household respondents considered the bore water as "not safe"

In most communities there was a positive association between perceived drinking water safety and water treatment practices

- Overall, people were generally more satisfied with their household water supply in the wet season than the dry season.
- With regard to accessibility, that is anyone in the house being able to get water for themselves, a number of households reported having at least one household member who had difficulties with day-to-day access, usually elderly residents or people with a disability.
- The desire for Water Authority of Fiji (WAF) water (piped into their homes) and/or treated water (e.g., chlorinated and/or filtered) was a recurrent theme, echoed most strongly in Narara, Cobue and Rukuruku.
- Low rates of open defecation were reported, with households reporting open defecation only when they were away from their own or a nearby toilet (e.g., in the garden).
- Generally, people prioritised improvements to water systems more highly than sanitation and hygiene, with a common preference to improve water systems to enable water-based sanitation.

Table 4: Overview assessment of WASH situation of community water management in the eight case study sites. The criteria listed include a range of measures used to indicate WASH situations, and to indicate the features of "good" CWM as outlined in the methods. [3]

	Assessment criteria	Bavu	Cobue	Daviqele	Galoa	Nabubu	Narara	Rukuruku	Wailotua-two
WASH SITUATION	SDG 6.1.1 - Drinking water service level	HIGH	MED	LOW	LOW	HIGH	HIGH	LOW	VERY LOW
	SDG 6.2 – Sanitation	MED	MED	HIGH	LOW	LOW	HIGH	MED	HIGH
	SDG 6.2 – Hygiene service level	MED	MED	MED	LOW	MED	MED	HIGH	MED
	Water quality (drinking)	VERY LOW	LOW	LOW	MED	LOW	MED	MED	VERY LOW
	Drinking water risk assessments	VERY LOW	LOW	MED	MED	MED	MED	LOW	MED
	Perceived water quality (%HH perceived water as "very safe")	LOW	MED	MED	LOW	MED	VERY HIGH	HIGH	HIGH
	Water treatment (%HH that treat water at least sometimes)	HIGH	HIGH	MED	HIGH	MED	VERY HIGH	VERY HIGH	HIGH
	WASH-related Health	MED	MED	LOW	HIGH	HIGH	LOW	MED	MED
	Drinking water availability and reliability	LOW	MED	HIGH	VERY HIGH	HIGH	MED	LOW	LOW
	Accessibility (% HH with someone with water access difficulties)	HIGH	VERY HIGH	HIGH	MED	VERY HIGH	MED	HIGH	HIGH
	Water system functionality	MED	MED	HIGH	HIGH	MED	MED	MED	HIGH
	Satisfaction with water situation (%HH reported being "happy" with water source)	LOW	HIGH	VERY HIGH	HIGH	VERY HIGH	VERY HIGH	MED	VERY LOW
	Handwashing (aggregate indicator of behaviour)	VERY LOW	VERY LOW	VERY LOW	VERY LOW	VERY LOW	VERY LOW	MED	VERY LOW
COMMUNITY WATER MANAGEMENT	Water committee / nominated people	HIGH	HIGH	MED	VERY HIGH	HIGH	HIGH	HIGH	HIGH
	Water point functionality (observation)	HIGH	HIGH	HIGH	VERY HIGH	VERY HIGH	VERY HIGH	MED	HIGH
	Maintenance activity	MED	MED	MED	VERY HIGH	HIGH	MED	HIGH	MED
	Drinking water risk assessments (scores)	VERY LOW	LOW	MED	MED	MED	MED	LOW	MED
	Risk management (awareness, actions)	LOW	MED	MED	MED	MED	MED	MED	LOW
	Supply management	LOW	MED	HIGH	MED	LOW	LOW	LOW	HIGH
	Demand management actions	HIGH	MED	MED	LOW	HIGH	LOW	LOW	LOW
	Inclusion (processes, actions etc)	LOW	MED	MED	HIGH	MED	MED	HIGH	LOW
	Policy/ rules/ norms	MED	HIGH	MED	HIGH	MED	MED	MED	HIGH
	Monitoring	LOW	LOW	MED	VERY HIGH	LOW	MED	MED	MED
	Consulting, reporting to community	MED	MED	MED	MED	MED	MED	MED	MED
	Linkages to other committees/ groups	HIGH	LOW	MED	MED	MED	LOW	HIGH	LOW
	Capacity to access external support	MED	HIGH	VERY HIGH	VERY HIGH	MED	MED	MED	MED
	Collective action: financial	HIGH	MED	MED	VERY HIGH	MED	MED	HIGH	HIGH
	Collective WM action - other	MED	MED	MED	VERY HIGH	MED	MED	HIGH	LOW

VERY LOW
LOW
MED
HIGH
VERY HIGH

[3] The colour-coded ratings for most WASH and CWM criteria in the table represent a summary assessment of both qualitative and quantitative data. The ratings applied to the SDG 6.1 indicator results were based on the proportion of population accessing basic and safely managed water services. SDG 6.1 indicator results were based on the location, type of facility and water quality of the primary source of drinking water identified by the household. However, water tests were conducted at one point in time (wet season), and water quality was not tested at every household surveyed but rather from a sample of 'types' of water supplies and extrapolated to all of similar types (e.g. results from 1 or more rainwater tanks were applied to all households using rainwater as the primary drinking water source). In addition, some households indicated different primary drinking water sources for wet and dry season; in these cases, the lower service level was used to represent overall service level. Therefore, the colour codes given in this table may vary throughout the year.

COMMUNITY WATER MANAGEMENT

Similar to Solomon Islands, all eight study communities were struggling with some aspects of community water management, although there were some strengths in particular aspects of community water management.

Water management institutions

Most communities in Fiji have Water Committees or designated groups of water managers, many of which were instigated through engagement by external actors (and which is now formally required as part of Fiji's rural governance models) (Nelson et al., 2021).

At the time of the research, the Fiji Government advised there was no set water committee structure other than the *Turaga ni Koro* must be a member and there should be at least one female member and a youth representative. There was significant variation in general Water Committee structure and membership across the case-studies. The size of the water committee also varied, from a total of four members in Bavu through to eleven in Nabubu. Recent policy changes (July, 2021) now require "one or two female members and similarly youth members" to be on the water committee (DWS, 2021:13.2.v).

> The decree that there must be a Water Committee appears especially suited to Fiji, where government regulations do influence people's actions at the community level

Some findings relating to water management institutions include:

- Water Committees displayed a range of organisational structure and member attributes. A lack of prescribed governance structure (e.g., executive roles, number of members etc.) did not appear to be an issue or impact management actions.
- A lack of funds is an impediment to good CWM outcomes in some cases (e.g. limiting access to spare parts and up-grading systems).
- Household water wastage and/or mismanagement is a problem in some places (Galoa, Daviqele, Cobue).
- Age disparity is an issue in all water committees (negatively impacting knowledge transfer, institutional resilience).
- Knowledge of old sources – such as shoreline springs/wells – is not always passed on, delimiting community resilience into the future (e.g., Galoa)
- Despite a range of water management challenges, people were fairly satisfied with 64% of all the respondents in the WASH household survey reporting that they believed that their water supply was "managed very well" and 20% "mostly well".

Gender equality and social inclusion

- Women were rarely directly consulted about WM issues.
- There is a clear age disparity in Water Committee membership that does not reflect the national reality - Youth are valued as the "hand of work" but are not valued as potentially constructive contributors to CWM more widely.
- There is a lack of diversity in water committee membership (age and gender).
- In terms of equity of **access to water**, most community respondents felt that everyone had equal access to water, although in practice some households did not due to the physical location of their house, which may be related to underlying forms of marginalisation.

Women mapping the water system in Wailotua 2 village, Fiji (Photo credit C. Beal)

Water management operation and maintenance

Levels of maintenance activities varied across the communities. All case-studies had evidence of *reactive* maintenance activities, such as cleaning out dams after heavy rain or flood events, cleaning and flushing the storage tank and fixing leaking, burst, or blocked pipes, but **proactive maintenance was less wide-spread** (e.g., monthly cleaning of dam).

Water committees were often struggling to operate and maintain their water supply, often due to limited technical capacity - even for simple issues

- Water Committee collective action varied across sites. In the strongest case (Bareho), maintenance activities were primarily driven by a motivated individual (water champion).
- No locales reported having clear formal (codified) polices or guidelines that they followed for regular water management operating and maintaining activities, but some still had fairly prescribed and organised maintenance and operation schedules.
- Surface water contamination during wet weather was prevalent, but there were usually only rudimentary control measures in place (e.g., makeshift filters).
- There is some evidence that there is a level of dependency on WAF that is not in line with current community-led water-management policy (e.g., reactive rather the proactive operation and maintenance, a reliance on WAF for water delivery [Bavu] and a strong desire for WAF-treated water).
- Most Water Committees displayed limited awareness of risk mitigation measures, with risk management and risk awareness observed to be generally poor across all the communities.
- The main water management issues identified through the WASH household survey related to a lack of community or household cooperation, and money.
- There is a critical need to strengthen Water Committee linkages and communication with other committees or groups in communities (particularly with community health worker/nurse, Health Committees, Sanitation Committee, and possibly Church groups).

Storage tank inspection, Rukuruku, Fiji (Photo: S. Pene)

Water management, community engagement and collective action

Village cooperation and collective action (both within and outside WASH domains) were explored through a variety of instruments to better understand what social determinants may inform CWM outcomes and possibilities.

- The relative absence of land disputes and the existence of customary land agreements with neighbouring communities where the water source is located (e.g. Galoa), was a critical factor that informs water service outcomes (this was generally totally lacking in Solomon Islands).
- There was evidence of proactive and regular maintenance in some cases (e.g. regular dam cleaning and keeping communal tap stands free of weeds and rubbish), with community work an entrenched and strong institution in some locals (e.g. Galoa).
- There was, overall, regular and effective systems of financial contributions. The absence of a set water fee did not appear to correlate with better or worse CWM outcomes.
- There was strong WASH-related linkages with rural emigrants based in 'town' in some sites (Nabubu, Galoa, Rukuruku), which has been instrumental to improving community WASH outcomes
- Cross-committee linkages are lacking – especially between the Water Committee and Health Committee/nurse – and seems to be a widespread and recurrent issue.
- WC and community/HH cooperation and communication is typically weak (e.g. Rukuruku, Daviqele, Cobue).

Solesolevaki activities (fundraising and community work) were common and critically improved community well-being, both within and beyond the realm of CWM and WASH

Links between 'good' water management and WASH outcomes

The community with the strongest **identifiable water manager group** (e.g., Galoa), also had:

- Higher accessibility to water services, including from a social inclusion perspective
- Greater water point functionality
- High drinking water reliability and accessibility
- More maintenance activities

Notably, there was also strong collective action in terms of both financial action and indirect water management (proactive monthly cleaning of dam, flushing reservoir tank, fixing leaks etc.). Galoa also had amongst the highest levels of external (familial) support.

CWM satisfaction

Water management satisfaction and water committee/group were linked:

- Higher management satisfaction levels were generally observed where there was a 'stronger' water committee or group
- Communities with comparatively 'weaker' water committee/group (Bavu, Wailotua-two and Rukuruku) all recorded lower management satisfaction levels
- Higher management satisfaction correlated with "better" water management (Galoa, Daviqele and Nabubu)

Community satisfaction with water management was also somewhat linked to both ***water point functionality and drinking water availability and reliability.***

Lastly, the desire for water-based sanitation was clearly a key driver for improved water supply and appears to remain a potent motivator for ongoing maintenance in various locales (e.g. Wailotua, Daviqele, Galoa, Narara, Cobue).

STRUCTURAL FACTORS INFLUENCING CWM PLUS

A range of structural factors that affect CWM and WASH were identified in Fiji. As these factors can't be (easily) changed, it is important that WASH and CWM interventions are adjusted to suit these structural particulars.

Some of key structural factors identified and explored in the research in Fiji, include:

Physical setting

Topography, water availability, natural resource specifics (logging, animal husbandry, forestry practices) impact the WASH situation. The water source may be located on land where non-village/settlement residents have primary rights (Daviqele, Cobue, Galoa).

Demographic & Social context

- Population and size of the community: Smaller communities typically tend to have stronger bonding social capital (e.g. Galoa, Nabubu), but not always.
- The number of mataqali [clan] and religious denomination(s) within a single community influences social capital
- Galoa and Nabubu had the 'best' CWM and least amount of reported social issues (as elucidated by respondents); Daviqele, Rukuruku and Wailotua-2 had comparatively 'poorer' CWM and the most reported social issues.
- Economic collective action: water-fees worked well in some contexts (e.g. Bavu), whilst in Cobue and Nabubu organised fundraising to support CWM negatively impacted people's ability and/or willingness to maintain the monthly water fee.
- Remittances and/or community-town linkages can be crucial to CWM performance (e.g. Galoa, Nabubu).
- Wealth was not a driver of good CWM - of the comparatively wealthiest communities only Daviqele was in the top three 'good' CWM category.
- Poor past experiences and limited water options may be a motivator for strong CWM actions.

Cultural norms

- In iTaukei contexts, women's agency and ability to engage with the WM group are informed by kinship dynamics (e.g. a lack of maternal linkages within a *koro* can delimit the community

health workers' ability to engage with the WM group).
- youths are not customarily given leadership positions in committees.
- It is "easier to get female involvement" in Indian settlements than iTaukei villages.

Political Economy of WASH projects:

Based on the PEA, some **implications** for how government, donors and CSOs seek to improve rural CWM in Fiji include:

- Water resources are governed by many different actors and policies and lack clear, systematic and effective coordination.
- There was evidence of a growing reliance on, and community expectation for, government supplied water at no cost to users.
- Bureaucracy is complex and shifting, making it difficult for communities to easily access support.
- External actors need to work differently depending on leadership strength and community capacity, and give people confidence in being able to solve their own problems.
- There is a growing reliance on, and community expectation for, government-supplied water at no cost to users WAF's policy of fully subsidising water carting "…impedes communities' self-organising" capabilities (KII, CSOz) and delimits "resilience" (KII, GoFa);
- This reliance is led by the current government's agenda rather than sound policy and is arguably delimiting community resilience, fuelling dependency, and – in the long term – threatens the sustainability of strong CWM at the rural le

CONCLUSIONS and RECOMMENDATIONS

Building on the strengths and persistent challenges identified in achieving "good" CWM in both countries, there are a number of recommendations that can be made (Figure 6).

It is clear from this research, and others, that most community water management groups require some kind of support if they are to remain active and effective water management stewards. **Enabling actors** such as CSOs and provincial and national governments must provide some kinds of further advisory and practical support if the community-based water management model is to lead to safe, reliable and adequate WASH services.

This **support could be direct or indirect,** such as through leveraging town-community social networks. Irrespective of the mode of support, it is clear that communities do, and will, continue to face unfamiliar challenges – both technical and governance in nature.

Any such ongoing support needs to be pragmatic and place-based, whereby a **balance is struck between fostering dependency (undesirable) and encouraging self-help (desirable)**.

A recurring theme that emerged during the Phase 1 research was the need for a more place-based understanding of the wider socio-cultural dynamics that were limiting (or enabling) functional, proactive, and collective management of water systems.

Enabling actors can further improve the quality of their support by **improving their awareness of community context, including structural factors, prior to engagement** (diagnostics and pre-awareness activities).The recommendations summarised in Figure 6 are based on community characteristics, WASH situation and patterns of CWM approaches identified in the Phase 1 (formative research) component. As such, they are derived from (primarily) just eight communities; hence, they may not all be relevant, suitable, or achievable for implementation in all contexts. Good WASH requires good community water management. Good community water management needs an active and diverse Water/WASH committee that has access to ongoing support - both advisory and practical in nature. Rural communities need support to address both technical water system issues and community water governance challenges. Water committees also need improved training that is better tailored to the socio-cultural, economic and environmental particulars of the region. Lastly, water committees need the support of their communities in the form of collective action:

Figure 6 includes recommendations of actions and approaches that we believe can contribute to improved CWM outcomes.

Figure 6: Recommendations and Actions from Phase 1 to support resilient, sustainable and inclusive community water management

Water is everyone's business!

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