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Phase 1 Findings Report for Solomon Islands



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ACRONYMS AND ABBREVIATIONS

AR	Associate researcher
BSIP	British Solomon Islands Protectorate
CBT	Compartment bag test
CDD	Community-driven development
CDF	Constituency development funds
CPR	Common pool resource
CSO	Civil society organisations
CSR	Community background summary report
CWM	Community water management
CWM+	Community water management Plus
DW	Drinking water
EHD	Environmental Health Division
EU	European Union
F	Female
FB	Facebook
FBO	Faith-based organisation
FN	Field notes
GESI	Gender equality and social inclusion
GP	Guadalcanal Province
Gp Int	Group interview
GU	Griffith University
HH	Household
HIES	Household Income and Expenditure Survey
HW	Handwashing
ICT	information and communications technologies
IWC	International WaterCentre
JMP	Joint Monitoring Program
KII	Key informant interview
LH	Life history (interview)
LLEE	Live & Learn Environmental Education
M	Male
MHMS	Ministry of Health and Medical Services
MME	Ministry of Mines and Energy
MNP	Most probable number
MP	Member of Parliament
MPGCD	Ministry of Provincial Government and Constituency Development
PA	Project actor (interview)
PaCWaM+	Pacific Water Management Plus
PEA	Political economy analysis
PIC	Pacific island countries
RA	Risk assessment
RDP	Rural Development Program
RWASH	Rural water, sanitation and hygiene
RWSS	Rural Water Supply and Sanitation Program
RWT	Rainwater tank
SBD	Solomon Islands dollar
SDA	Seventh Day Adventist (Church)

SDG	Sustainable Development Goal
S-E HHS	Socio-economic household survey
SI	Solomon Islands
SIG	Solomon Islands Government
SINSO	Solomon Islands National Statistics Office
SINU	Solomon Islands National University
SIWA	Solomon Islands Water Authority
SSEC	South Seas Evangelical Church
TS	Tap stand
UNDP	United Nations Development Programme
VL	Village leader
VM	Vulnerable/Marginalised
VRA	Village research assistant
WASH	Water, sanitation and hygiene
WC	Water committee
WCR	Water committee representative
WfW	Water for Women
WHO	World Health Organisation
WM	Water management
WQ	Water quality
WQT	Water quality testing
WS	Water system
WP	Western Province
YR	Youth representative (interview)

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EXECUTIVE SUMMARY

Purpose

In many Pacific island countries, including Solomon Islands, the ongoing management of water systems in rural communities is the responsibility of community members. This is, in large part, because of the inability of government or the private sector to provide water supply services to the many small and remote communities that make-up the bulk of the population.

One critical outcome of community water management is its influence on whether community members are able to enjoy good water supply for domestic needs and support good sanitation and hygiene practices (i.e. good WASH)¹.

A key lesson from community-managed water systems elsewhere is that although many communities are able to successfully manage many aspects of their water systems, communities typically require some ongoing assistance to be able to fully realise successful community water management in the long-term.

The specific purpose of this research is to identify ways that enabling actors, in particular civil society organisations (CSOs) and governments, can better support communities to manage water systems in order to enable them to support improved WASH outcomes; that is, 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).

Approach

The community water management actions and arrangements that work well for one village may not work in other villages. This is because a range of factors influence what community water management arrangements work best for any one village, including the physical environment of the village and its water catchment, the social and economic structures and context of the village, and interactions or engagement with people and organisations residing outside the village (Figure A).

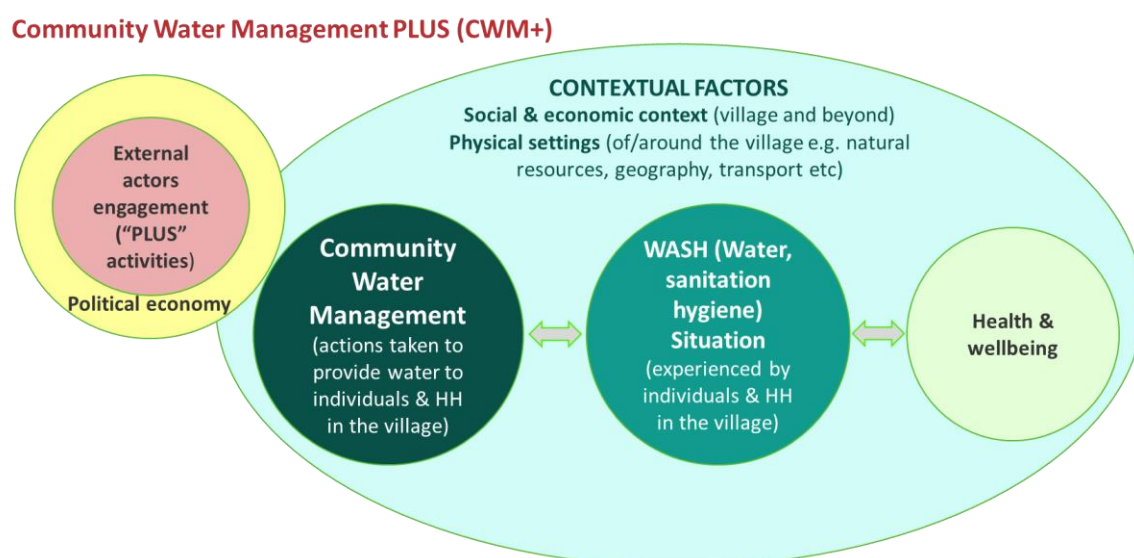


Figure A: Graphical summary of the key concepts underpinning the PaCWaM+ research, identifying key influencers of community water management, including 'plus' activities by external actors

¹ There are a range of indicators used to define good WASH, such as the SDG6 indicators. Here, we use the SDG6 indicators for water supply, sanitation and hygiene services, plus a range of other qualitative measures of the reliability, availability, and quality of water access, as well as qualitative perspectives on sanitation and hygiene.

This research sought to apply a strengths-based approach, identifying the specific factors that influence the success of water management. By examining a range of villages across different physical and socio-economic contexts in Solomon Islands, we identified a range of factors that aligned with good water management.

The strengths-based approach entailed identifying ways that communities have worked to successfully manage their water systems, recognizing that these may differ between villages. However, recognizing that villages in Solomon Islands currently receive no regular, ongoing support, we expected that even villages with better water management than others, would still have challenges that they have been unable to address. We expected that these challenges would give insights into the type of additional support that may be useful.

The main measure of how successful a village was at managing its water system was the status of water (and sanitation and hygiene) services available to community members. We assessed water accessibility, availability, reliability at the household level (where water is used for a range of domestic purposes) and drinking water quality. We also measured sanitation and hygiene situations, as secondary measures of the success of community water management. Good hygiene practices require sufficient water (although poor hygiene may not always be due to limited water services), good sanitation systems can contribute to good water management through protection of water resources (though may also affect water demand), and thus good water managers might be expected to promote sanitation.

Key findings

WASH situations in the case study villages

This study explicitly sought villages 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 villages. No villages achieved the highest level of service or conditions across all aspects of WASH (Table A). Although this is the aspiration, it was not expected that villages would achieve highly in all of these dimensions, particularly given that villages receive no regular ongoing support to manage their water systems.

Although there was considerable variability between the villages, some key patterns were observed:

- Although all study villages had 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 villages 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 villages
- In some villages, 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.

Table A: Overview assessment of WASH situation and community water management in the eight case study villages.

		Hulavu	Sumate	Bareho	Dadala	Gouna-busu	Hovi	Kolosori	Manak-wai	
WASH SITUATION	SDG6.1 ² - Drinking water	●	●	●	●	●	●	●	●	●
	SDG 6.2 – Sanitation	●	●	●	●	●	●	●	●	●
	SDG 6.2 – Hygiene	●	●	●	●	●	●	●	●	●
	Water quality (drinking)	●	●	●	●	●	●	●	●	●
	Drinking water risk assessments	●	●	●	●	●	●	●	●	●
	Perceived water quality (%HH as “very safe”)	●	●	●	●	●	●	●	●	●
	Water treatment (%HH that treat water)	●	●	●	●	●	●	●	●	●
	Drinking water availability and reliability	●	●	●	●	●	●	●	●	●
	Accessibility	●	●	●	●	●	●	●	●	●
	Water point functionality	●	●	●	●	●	●	●	●	●
	Satisfaction with water situation (%HH “happy”)	●	●	●	●	●	●	●	●	●
	COMMUNITY WATER MANAGEMENT ASSESSMENT	Water committee / nominated people	●	●	●	●	●	●	●	●
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		●	●	●	●	●	●	●	●	●
Reporting to community (water committee finances)		●	●	●	●	●	●	●	●	●
Monitoring		●	●	●	●	●	●	●	●	●
Consulting, reporting to community		●	●	●	●	●	●	●	●	●
Linkages to other committees/ groups		●	●	●	●	●	●	●	●	●
Collective action: financial		●	●	●	●	●	●	●	●	●
Collective WM action - other		●	●	●	●	●	●	●	●	●

●	VERY LOW
●	LOW
●	MED
●	HIGH
●	VERY HIGH

² The colour-coded 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.

- 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 village, 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, using SDG 6.2 indicators, were consistently inadequate
- 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, with a common preference to improve water systems to enable water-based sanitation (and a suspected aversion to improving sanitation until water-based sanitation could be supported).

Community Water Management

The objective of this research was to learn lessons from villages where community water management (CWM) was considered to be 'good'; that is, supporting good WASH outcomes including resilient, sustainable and inclusive water supplies (as defined in the WASH section) and also considered by community members to be 'good'. However, it is clear that although there were some strengths in particular aspects of community water management, all eight study villages were struggling with some aspects of community water management. This is not a surprise given the global evidence that communities left to manage water systems on their own will typically struggle to sustainably deliver inclusive, reliable, available, safe water systems.

Water management institutions

Water management can be broadly defined as people being organised and undertaking 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 did they work.

- 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 have been identified as factors in poor water committee longevity.

Gender equality and social inclusion

- Despite the women's group representative generally presenting an affirmative expression of their role and agency within the village (see Section 4.10), in terms of CWM a few explicitly noted that they had never been directly consulted about water management issues
- Women may be more likely to have greater agency at zone/group level than at the village-wide, community 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. 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 village 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 villages 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 (younger males), were often central to maintenance tasks across all the sites
- Levels of maintenance activities varied across the villages; 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 communal tap stands free of weeds and rubbish
- 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 by some Water Committees)
- Only a few villages 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 villages
- 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 wide evidence and there clearly needs to be greater mobilisation of village 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 villages (particularly Health committees and possibly Church [esp. in the SDA communities]).

Water management issues and community satisfaction

Water management challenges strongly related to co-operation and organisation. Combined with the somewhat underwhelming ‘satisfaction’ ratings from respondents suggests that improvements in community engagement, whole of village co-operation and collective action, and good communication are at least as important, if not more important, than the technical challenges underpinning successful CWM.

“Good” Community Water Management

We broadly defined water management as people being organised and undertaking water management activities. As noted, we did not assume that a water committee was necessarily an essential component of water management. Based on existing literature and the results of the research – both strengths observed and problems encountered (i.e. evidence by inadequate WASH, or factors identified by village members) – we identified a suite of key features of what constitutes ‘good’ water management. 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** (across different socio-spatial levels); and iii) **External actors role** (in each village relating to WM) (Table B).

Table B: Features of 'good' water management

FEATURES OF 'GOOD' WATER MANAGEMENT
<p>Actions by a group of people in the village (water managers):</p> <ul style="list-style-type: none"> • Maintenance (proactive, timely, innovative) • Managing / encouraging WQ Risk management (mitigate hazards, e.g. promote sanitation, maintenance, treatment/promoting HH treatment of poor water) • Planning and managing supply (multiple sources, storage capacity, plan for future demand and changes) • Managing demand (supply strategies with multiple water sources, awareness activities, community messaging about why, when and how to conserve water) • Efforts to achieve inclusion – physical accessibility, participation of gender, youth, vulnerable, all parts of village • Use of policies and rules (formal, informal) • Managing finances transparently and competently • Monitoring to guide improvements and report to community • Consulting with and reporting to community on water issues, transparency and accountability • Coordination and leverage between community committees/groups • Ways, means and capacity to access external support • Motivate and coordinate collective action of community members
<p>Actions by all water uses:</p> <ul style="list-style-type: none"> • Collective action (from all individuals, or other levels of organisation within the village such as households / families, groups / 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
<p>Enabling actors – village-level actions:</p> <ul style="list-style-type: none"> • 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 <p>Note: <i>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, this list focused on the actions of enabling actors (government, civil society, private sector businesses) that are required at the village-level.</i></p>

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. Using most of these features, Table A (above) provides an assessment of the case-study villages Community Water Management status. As evidenced by the colour ratings, Manakwai, Hovi and Kolosori were the 'best' examples amongst the eight villages in terms of these CWM features. There was some connections between CWM status and WASH outcomes.

[Links between good water management and WASH outcomes](#)

Whilst the sample size is too small to confidently extrapolate too much, some connections and potential correlations were noted.

When there was a strong **nominated water group** (Manakwai, Hovi and Kolosori), 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 systems as a whole
- Greater water infrastructure functionality.

In contrast to what was expected, it was observed that the villages with comparatively 'better' water management (Manakwai, Kolosori and Hovi) recorded lower *management* satisfaction levels than the other villages. 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 villages where people had living memories of a bad water situation, such as scarcity or difficulty in accessing water, or villages that had previously had better water systems, people tended to have low levels of satisfaction with the existing water management situation. Conversely, villages with neither a history of better, or worse, water situations were reasonably satisfied with the existing situation. The level of water management satisfaction may influence motivation, with villages with higher expectations (based on past experiences) having a greater capacity to mobilise collective action.

Structural factors influencing CWM PLUS

Structural factors include the physical setting (water resources, geography, climate, village 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. Understanding such factors, and how they inform CWM and WASH-outcomes, is important.

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

- Village 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
- Demographic factors: Population and size of the village; number of tribes; socio-spatial dynamics (zones/groups); number and type of religious denomination(s); mobility and livelihood particulars, all influence social cohesion and collective action, informing CWM outcomes
 - Smaller levels (e.g. zone/area) can have 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 villages but had good, long-term (8 years) CWM
- Governance: Leadership specifics, dynamics, tensions; committee numbers and activeness; ability (and willingness) to potentially link with WM group
- WM structure: Age, inclusiveness, members other roles and responsibilities; willingness to link with other committees; ensuring against redundancy (through mentoring and including young people)
- Physical Setting:
 - Topography affected inclusive access to gravity fed systems
 - Sources can be located on land where non-village residents have primary rights
 - The environment influences livelihood activities, which in turn influences social dynamics
 - Villages 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 the modality of 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, and the tendency for pre-determined project activities and outputs to be non-adaptive and not take contextual specifics into consideration.

Government and CSO engagement in the sector needs to focus on improving factors that can be influenced in a short-medium timeframe, whilst navigating structural factors that require longer-term changes. To do this, the status of structural factors in a given locale need to be assessed through a diagnostic – such as a rapid village assessment – prior to the implementation of a CWM or WASH project. Cognisant that there is a small pool of technically proficient WASH staff with backgrounds in engineering, monitoring and evaluation, and community engagement, any diagnostic must be easy to train, learn, and implement.

Conclusions

Building on the strengths and persistent challenges identified in achieving "good" CWM discussed above, there are a number of recommendations that can be made.

Beyond existing actions and activities, enabling actors such as CSOs and provincial and national governments can further strengthen CWM outcomes by either influencing (through direct support) or by improving their awareness of community context prior to engagement (diagnostics and pre-awareness activities). Irrespective of the mode of support, it needs to be pragmatic and place-based, where a balance is struck between fostering dependency (undesirable) and encouraging self-help (desirable).

Any support that is given by enabling actors needs to be locally appropriate and contextualised within the village dynamics and specific needs and capabilities of each community. The following are recommendations of actions and approaches that can be implemented to improve CWM outcomes, based on the Phase 1 research:

Village specific diagnostics to better inform enabling actors about pre-existing factors that influence community attitudes about water management. This may include:

- *Identifying and working with existing levels of social cohesion* where a village's multiple social structures (e.g. zones, tribes, geography) is leveraged as a strength rather than a potential limitation. This is an example of 'working with the grain' of existing and functioning social networks that are already active in collective action terms
- *Consideration of past experience with external support* and the level of project dependency that a village might have (as this can potentially limit motivation for collective action)
- *Understanding past experience with water systems* where positive or negative experiences can affect expectations and motivation for collective action).

Mobilising collective (pro)action in a community to improve water (and WASH) management outcomes. Maintaining on-going collective actions beyond when there is an emergency or urgent need. This may include regular:

- *water financing* through community contributions and fundraising
- *work activities* (men, women children/youths) to maintain a well-functioning water system (dam, tanks, pipes, tap stand, water tanks)
- *water conservation actions* and water saving awareness activities.

Maintaining strong management group/committee using education and motivation to form and maintain strong water/WASH management group/committee. This may include:

- *Mobilising the water committee* to reach out and tap into existing strengths within the village e.g. help them to identify and make links that may not have been clearly mapped-out before
- *Working with existing social capitals and community skills* to reduce redundancy and fatigue within the water committee
- *Strengthening water committee linkages and communication* with other committees or groups in villages (e.g. village nurse, women's and youth groups).

Strengthening technical capacity in the village to foster proactive and appropriate maintenance rather than reactive and "band-aid" maintenance. This may include:

- *Technical backstopping* to provide technical information about solving unfamiliar or recurring technical problems
- *Demand management* (water conservation; fit-for-use approach to multiple sources)
- *Identifying and managing risks* to water quality to promote 'proactive' maintenance and hazard management (e.g. water quality hazard identification) (e.g. water container contamination)
- *Technical education* brochures to provide information indirectly via town cousins, or directly to village residents, on key water management activities.

The recommendations described above are based on village characteristics, patterns of CWM approaches and insights identified in the formative research component and are derived from (primarily) just eight villages, thus they may not all be relevant, suitable, or achievable for implementation in all Solomon Islands villages. Notwithstanding this, the 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. Successful delivery of the recommendations above, or any modifications of them, are more likely to be achieved through pilot implementation first, which is monitored and evaluated by the community as well as the implementers.

It is clear that some of these actions are not so easily delivered in a sustained way through the modality of "projects". The political economy analysis identified projects as the dominant mechanism of support for communities – in fact for these case study villages the only form of support from governments and CSOs. This is unlikely to change given the inherent benefits of project-based engagement with communities. However, considering additional mechanisms that can enable more enduring community engagement will be necessary if good community water management is to be achieved and sustained.



Hulavu, Guadalcanal (Photo credit: D Gonzalez-Botero)

1. INTRODUCTION

1.1. Context

Water, sanitation and hygiene (WASH) development in Pacific Island Countries (PICs) remains sluggish compared to global trends. For example, while 80% of Melanesians live in remote, rural areas, only 40% have access to basic water services (JMP, 2017). Although there is an increasing coverage of improved drinking-water sources in several PICs, there is little information about the quality and safety of the water delivered to these populations, particularly in rural villages (WHO, 2017).

A suite of challenges constrain progress on improving water service delivery outcomes in rural PICs, including slow economic growth and employment, under-resourced governance, high climatic-induced disaster vulnerability, limited local capacity and resources, and large rural population base (Dahan, 2019). Compounding this are the very real threats from climate change to sanitation services (Fleming et al., 2019) and already limited freshwater sources, unique cultural factors, and the sheer social, geographical and cultural heterogeneity characteristic of many PICs (e.g. McDonald et al., 2017).

Previous evidence demonstrates the critical role of local capacity in managing and maintaining safe and secure water systems in the Pacific islands (Foster and Willets, 2018, Dahan, 2018). Improving local capacity, combined with well-informed and relevant external support, will strengthen the likelihood of improved equity, health and wellbeing around WASH services in rural villages; consistent with Sustainable Development Goal (SDG) 6 – Clean water and sanitation aspirations. Government and private sector services 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 policies. Thus, CWM is the necessary model in the PIC context. However, evidence from the Pacific and elsewhere indicates that CWM models of service delivery 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., 2015). This, then, compromises the health and wellbeing of all people, but disproportionately affects women and girls. Importantly, the SDG6 targets reiterate that water service outcomes, sanitation and hygiene practices and ecosystem health, are intractably affected by CWM, and vice versa.

The community water management plus (CWM+) model is widely considered a viable improvement to the “one-size-fits-all” basic CWM model (Baumann, 2006; Hutchings et al., 2016, Souter and Schuch, 2017). The CWM+ model includes long-term support from external organisations following the initial hand-over of water infrastructure to communities. The current CWM+ research has identified a range of generic intrinsic and extrinsic factors that inform the success of CWM; however, research is required to identify these factors in specific socio-cultural, economic and environmental contexts. Furthermore, there has been limited investigation of how wider factors, such as institutional and customary norms, may further inform the success, or not, of maintaining village water source infrastructure (Joubert and Summers, 2018).

Pacific governments appreciate that further support is required to support CWM. But while some lessons can be gleaned from research in other parts of the world, the unique context of PICs – rurally-dominated and geographically-dispersed populations characterised by diverse and complex socio-cultural settings with discrete and varied hydrogeological constraints and a limited enabling environment – requires specific and rigorous place-based evidence about which approaches are most feasible and effective.

1.2. Purpose of research

The core rationale for this project was to explore what a CWM+ approach might look like in a PIC context – specifically Solomon Islands and Fiji – and to better understand what **internal** (e.g. local-level social, cultural, economic, governance and historical characteristics) and **external** (e.g. community engagement process, political economy characteristics) factors are most aligned to ensuring relevant and tangible bipartite support to improve rural CWM outcomes across different village, island and country contexts. Figure 1.1 (below) is a conceptual figure of the framework used to guide the research.

We know that community water management actions and arrangements that work best for one village may not work so well in other villages. This is because a wide range of factors influence what is the most appropriate and sustainable community water management arrangements in any given village, including: the physical environment of the village and its water catchment; social and economic structures and context; and, interactions or engagement with people and organisations residing outside the village. Some of these factors can potentially be influenced, facilitated, or triggered with targeted support and engagement from enabling actors. These are the factors that we explored through this research to identify if and how they might be utilised by enabling actors in future interventions to improve CWM outcomes and sustainability.

Some factors that influence community water management are difficult to change or influence, either because they are not changeable (e.g. natural water resource availability, distance from town) or are not easily influenced and/or likely to change in the foreseeable future; particularly through water management interventions (e.g. socio-cultural structures, livelihoods). We have termed these 'structural factors' and recommend that assessing the status of these factors before commencing a water supply or management intervention is important as it can influence the type and content of community engagement.

This report synthesises the findings of the **formative research component** (PHASE 1) of the PaCWaM+ project in Solomon Islands, which undertook research in eight different villages across four Provinces.

Community Water Management PLUS (CWM+)

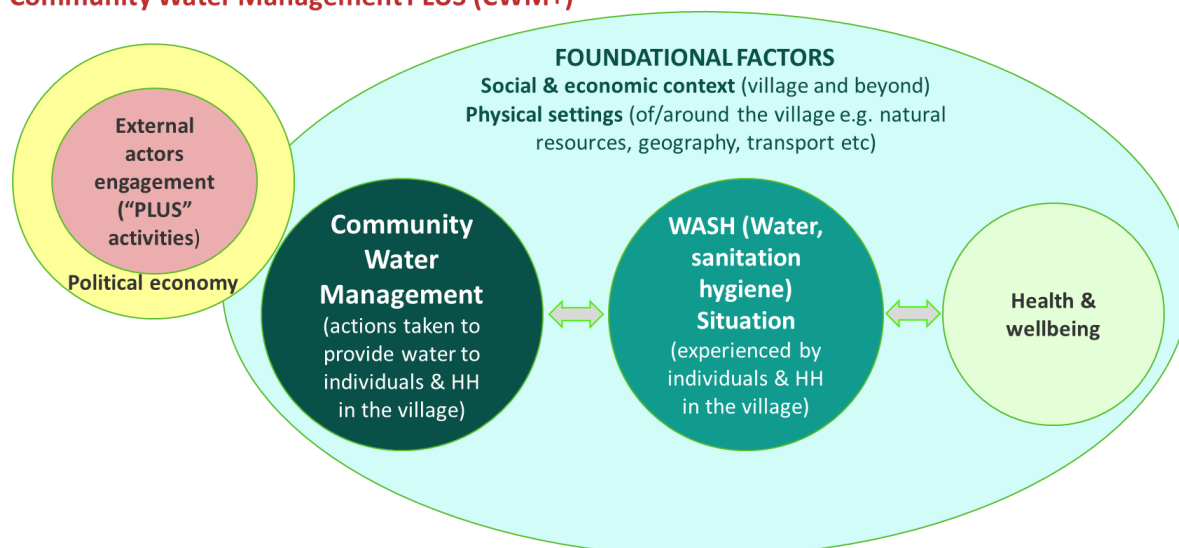


Figure 1.1: Graphical summary of the key concepts underpinning the PaCWaM+ research, identifying key influencers of community water management, including 'plus' activities by external actors

1.3. Objectives of the research

This research seeks to address the significant gap in evidence noted above; that is, provide some 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.

In partnership with civil society organisations (CSOs), government and communities in Fiji and Solomon Islands, the **'Pacific Community Water Management Plus'** (PaCWaM+) project seeks to explore how CSOs and governments can better enable rural CWM in the Pacific. This three-year collaborative and applied research effort was led by the International WaterCentre and Griffith University, and funded under the Australian government's WASH Research Awards (as part of the Water for Women Fund)³.

Specifically, the overall objective of the research is to investigate how CSOs and governments can better enable rural CWM in the Pacific to improve SDG6 outcomes, including the resilience, inclusiveness and sustainability of WASH outcomes. There are two key research questions and associated activities formulated to address this key research objective (Figure 1.2):

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?

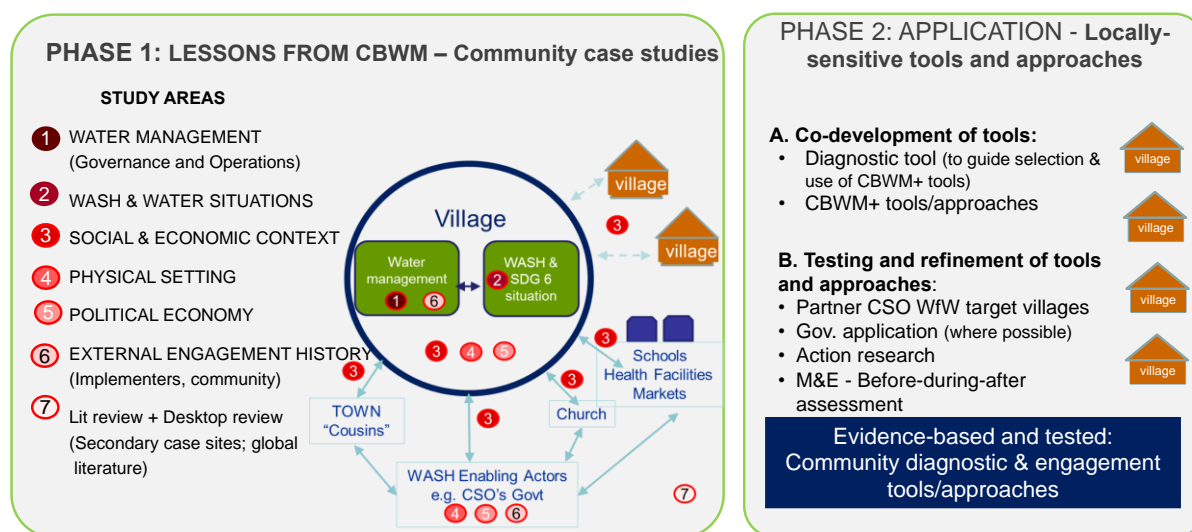


Figure 1.2: PaCWaM+ Research Approach and Phases

³ University partners: The University of the South Pacific (Fiji) and Solomon Islands National University (Solomon Islands); Civil Society Organisation (CSO) partners: Habitat for Humanity Australia, Habitat for Humanity Fiji, Plan International Australia and Live and Learn Solomon Islands.

1.4. Methodology

1.4.1. Village-level data

This research sought to use a strengths-based approach, identifying specific factors that influence the success of water management, which entailed conducting formative research in villages with 'good' water management. 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.

The presence of a formal "water committee" was, deliberately, not assumed to be an indicator of good water management.

A strengths-based approach entails identifying ways that communities have worked to successfully manage their water systems. However, recognising that villages in Solomon Islands currently receive no regular, ongoing support, we expected that even villages with better water management than others would still have challenges that they have been unable to address. This was certainly the case. We expected that these challenges would give insights into the types of additional support that may be useful, as well as assist in identifying some of the key contextual factors that inform – both delimit and enable – CWM outcomes. Identifying these factors *prior* to a water intervention program, and tailoring community engagement to these specifics, can also improve CWM outcomes.

The key domains of information collected in each village are represented in Figure 1.2 above (Research Approach and Phases), and included:

- **WASH situation:** The main measure of how successful a village was at managing its water system was the current status of water services available to village members, including water accessibility, availability, reliability at the household level, and drinking water quality. Sanitation and hygiene situations were also rapidly assessed, as secondary measures of community water management status
- **Social and economic context:** Both within the village, as well as social networks extending out from the village to other people and organisations, was considered as inclusive of the social and economic 'whole' (that is, the village was not considered as an isolate). The type of social and economic information collected included descriptive and attitudinal data on topics such as village history, governance structures, socio-economic particulars, and examples of village cooperation and self-help
- **Physical setting:** Geography, infrastructure, natural resources, land use and climate
- **External engagement and political economy:** The history of engagement with people and organisations, particularly relating to water projects but also considering other development projects or initiatives was captured. The political economy of government and CSO engagement with community WASH and water management was also assessed
- **Community Water Management:** Governance and operations relating to community water systems, focusing on current actions and arrangements but also reflecting on previous arrangements and experiences. This included operational activities and responsibilities/implementers; the structure and history of a water committee (if it exists), water management actions and capacities, and relationships with other community institutions; perceptions of success/challenges by water committees and community members; water-related formal and informal rules; design & funding for infrastructure; consultation & communication processes; finances; reporting to community; catchment/water resources management practices; community mobilisation; and, community/household responsibilities for water management.

1.4.2. Village selection

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:

- Villages in rural settings
- Villages with 'good' community water management. 'Good' was defined as having safe water, inclusive access coverage, and year-round access to water (even if water resources were insecure)
- A diversity of external engagement experiences (e.g. previous CSO engagement/work, government support, external stakeholder support or engagement, etc.)
- Diversity of climate, vulnerability to disasters, water security
- Selection of geographic locations (different provinces represented).

An inception workshop with stakeholders in Solomon Islands, with subsequent sharing of WASH data, was critical to identifying potential study villages.

However, pre-identifying eight 'good' CWM sites proved challenging and all sites ultimately displayed both strengths and weaknesses, with generally more challenges and weaknesses than strengths.

Table 1.1 is a demographic summary of the village case-study sites. Figure 1.3 (below) is a map of the villages involved in the Phase 1 research in the Solomon Islands.

Table 1.1: Demographic summary

Village	Province	Population & households	Religion	Tribes	Zone/ Group
Manakwai	Malaita	~540 pop; 80-100 HHs	SSEC-Estate / Kingdom; SSEC (original)	9	5-6
Gounabusu	Malaita	~170 pop; 44 HHs (30 occupied)	SSEC; 1 HH SDA	3	4
Hovi	Isabel	~120 pop; 25 HHs	SDA	3	4
Kolosori	Isabel	320 pop; 52 HHs	Anglican; 1 HH other	2	4
Bareho	Western	~300-500 pop; 78 HHs	SDA	12	3
Dadala	Central	~130-150 pop; 31 HHs	Anglican; 1 HH other	4	2 (4)
Sumate	Guadalcanal	~300-400 pop; 70-80 HHs	Catholic; few HHs other	4	4
Hulavu	Guadalcanal	~300-400 pop; 80-86 HHs	Catholic; few HHs other	4	4

Note: All villages reported a significant increase in village population levels during holidays, especially at Christmas (e.g. in Hovi, the village population doubles in size).

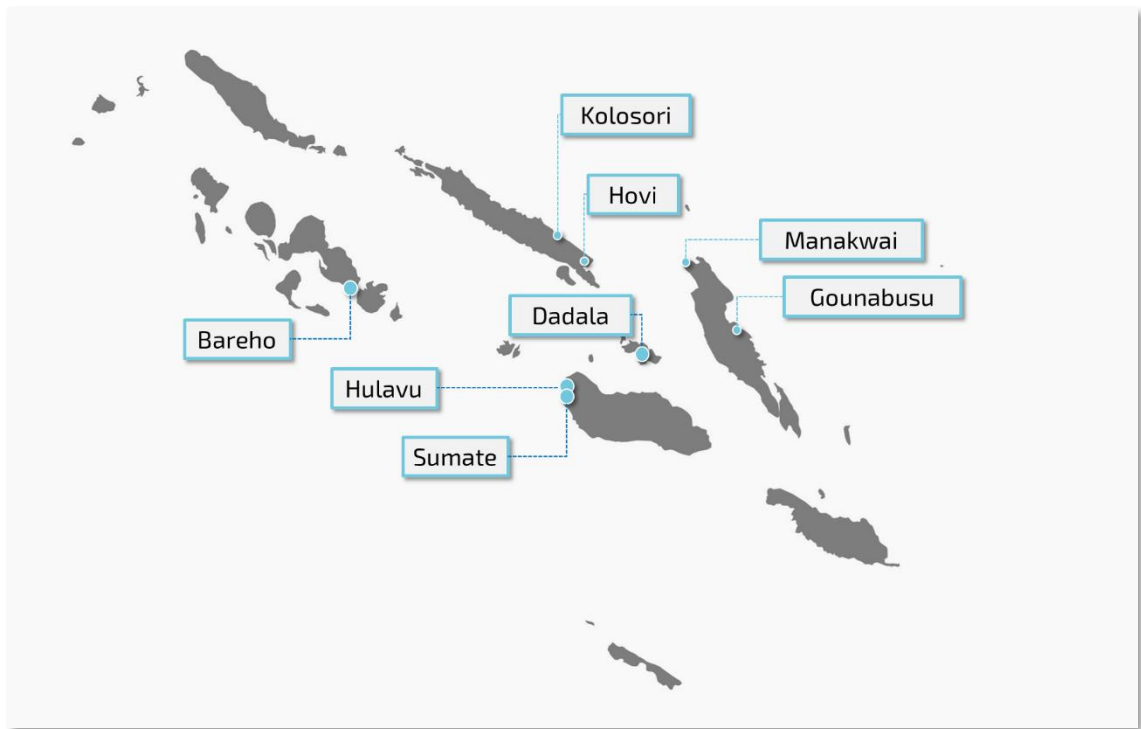


Figure 1.3: Map of Solomon Islands study sites

1.4.3. Village Data collection

The Phase 1 formative research methodology comprised a mixed-methods approach, drawing on a range of quantitative and qualitative research techniques (see Table 1.2 below).

Qualitative data

Research teams spent one week (typically 5-6 days) in each village. Teams consisted of one male and one female Associate Researcher (AR) from Solomon Islands National University (SINU), a minimum of two village 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).

Community-level data collection comprised of:

- 16 group interviews (Gp. Int.) (8 x water committee/group reps; 8 x women group/reps)
- 105 key informant interviews (KIIs) (63 M/ 42 F), including 5 people with cognitive or physical disability and 8 health workers (5 village nurses, 3 clinic nurses)
- 436 household surveys (HHS), of which 220 were S-E HHS and 216 WASH HHS
- 45 water quality tests (WQT) and 38 risk assessments.

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™.

Interviews (Key informant interviews, Group interviews) were conducted in Solomon Islands Pidgin, transcribed and translated (a mix of paraphrasing with some verbatim quotes, using time codes) into English. Along with Community Background Summary Reports (CSRs), fieldnotes (FN), and other village-related documents, this data was entered and coded in NVivo™.

To supplement information about external engagement provided by community members:

- A search of Ministry of Health RWASH database of WASH projects was searched for information relating to each of the study villages

- A search of public (internet and other sources) documents describing external engagement for each of the study villages was conducted.

A summary of key data collection tools and instruments are appended below (Table 1.2).

Table 1.2: Research methods

Instruments	Abbreviation	Notes
Key informant Interviews (village)	KIIs	Target: >10 KIIs in each village. Includes: Elders (M & F), youth representatives (M & F), Women's Church group reps, chiefs, water committee reps, religious leaders, project actors (WASH &/or non-WASH), teachers, health workers, vulnerable/marginalised persons
Group Interviews	Gp. Int.	2 group interviews in each village: 1 x water committee or group reps responsible for, or active in, CWM (including a water system and implementation mapping and timeline activities); 1 x women's group or reps interview (including a women's daily water access wheel and water preference ranking activity)
Community Background Summary Report	CSR	A community profile and research summary report document, filled-out in the village during fieldwork by the ARs
Fieldnotes	FN	Associate Researcher and water committee/ researcher notes (observation and informal discussions)
WASH Household survey	WASH HHS	Target: 40% or higher sample coverage of total village HHS
Socioeconomic household survey	S-E HHS	Target: 40% or higher sample coverage of total village HHS
Water Quality testing	WQT	Aquagenx <i>E.coli</i> water testing: Source to house (5-6 replica samples in each village, e.g. source, dam, reservoir tank, tap stands, water container)
Risk Assessment	RA	Risk Assessment undertaken at each WQT location. Ideally also drainage assessment
Political Economy Analysis	PEA	Sector level PEA. Key Informant Interviews (national and Provincial level Gov. actors, CSO reps). Desktop review of relevant Policies

Quantitative and semi-qualitative data

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 village visits in the correct procedures to obtain water quality samples and subsequent water quality testing. For each site, key drinking water sources were identified during the water committee group interview and then subsequently tested in-situ. Two samples were tested per drinking water source.

Overall, a total of 45 drinking water sources were taken across the 8 villages. Types of drinking water sources that were tested include: surface water (dams, storage tanks and tap stands); spring water (spring source); rainwater (storage tanks – communal and private), and some randomly selected household containers.

Once the water quality tests were complete and the scores were recorded, the Associate Researchers prepared a water quality report, in Pijin, for the village leader to discuss with the water committee and other village members (this was left to the village chief to determine how to communicate the results). Information on how to clean rainwater tanks and treat drinking water was also given to the water

committee to share with the village. It was highlighted that the water quality tests were a 'one off' (one point in time and hence not necessarily representative) and that the researchers could not return to conduct follow-up tests.

Limitations of water quality testing

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.

While *E. coli* remains an important indicator of faecal contamination for verification of water quality, measurements of *E. coli* do not represent a risk-based water quality target (WHO, 2017). The presence of *E. coli* does not necessarily indicate the presence of human faecal microorganisms, but is good evidence of recent general faecal contamination which may have been sourced from any animal species including pigs, dogs, chickens, lizards and birds etc. 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

A total of 38 risk assessments were conducted across the eight study villages. The ARs were trained in conducting drinking water 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).

Drainage inspections

A drainage assessment was also undertaken as part of the site risk assessment activity to identify any hazards and contaminant sources that could impact on drinking water quality (e.g. water pooling in open defecation areas) and overall health hazards (e.g. poorly drained surfaces as vector habitats).

Mosquito surveys

For the collection of *Anopheles* larvae, a standard 250ml dipper was used. In each of the breeding sites (creeks, swamps), mosquito larvae from 10 dips were collected, and put into collection vials. The number of mosquitoes per dip was then calculated by taking the total number of mosquitoes divided by 10 dips.

For the collection of *Aedes* mosquitoes, plastic pipettes were used to collect mosquito larvae from water-containing containers. All collected mosquitoes were identified into genus level by the accompanying medical entomologist from SINU.

1.4.4. 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 village 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 villages, was shared with communities once the analyses was completed.

1.4.5. Country-level Political Economy Analysis

A political economy analysis (PEA) of the Solomon Islands 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. The PEA study was undertaken as a Masters thesis by D. Rodgers, entitled: *How does the political economy of government investment in WASH affect rural community water and sanitation in the Solomon Islands*

The approach to the political economy analysis was drawn from USAID's PEA framework (Rocha Menocal et al., 2018). This framework uses four pillars to investigate the structures impacting 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 they affect or work against each other (Rocha Menocal et al., 2018).

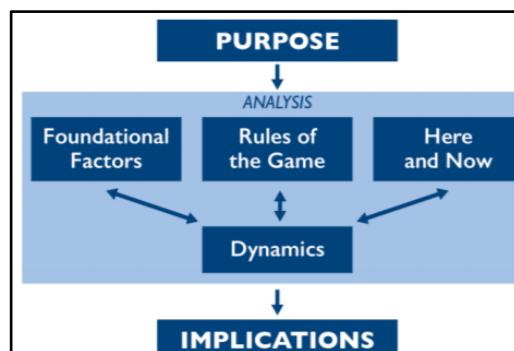


Figure 1.4: USAID's PEA framework.

Source: Rocha Menocal et al., 2018.

The methodology of the PEA involved using the framework to guide collection and analysis of data, including the Ministry of Health – rural WASH program 2018 project database and semi-structured interviews with: National Government representatives, Development Partner (Donors, UNICEF), NGOs, a WASH consultant, and, community members from two villages in the Western Province.

1.4.6. Limitations

Due to financial and logistical constraints the number of sites where the research could be undertaken was limited to eight. Moreover, water scarce locales (such as villages located in atoll islands) were not

able to be included in the research sample due to the challenge of logistics, cost, and time. Additionally, searching for a range of implementation examples and geographical locales conspired to result in all our water system types being gravity feed systems (albeit often supplement by other systems, such as wells and rainwater tanks). As noted above, pre-identifying "good" CWM sites was particularly difficult; however, this likely represents the fact that there are few documented or known sites where CWM can be said to be especially "good", even with regards to the truncated criteria noted above (1.4.2). This impacted the strength-based approach as there are potentially not enough "good" CWM sites to confidentially identify **all** the key internal and external factors likely to correlate with good CWM. Nevertheless, the diversity in CWM status in our final sample does allow for inter-case comparison (with a caveat regarding the small sample size) and the opportunity to explore instances of "positive deviance". The breadth and depth of the data has ultimately been sufficient to provide some productive insights and address the key research objectives.

1.4.7. Ethics

All required Ethics documentation was completed and approved prior to commencement of data collection. Approval was granted from the following research institutions and agencies:

- Solomon Island National University – ref SINUREC 02/18
- Solomon Islands Ministry of Health – ref HRE037/18
- Griffith University – ref HREC 2018/793
- University of the South Pacific – ref sarahpene/2018
- University of Queensland – ref 2019000441/2018/793.

In addition, permission was sought from relevant community leaders from each village prior to site visits and data collection. Informed consent was obtained from all respondents prior to participating in village data collection activities (surveys and interviews).



Manakwai, Malaita (Photo credit: M Love)

2. WASH AND WATER SITUATION

2.1. Summary of SDG 6 indicators across villages

Very few villages met the SDG 6 definition for safely managed water system services; this is mostly due to the inadequate water quality and, for some villages, the location of access (being outside the household plot). Twelve percent of the population in the study villages had sanitation classified as safely managed. In comparison to national rural standards, drinking water and sanitation services levels were generally higher. However, they had a lower proportion of the lowest service level for both water and sanitation⁴; and open defecation rates were lower for the case study villages than the national rural average (Figure 2.1).

The service levels of hygiene (handwashing facilities) were lower than the national rural average.

The higher service levels in the case study villages, for water and sanitation, likely reflect the fact that the villages were not randomly selected but targeted because they were suspected to have higher performing water systems (as per our strengths-based objective).

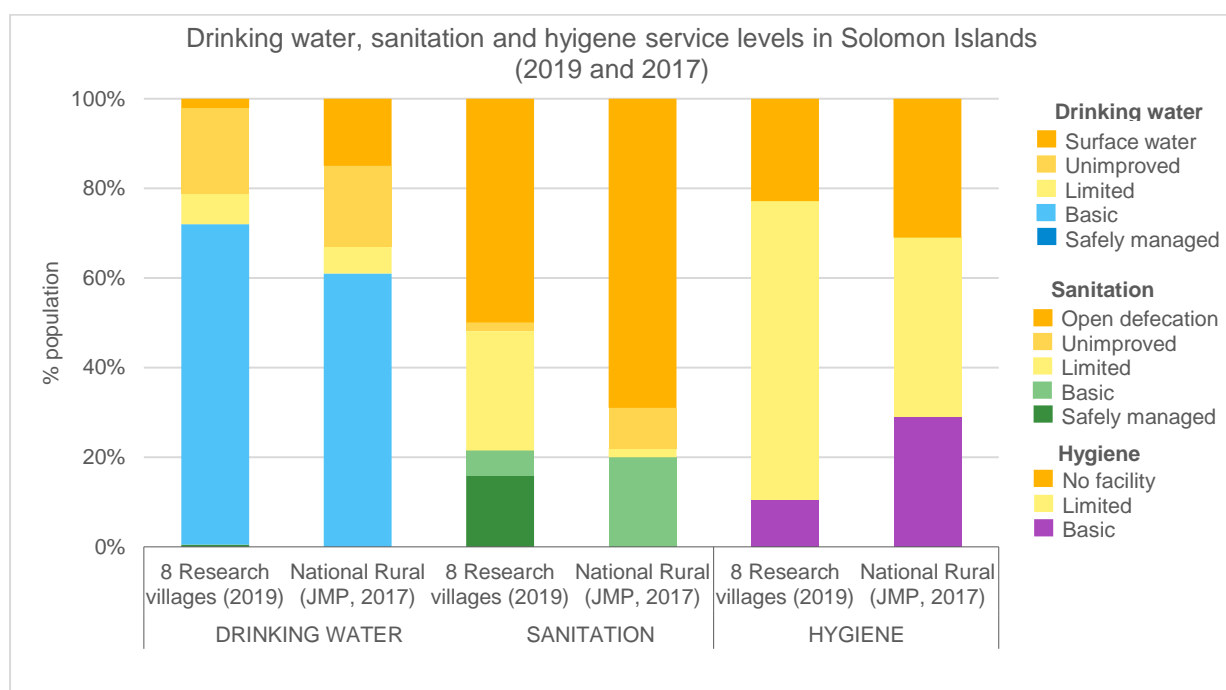


Figure 2.1: Drinking water, sanitation and hygiene service levels for the 8 research villages compared to the national rural levels

2.2. Overview of water systems

All the study villages had a gravity-fed water system from a source in the hills close to the village and all sources were open surface waters with a dam, except Dadala and Manakwai, which had spring sources. All water was piped to shared tap stands (TS) through a reticulated system, with varying

⁴ There may be a difference in the way the definition for safely managed sanitation was applied to the national rural dataset compared with the study villages; the interpretation used here is that on-site sanitation, such as pit latrines, that meet the criteria for a functional user interface (lid, slab etc), are exclusively used by the household, but that are never emptied, are considered safe. Once filled, these pits are covered and a new pit dug, thus faecal sludge is not extracted or transported from the pit, nor can humans come into direct contact with it. Additionally, the faecal sludge in septic tanks in rural locations was assumed to never be emptied and disposed so that human contact is not possible and were thus not classified as safely managed.

numbers of houses sharing each tap (Table 2.1). All of the water supply systems were constructed with assistance from an outside organisation, usually the Solomon Islands Government (except Gounabusu). All but three villages had some reliance on household rainwater tanks (RWTs).

Table 2.1: Summary description of study village water systems

Village	Water source (shared water system)	Water system basic system design (and age)	No. of TS	HH/tap ratio ⁵	WS piped to house	Rainwater tanks (% HH) ⁶
Manakwai	Spring (direct to reservoir)	Gravity-fed Est. 2012 (RDP-RWASH)	47	2-3 HHs per TS	HH with toilet blocks only ⁷	10%
Gounabusu	Surface water to reservoir via dam	Gravity-fed Est. 1998 (ADRA)	30	1-2 HHs per TS	3 HHs [not sanctioned]	4%
Hovi	Surface water to reservoir via dam	Gravity-fed Est. 2018 (RWASH)	33	0.8	3 HHs [not sanctioned]	20%
Kolosori	Surface water to reservoir via dam	Gravity-fed Est. 2011-13 (RDP-RWASH)	22	2-3	No	0% (2 clinic & school)
Bareho	Surface water to reservoir via dam	Gravity-fed Est. 2013 (RWASH) Communal RWTs (Est. 2016 (EU/SIG))	24	3-4	No	32-40% HHs (plus 10 communal RWTs)
Dadala	Spring to reservoir	Gravity-fed Est. 2010 (RWASH)	15	~2	No	0% (1 communal RWT - school)
Sumate ⁸	Surface water to reservoir via dam	Gravity-fed Est. 2009 (GP-RWSS)	13	6-7	Yes (1 HH) [not sanctioned]	17%
Hulavu	Surface water, to reservoir via dam	Gravity-fed Est. 1994 (GP-RWSS)	18	4-5	Guest HH	0% (but many collect in containers)

2.3. SDG 6.1 service levels

Using SDG 6.1 as an indicator of water access, very few water systems met the definition for safely managed services (Figure 2.2); this is mostly due to the unsafe quality of primary drinking water source and the location of access (being outside the household plot).

The service level varied between wet and dry season, and for all but one village the service level dropped during the dry season, highlighting the importance of considering seasonality when reporting service levels (Figure 2.3). The reason for the drop is most often the switch to a different primary drinking water source, which has a lesser water quality and different location – most usually a switch from rainwater to other sources.

⁵ HHs to TS ratios are not evenly spread – some zones have a higher ratio of HHs to TS.

⁶ Percentage of surveyed HHs (taken from the S-E HHS)

⁷ Water committee policy is to connect water to any HH that builds a toilet block (that also includes hand washing facility and shower)

⁸ A zone of Sumate – Variana – does not use the main village source but has its own gravity-fed water supply system, installed by a logging company.

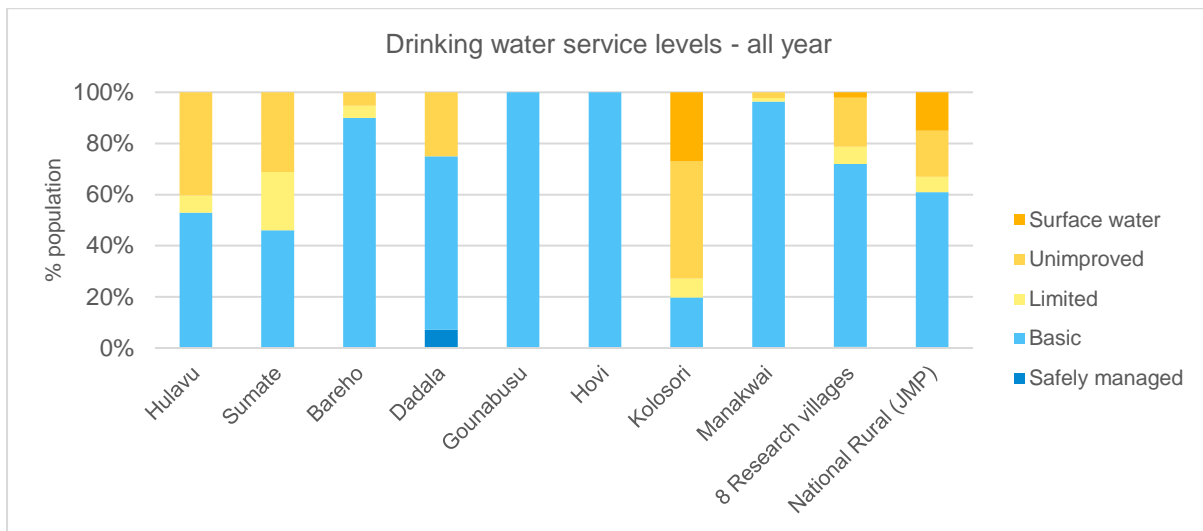


Figure 2.2: SDG 6.1 - Drinking water service levels for each village, aggregate for all village case studies, and rural national

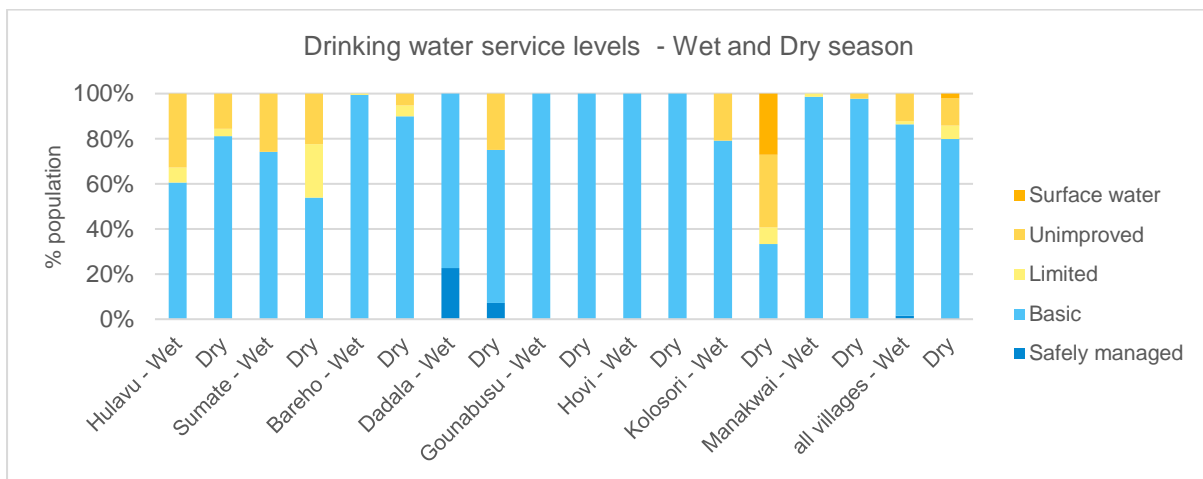


Figure 2.3: SDG 6.1 Drinking water service levels per village and disaggregated by season (wet and dry seasons) (% population, n=1253)

Following the JMP definition for SDG 6.1, the above 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 tanks as the primary drinking water source). In addition, some households indicated different primary drinking water sources for the wet and dry seasons; in these cases, the lower service level was used to represent overall service level.

The use of SDG 6 indicators, and their definitions and monitoring methods, have sparked debate amongst academics and practitioners in terms of their veracity and practicality (e.g. Guppy et al., 2019; Massa et al., 2017). Indeed, the potential ambiguity and accuracy of SDG 6 indicators have been recognised by the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) (e.g. WHO and UNICEF, 2017a; WHO and UNICEF, 2017b). The JMP, as well as critics of the framework and methodology have highlighted important limitations and caveats, which are pertinent to recognise when using WASH service ladders and the data associated with them.

2.4. Water sources and availability

Across the eight villages, there were 6 main types of water sources in use (Table 2.2). Most villages relied upon more than one source for drinking, and used additional sources for non-drinking needs.⁹

There is some seasonality in the primary water sources used for drinking (Figure 2.4) and non-drinking. Less households use rainwater as their primary drinking water source in the dry season, and some sources that are not used for drinking at all in the wet season are used during the dry season, in particular, boreholes and direct surface water (Table 2.2).

Some villages (Gounabusu, Hovi, and Manakwai) use the same source for both drinking and non-drinking uses but do not lack availability to this source during the dry season (Figure 2.4).

Table 2.2: Diversity of water sources used by case study villages, for drinking and domestic non-drinking needs

Sources used by any HH	Hulavu		Sumate		Bareho		Dadala		Gounabusu		Hovi		Kolosori		Manakwai	
	Drinking	Non-drinking	Drinking	Non-drinking	Drinking	Non-drinking	Drinking	Non-drinking	Drinking	Non-drinking	Drinking	Non-drinking	Drinking	Non-drinking	Drinking	Non-drinking
Reservoir from Dam (Surface water source)	•	•	•	•	•	•			•	•	•	•	•	•		•
Spring	•		•		•		•	•					•		•	•
Rainwater (tank or other containers)	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•
Borehole / tube well	NA	NA	•		NA	NA		•		•	NA	NA	NA	NA	NA	NA
Shallow Dug Well		•	•			•			•							
Surface water (river, creek, brook etc.)		•		•		•		•					•	•		•

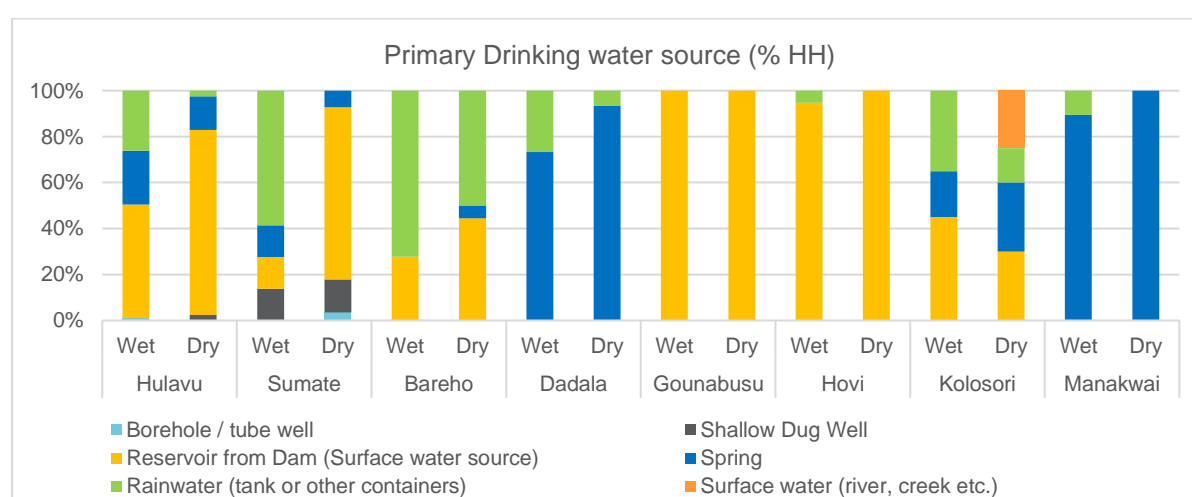


Figure 2.4: Primary drinking water source in the eight case study villages, during the wet and dry seasons. (n=217)

⁹ There is variability across the Solomon Islands in water resource availability and use, especially with regards to main drinking water (Anthonj, et al., 2020).

Managing multiple sources to maintain drinking water availability

Many households used the same primary water source for both drinking and non-drinking needs (Table 2.3, % HH drinking = non-drinking). This was more common in some villages than others, e.g. in Gounabusu, Hovi, and Manakwai, at least 75% of households used the same water source for both drinking and non-drinking. The primary source used in these three villages was either spring or dam water; rainwater was not commonly used as the primary source except in Bareho (during the wet season).

Table 2.3 also indicates the proportion of households that did not use their primary wet season drinking source in the dry season (% HH main drinking source [wet]) is not available in dry season. Comparing these results indicates that villages whose primary drinking source is not available in the wet season are more likely to be using different primary sources for drinking and non-drinking (e.g. Bareho) – they may be purposefully conserving drinking water for use during the dry season. In contrast, some villages (Gounabusu, Hovi, and Manakwai) use the same source for both drinking and non-drinking purposes, but do not lack availability to this source during the dry season. Both of these situations demonstrate good water management in terms of planning for the use of multiple water sources to maintain year-round access to a water supply.

Interestingly, some villages do lack availability of their primary drinking source during the dry season, but still use that source for non-drinking purposes. For example, 21% of households in Sumate and 15% in Kolosori do not use their primary wet season drinking source in the dry season, but 28-55% of households are using their drinking source for other non-drinking uses. Both of these villages use at least 4 drinking and non-drinking water sources, but are not managing to conserve drinking water for the dry season.

Women that participated in the group interviews reported stricter use of rainwater - generally, only for drinking, cooking and washing dishes, and (in some cases) for bathing. The difference between the qualitative data and the HHS data may indicate knowledge of the benefits of conserving rainwater, but this is perhaps less application in practice.

Some female respondents identified that household rainwater tanks offered greater reliability than other sources, in particular regarding population growth and other village events that impact the shared water system:

“even if you grow old, the rainwater tank will always be there to provide water, because now the whole village is depending on the water supply and something can happen at any time” (Gp. Int.-Ho, W)¹⁰

All the toilets in Sumate were water-based, while half the toilets in Kolosori were water-based; ensuring drinking water is not used in water-based sanitation would be one strategy to improve drinking water security.

Table 2.3: Water availability (n=217 households)

	Hulavu		Sumate		Bareho		Dadala		Gounabusu		Hovi		Kolosori		Manakwai	
	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry
% HH drinking source used for non-drinking purposes	59%	59%	28%	34%	28%	31%	53%	53%	80%	84%	75%	75%	35%	55%	84%	82%

¹⁰ All exemplar quotes in this report are translated from Solomon Islands Pijin.

	Hulavu	Sumate	Bareho	Dadala	Gounabusu	Hovi	Kolosori	Manakwai
% HH main drinking source (wet) is not available in dry season	9%	21%	0%	0%	0%	0%	15%	0%
Total No. sources in use (wet or dry)	5	6	5	4	4	2	4	4
No. drinking sources in use	3	5	3	2	1	2	4	2

2.5. Water service reliability

Overall, 95% of respondents said their water source was "fully functional" in the wet season, whilst 99% said it was "fully functional" in the dry season. However, inspections of water infrastructure revealed some functional weaknesses in many sites (Table 2.4). The most common problems affecting reliability were low water pressure (particularly to elevated or more distant locations in the distribution network), and leaks or blockage of pipes from the dam during the wet season (due to an increase in leaves and sediment entering the dam).

Table 2.4: Functionality of water systems (based upon key informant interviews, WASH HHS and inspections of infrastructure)

Reliability of water supply & water point functionality	
Manakwai	Reported: Only disruptions were due to breakage. Some low-pressure issues in one area Tap stands reported: 95-100% (seasonal) functional Observed: 1 leaking tap
Gounabusu	Reported: Only disruptions were due to social factors; 3 HHs private/illegal connections (causing low pressure) Tap stands reported: 95% fully functional Observed: Many pipes and taps leaking
Hovi	Reported: Some disruptions in wet season (dirty, blockage) Tap stands reported: 95-100% fully functional [seasonal] Observed: Some pipes leaking, 2 taps not functional
Sumate	Reported: Some disruptions in wet season (dirty, blockage) Tap stands reported: 90% fully functional Observed: Some pipes leaking; most taps running all the time, few stoppers
Hulavu	Reported: Tap stands: 82% fully functional Observed: Many leaking pipes
Bareho	Reported: Only disruptions in wet when the pipes get blocked from the dam. Tap stands reported: 41% fully functional Observed: many taps not functional
Dadala	Reported: Some disruptions in wet season (dirty, blockage). reported 2 taps broken Tap stands reported in HH Survey: 100% functional
Kolosori	Reported: Some issues with low water pressure (uphill homes) and blockages (calcification) of pipes Tap stands reported: 100% fully functional Observed: all taps functional

2.6. Water accessibility

Very few households had water access points inside their house (Figure 2.5), and most households were sharing their main access point with other households. Some of the difficulties associated with accessing outside-house water access points were revealed in the household survey; Bareho and Hulavu reported the highest rates of accessibility difficulties. In Bareho, 27% of household respondents stated that someone in the HH had difficulty getting water for themselves, due to old age, blindness, or the distance required to cart water during the dry season when it was not available at their usual access point. Similarly, in Hulavu, the main difficulty cited was the struggle and/or inconvenience associated with carting water long distances.

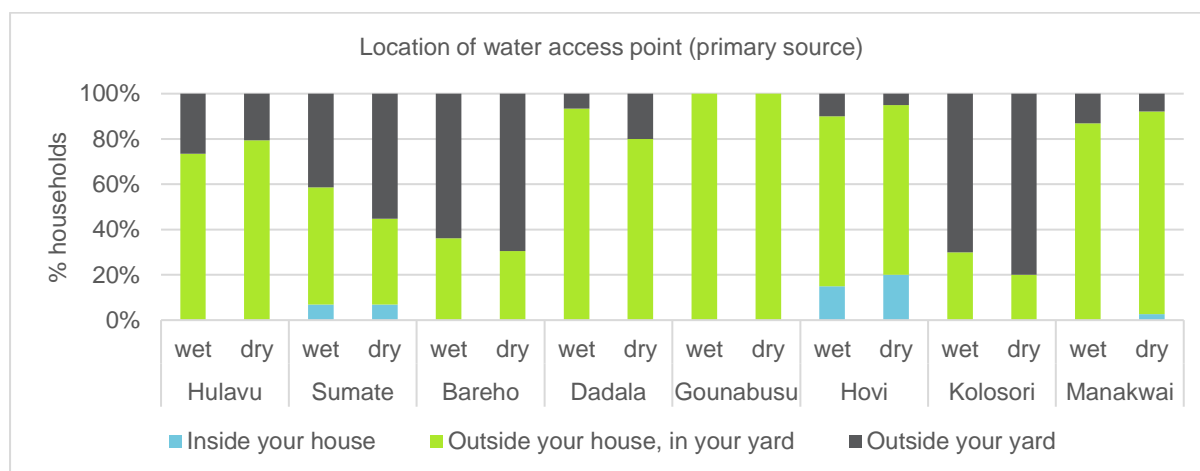


Figure 2.5: Location of primary water access point (% households surveyed, n=217)

Females were the dominant water collectors across all study villages. Across all villages and age groups, a female usually collected water from the primary drinking source, including when the water access point was outside the yard: 79% and 85% collection by females (in dry and wet season respectively for access points outside the yard). Adult females (over 17 years of age) were the usual collectors, although female youth and children were also common collectors. The women's group interview indicated that men were more likely to be involved in transporting water when the access point was further from the house, such as carrying water from a stream, river, or when it required paddling to access it; and the household survey data indicated a slight increase in collection by men during the dry season. Notably, in Malaita – where gendered roles and responsibilities are particularly marked and rigid relative to the other research locales – no adult males assisted with collecting water. This was consistent across the household surveys and the women's group interviews.

Piped water supplies to **shared tap stands were considered the "least" worst available option**; women consistently identified their 'aspirational water system' as one that they could access from inside their house. As well as the **lack of privacy for bathing and cleaning**, women also described the **inconvenience associated with outdoor access points, noting that it was difficult and time consuming to do chores such as washing, cleaning and cooking.**

However, some women noted that privacy is actually more possible at tap stands than other available access points (such as streams/ivers), because they were more easily accessible after dark, when privacy could be increased. Moreover, although cultural norms prohibit bathing and cleaning of menstrual materials at tap stands, some women stated that it was possible to do this after dark:

“The water supply is good for us women when we have our period. In the past, it's very inconvenient during menstruation to bath in the river when are all their together. But today, we can use the water supply during the night to wash ourselves and our clothes” (Gp-Int.-G, W)

Being limited to outdoor access only (whether inside or outside the property boundary) is linked to diminishing health and wellbeing benefits from water access (Evans et al., 2013).

Women reported that water usually needed to be collected two to three times a day, depending on what domestic chores were planned for the day and whether or not the women were going to work in the garden for the day. The average time to collect drinking water from the primary access point (when it was outside the yard) was 19 minutes during the wet season, and 29 minutes in the dry season. This indicates around **1 to 1 ½ hours each day is spent collecting water, usually by females**. This could be much longer when considering time required to perform activities at the water stand or source (e.g. river/creek).

As part of the women's group interview, a participatory 'water wheel' activity was developed whereby participants began the interview by temporally figuring their typical daily routine around a clock face, capturing when, why and for how long they access water. Below (Figure 2.6) is an example of a 'water wheel' from Bareho and Manakwai. As well as a process to prompt dialogue, this activity neatly captures the centrality of water access to women's daily life.

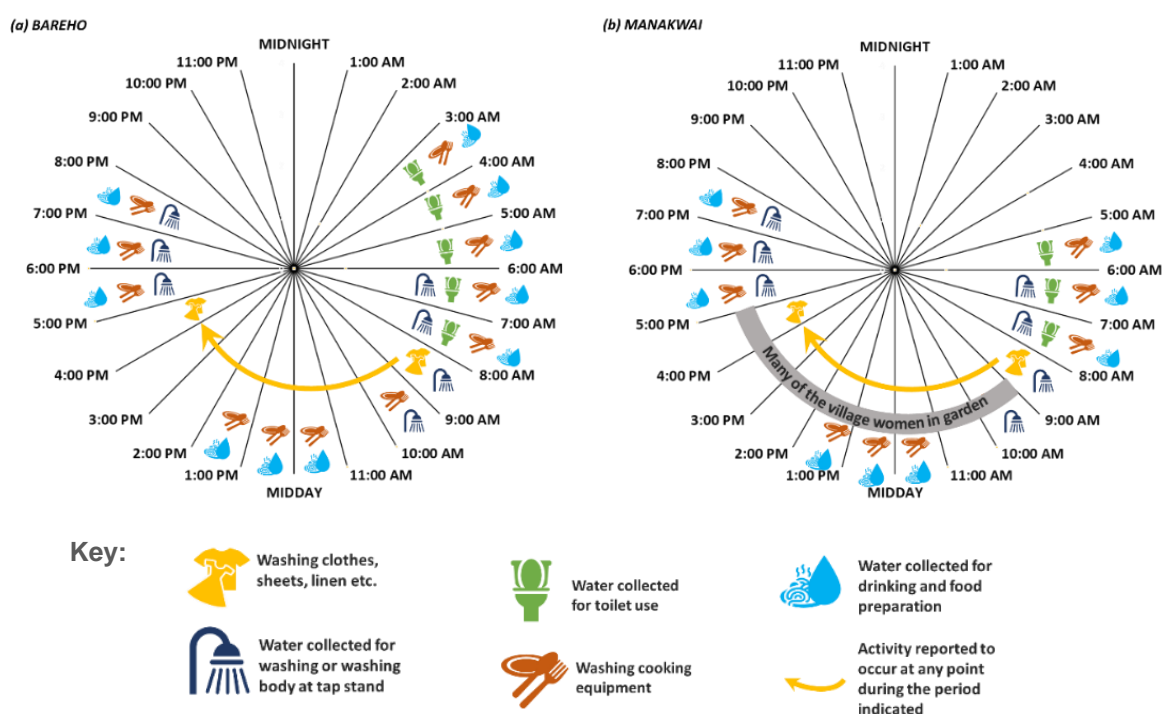


Figure 2.6: Women's water wheel indicating timing type of water use activities for (a) Bareho and (b) Manakwai

2.7. Water Quality and Sanitary risk assessments

Overall, a total of 45 drinking water samples were tested across the 8 villages. Types of drinking water samples included surface water (dams, storage reservoirs, tap stands and household containers); spring water (spring source); rainwater (storage tanks – communal and private) and household containers.

It is important to note that a majority of the water testing occurred during or just after rainfall, which is known to influence (reduce) the quality of surface water drinking supplies – of which a majority of the research communities relied on as their prime water source. It is quite possible that *E. coli* counts may have been lower had the samples been taken during the dry season.

All villages had a presence of the microbial indicator *E. coli* in at least one, if not all, their drinking water source types (Table 2.5 below). As is expected based on other studies, spring and rainwater sources typically had lower most probably numbers of *E. coli*.

Table 2.5: Water quality results: *E. coli* MPN measured using Aquagenx compartment test bags, and compared with 2017 WHO Guidelines according to the key to the right

Water source type		Manakwai	Kolosori	Hovi	Gounabusu	Dadala	Bareho	Hulavu	Sumate
Surface water	Dam		>74.15	>74.15	11.6	>100	>100	>100	
	River (downstream from dam)	>74.15							
	Storage tank (reservoir)		56.8	11.5				>100	
	Tap stand	13.6 - 48	13.6	30.95	8.5	11.6	>100	48.3	48.3
	Water container			>100			>100	>100	>100
Spring water	Spring source		1.6		13.6	28.7			32.6
Rainwater	Tank	40.5	0.6	30.95		0	>74.15		1
	containers/hands		9.5 (pre-treatment)						

E. Coli CFU/100ml	
0	SAFE
0-10	LOW
10-100	INTERMEDIATE
>100	HIGH

2.7.1. Water containers

Water storage containers all contained some *E. coli*, with most being in the “High” level category. For villages such as Hovi and Sumate, water quality from the source was not as poor as the water quality from household containers, indicating inadequate hand and water hygiene as contamination pathways.

Households used a variety of water containers to carry and store drinking water. **Water container cleaning** frequency was variable. On average, the majority of respondents reported cleaning their containers "daily" (43%) or "1-3 times a week" (24%). However, direct inspections of HH water container cleanliness revealed that only two villages had any households where *all* drinking water containers were visually clean.

Attitudinal data on water quality and water treatment practices

Most households across all villages perceived their drinking water supply to be “very safe” or “mostly safe” (Figure 2.7).

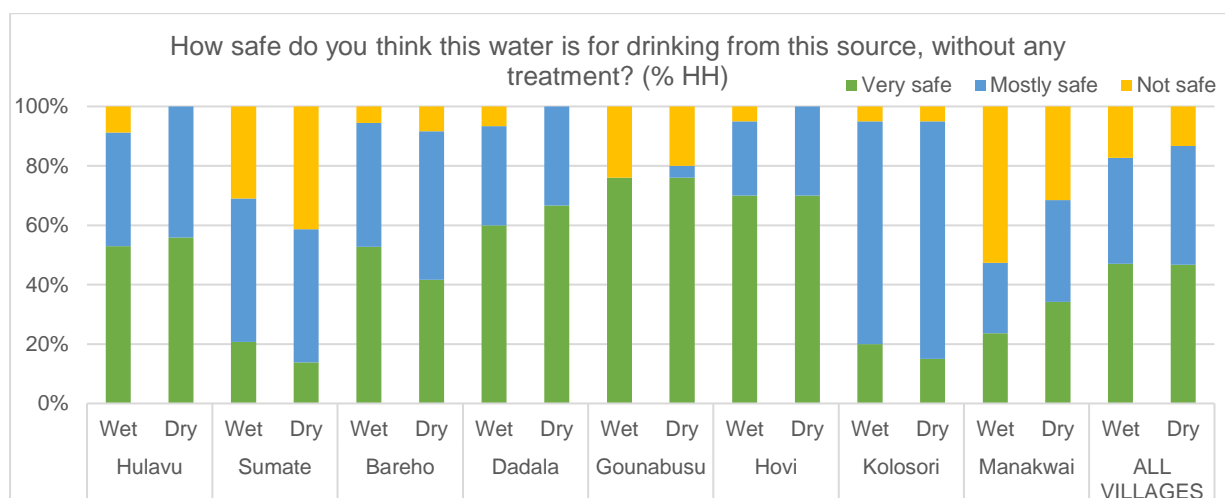


Figure 2.7: Perceived drinking water safety (% HH)

Around one third of households “sometimes” treated their water in the wet and dry season. Typical treatment methods were boiling (>50-60%), with around 20% letting the water sit or filtering the water prior to drinking. There was, however, considerable inter-village differentiation, e.g. more people in Bareho and Sumate treated their water during the dry season, whilst in Hulavu, Manakwai and Kolosori it was greater in the wet season. Moreover, there was some general correspondence between people’s perception of water safety and reported treatment practices, but this was not consistent and in some villages the perception of unsafe water coincided with low rates of water treatment.

When asked to rank different water sources according to which are “best” for health, women from villages that had a **rainwater source ranked this as the healthiest water source**. One village that used rainwater ranked it lower than piped water from a spring, despite their acknowledgement that rainwater was safer and cleaner; the lower ranking was because they believed the quantity of rainwater available was not high enough to ensure good health. This indicated a sophisticated understanding of health being a function of both the quality and quantity of water.

The most commonly stated reasons women believed that rainwater was safer and cleaner was because during the rainy season surface water sources were dirtier. Women also mentioned that animals had access to many of the water sources, affecting water quality.



Figure 2.8: Water quality testing and site risk assessment activities (Green liquid indicates presence of *E. coli*) (Photo credit: D Gonzalez-Botero, C Beal and M Love)

We examined drinking water risk scores to explore if these could be aligned with water quality (Figure 2.8), as this could potentially be a cost-effective way to predict water safety without testing the water quality. Based on our case-study results, the risk assessment method appears to be a relatively accurate and useful proxy for water quality testing if risk scores are either low or high, but needs further refinement and ground truthing to further assess if predictions for the middle range can be improved or not.

2.8. Water drainage and mosquitoes

Most of the research visits were conducted during the wet season and low-lying areas were often poorly drained with evidence, in many of the villages, of blocked drains, pooling water, and sediment build-up around water outlets. Generally speaking, qualitative data showed that people in most villages had an awareness of the relationship between poor drainage, waste disposal practices and vector borne illnesses.

Aedes spp., the vector species for Dengue fever, were found in its larval stage in all eight villages. *Anopheles* spp., responsible for Malaria, was less prevalent and the larvae was observed in only two villages. The survey results indicated that although vector control against Malaria and Dengue is active in the Solomon Islands, it is not adequate in coverage to prevent or suppress malaria and dengue vector persistence. An example of the range of containers where larvae was observed is shown for Kolosori in Figure 2.9.

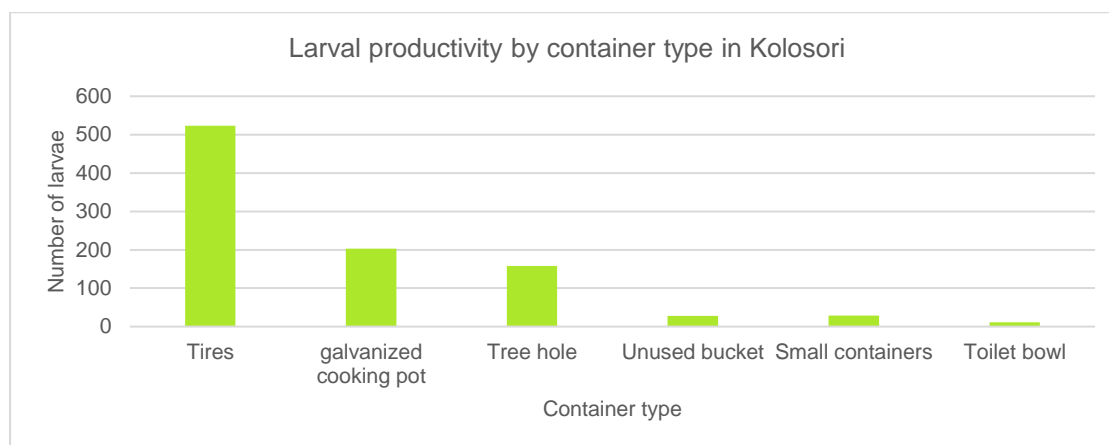


Figure 2.9: Larval productivity by container type in Kolosori

2.9. Water System Satisfaction and Aspirational Water Systems

Overall, people were generally more satisfied with their household water source in the wet season than the dry season. Satisfaction levels varied across villages and lower satisfaction rates were often associated with household location in a village, which often correlated with water pressure issues (lower in elevated areas), religious denominational differences, socio-economic status, or fewer tap stands.

During women's group interviews, participants were asked to rank the water sources in their village by "best to worst" (generic), and then specifically in terms of "health" and then "well-being". Tap stands (usually sourced from surface water) were ranked the "best"; rainwater was considered the "healthiest", and (again) tap stands were considered the "best" for "well-being".

There is a clear disconnect between what participants considered to be the healthiest water source compared to the most convenient and overall 'better' water source. Ideally, to foster trust and confidence in a community water supply (and thus promote better CWM and collective action) a village's best water supply would also be the one they perceived as the healthiest for the community.

For many women, water piped direct into their house was their most aspirational water system. Several reasons were given for this, with most relating to accessibility issues (privacy for bathing, convenience for chores), but a strong desire for water-based sanitation was also frequently cited.

Although piped water systems with tap stands were consistently identified as the best (available) water system, women respondents also highlighted many drawbacks to this system, including:

- No privacy for bathing or washing
- Lack of reliability during the wet season (due to blocked dams, storage tanks and pipes)
- Low water pressure in some areas of the village, meaning limited water flow and longer time to complete chores (caused by cracked or blocked pipes, or inadequate storage for increased population numbers)
- Cueing at tap stands (exacerbated by low water pressure, and more houses sharing each tap stand than originally planned)
- Inadequate drainage creating breeding sites for mosquitoes
- Sometimes dirty areas surrounding tap stands
- Strong odours following heavy rain
- “Worms” in the water (possibly mosquito larvae)
- Rusting of tap stands, and breaking of taps (and use of sticks instead)
- Accessibility of dams to animals, potentially contaminating the water
- Accessibility of tap stands to animals (pigs) who, due to poor drainage, dig the ground and damage pipes and tap stands.

2.10. Sanitation service levels

Across the case study villages, sanitation practices varied (Figure 2.10). The proportion of toilets that meet the requirements for “Safely-managed” was higher than the national average. This may reflect a higher sanitation service level in these villages, but may also relate to a difference in the way the definition for safely managed sanitation was applied to the national rural dataset compared with the study villages. The interpretation of the SDG 6.2 guidance used here is that on-site sanitation, such as pit latrines, that meet the criteria for a functional user interface (lid, slab etc), are exclusively used by the household, but that are never emptied, are considered safe. Once filled, these pits are covered and a new pit dug, thus faecal sludge is not extracted or transported from the pit, nor can humans come into direct contact with it. Additionally, the faecal sludge in septic tanks in rural locations was assumed to never be emptied and disposed, so that human contact is not possible, and thus were not classified as safely managed.

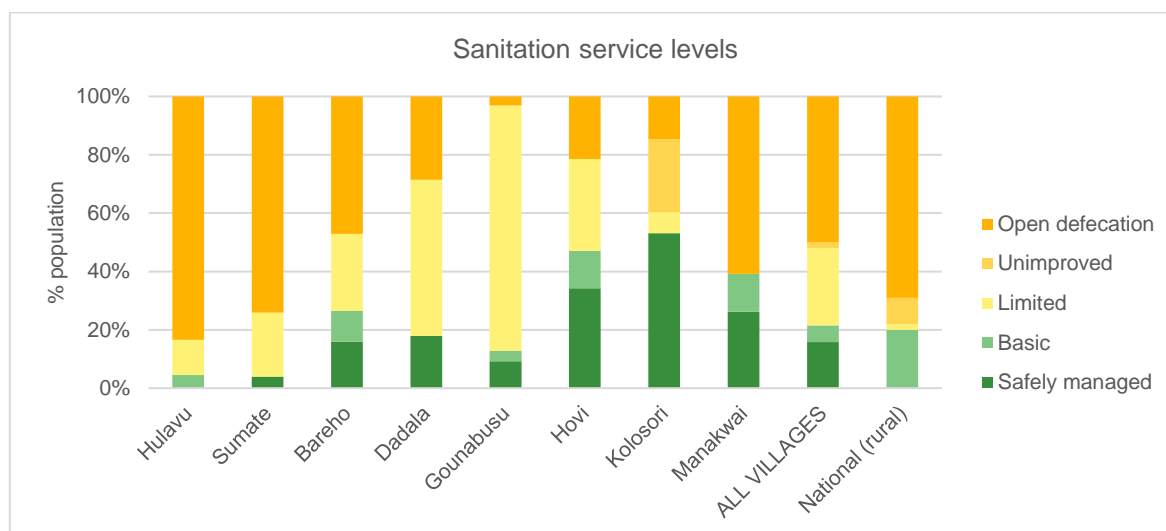


Figure 2.10: Sanitation service levels, for each village, aggregate for all village case studies, and JMP rural national levels

In more than half of the study villages, more than 80% of households had a toilet or latrine (Figure 2.11). Water-based pit toilets, pour-flush or cistern-flush, were the most common type of toilet (Figure 2.12). Very few VIP latrines were observed, though a larger number of dry pits with lids and slabs were in use.

However, very few of the toilets observed in these villages were fully functional, hygienic, private and accessible (Figure 2.11). In the four villages with no functional or other issues, household ownership of toilets was low (ranging from around 18-55%) but **all** had a higher proportion of fully functional, hygienic, private and accessible toilets. This may be due to an increased vigilance in toilet maintenance and care in villages where they are considered a luxury.

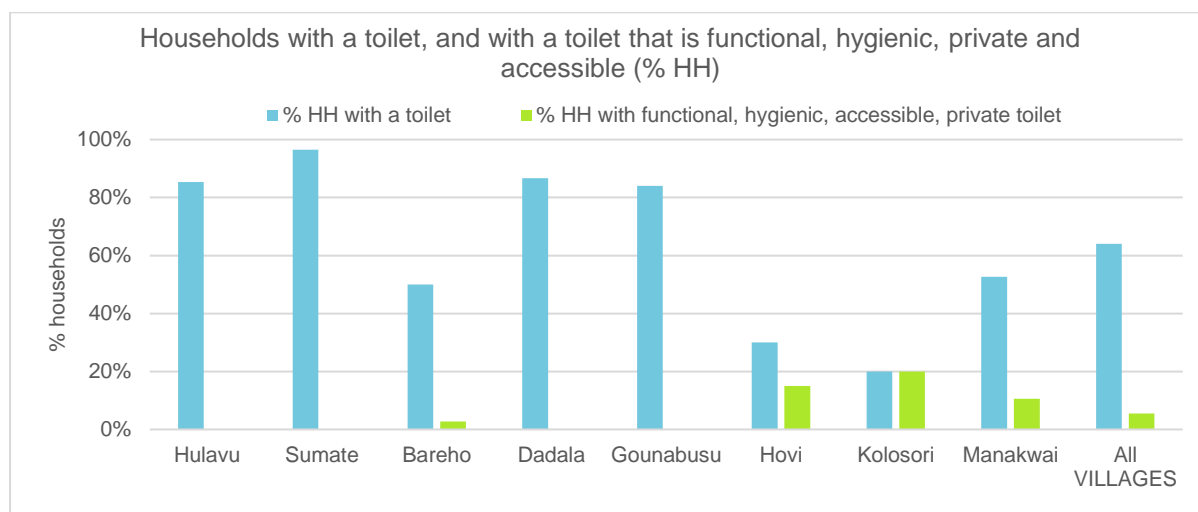


Figure 2.11: Proportion of households with their own toilet, and proportion whose toilets are functional, hygienic, private, and accessible. (% all households; n=217)

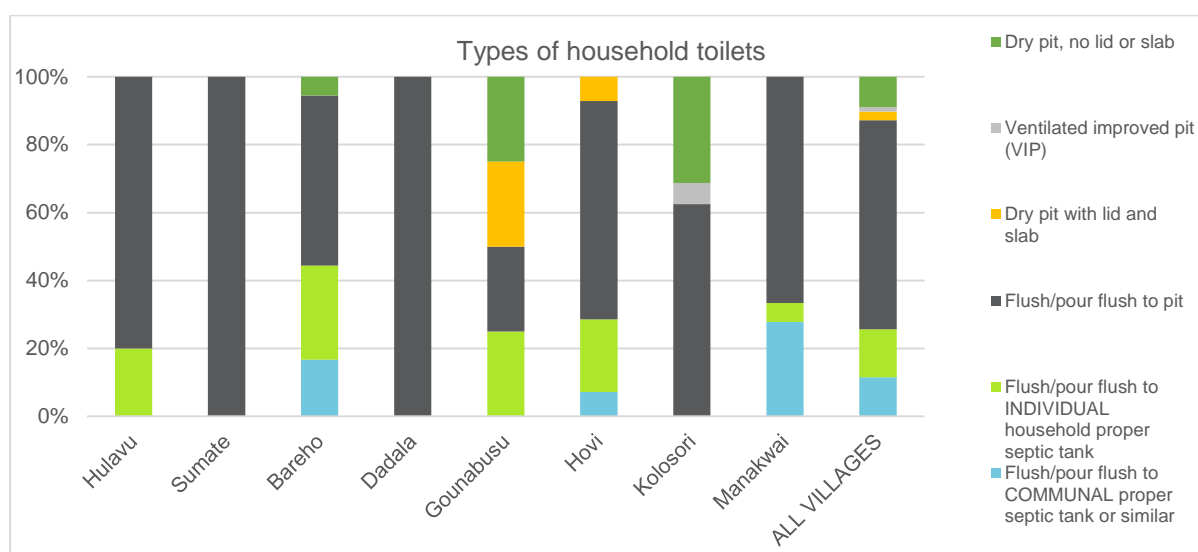


Figure 2.12: Types of toilets in use (% household toilets of each type in each village, and across all villages)

2.11. Open defecation

Reported usual defecation locations (when at home), indicate high rates of open defecation (Figure 2.13), and this rate increased when people are away from home (such as working in the garden, fishing, at the markets etc.) (Figure 2.14). Across all villages, 56% of households reported that someone in the house usually defecates openly and 100% of households reported that this happens when they are not at home. Note that this does not mean that all people always openly defecate when they are away from their home, but that every household does this at least sometimes (Figure 2.14).

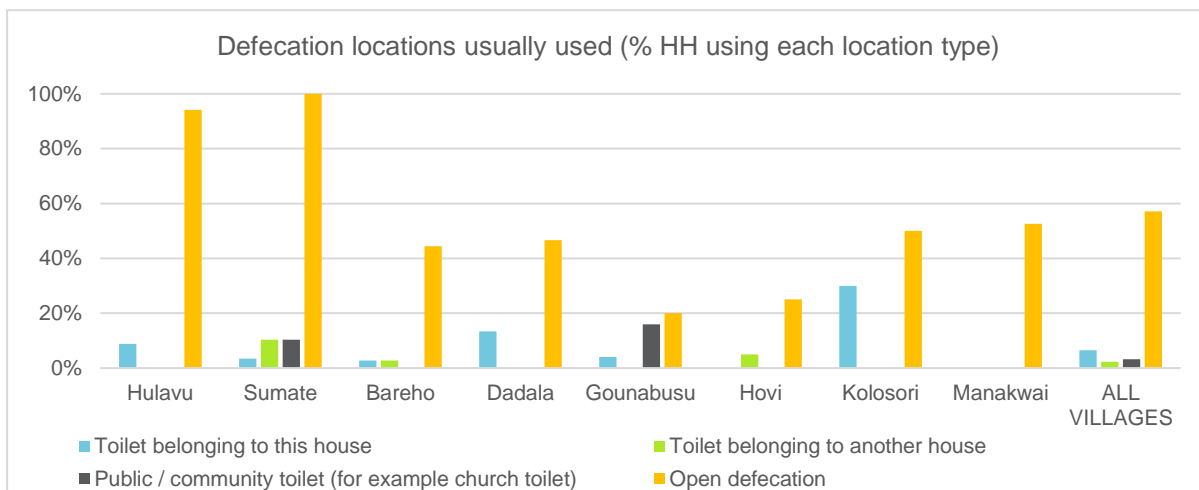


Figure 2.13: Usual defecation locations. "Where do people living in this house usually defecate? Please identify all locations used" (% households surveyed; n=217)

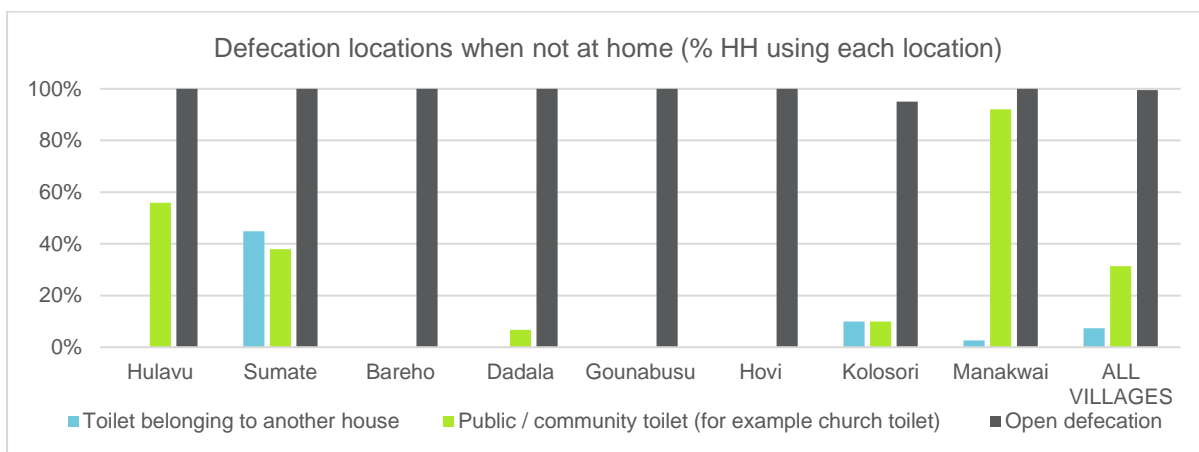


Figure 2.14: Defecation locations, when not at home. "Where do people living in this house usually defecate when they are not at home? Please identify all locations used." (% all households; n=217)

The most common locations for open defecation were in the bushes or the seaside, and when further from home, in a shallow dug hole (Figure 2.15). Rivers and creeks were less commonly used for sanitation than other open defecation locations, which may be associated with the use of these as water supplies for domestic needs.

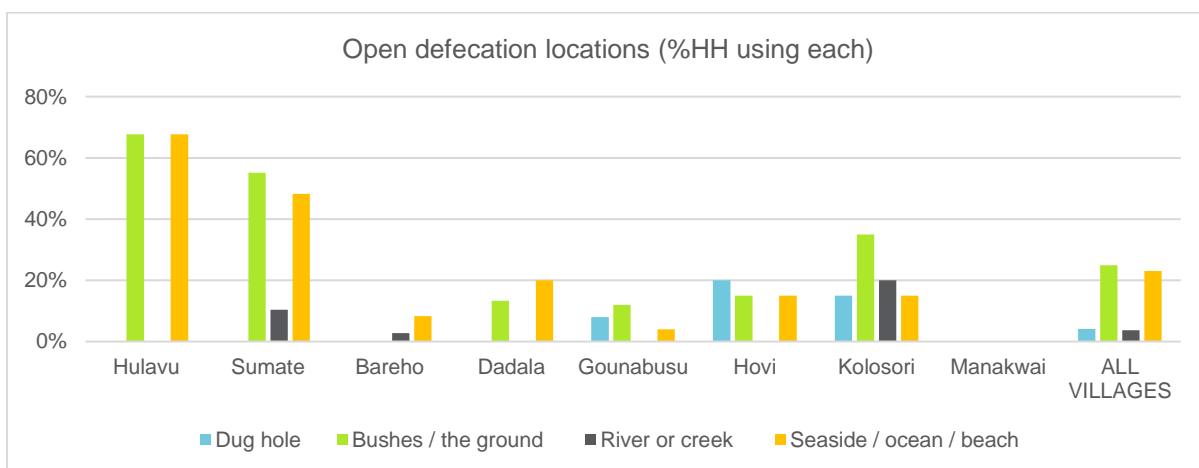


Figure 2.15: Open defecation locations usually used by households (% all households; n=217)

In all villages, women participants in the group interviews also indicated high rates of open defecation. In response to a question asking about usual places for defecation, respondents noted that open defecation in bushes and the beach was common practice:

“Only a few people in the village use a proper toilet, even the stream that runs in the village people use as a toilet sometimes. We still do our washing and the faeces will just float by” (Gp-Int.-K, W)

Some respondents further commented that men and women use the same place for defecation. Respondents from several villages highlighted that this was against custom, but in one locale stated that it was necessary because sea level rise had made a previous defecation place used by women inaccessible. Some women in this village identified that this practice (sharing an open defecation site with males) was not safe for girls.

“No, it is not safe [for girls to use] because both men and woman use the same place and it’s against the custom which is not right.”

[question: Who is responsible to solve this issue?]

“Chiefs and leaders in the community need to solve these issues because it is against the village custom. Women and men use the same place because of sea level rise. As the place used by men [is still good] they all use the same place to defecate.” (Gp-Int.-D, W)

The women’s group interview participants were asked about their knowledge of links between water and sanitation: 4 villages identified that water is required for effective sanitation, and 3 identified that proper sanitation is required to protect water from contamination (for health reasons).

2.12. Hygiene

The presence of basic handwashing facilities was not common in any of the case study villages and were lower than the national statistics (Figure 2.16). Using the SDG 6.2 definition of handwashing facility, ‘basic’ requires water and soap at an identified handwashing location. In the context of our sites, this includes a tap stand, tank, or other water access point which usually provides water in addition to being used for handwashing.

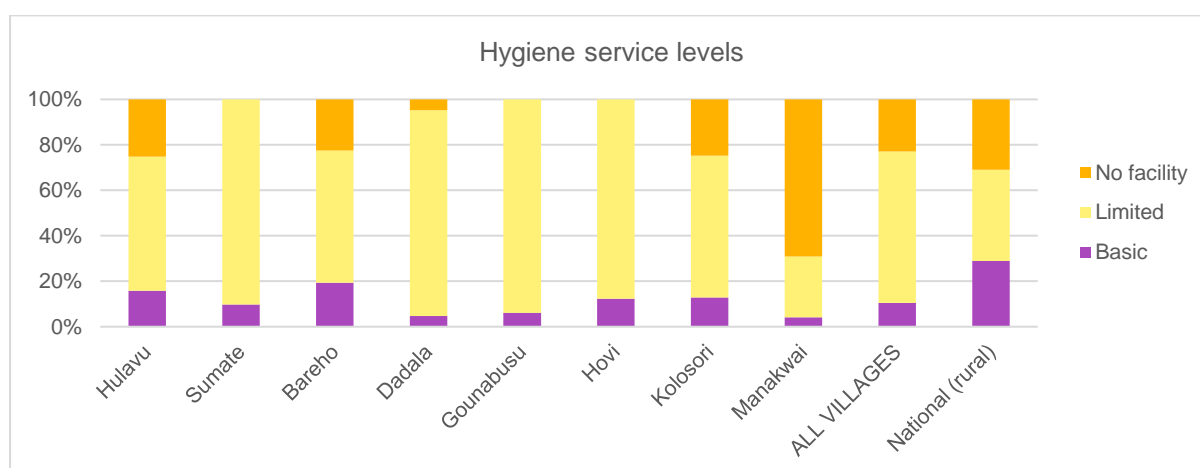


Figure 2.16: Hygiene service levels, for each village, aggregate for all village case studies (n=1251), and JMP rural national levels (% population)

Most handwashing facilities had either running or still water. The ‘running water’ handwashing facilities were most typically the tap stand used to access the water supply for all purposes, rather than a specific

handwashing facility. However, only 10-50% of these had a cleansing agent. Most commonly this was soap, but occasionally it was lemons or laundry detergent.

When asked to describe how, and using what equipment, respondents washed their hands, most described using water and soap; less than 12% of respondents reported using only water.

However, a better indicator of likely handwashing with soap is to aggregate, for each household, reported handwashing with soap with structured observation of soap at the handwashing location. This aggregate indicator of handwashing with soap indicates across all 8 villages that only **12% of respondents reported using soap and had soap present at the handwashing location** (Figure 2.17). There was significant variation between villages, but even the highest rates, at Hulavu (21%) and Hovi (25%), are still well below the required 100% to minimise transmission of germs from poor hand hygiene.

In the women’s group interviews, participants in all but one village reported that handwashing and hygiene practices were "not very good", with few people washing their hands with soap. The reasons for not washing hands included not having time and not remembering, with the most common reason reported for not having soap for handwashing being a lack of money.

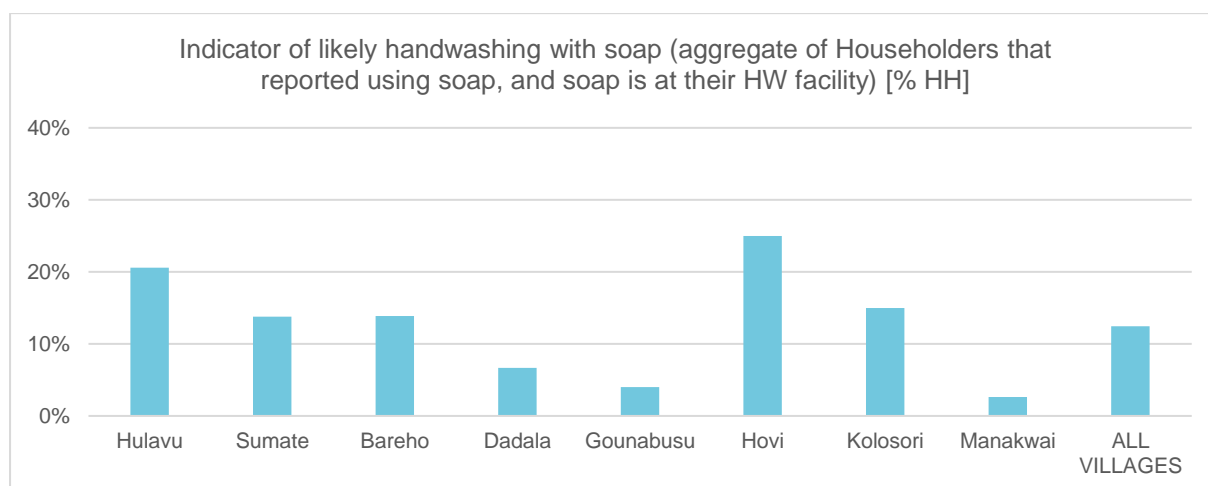


Figure 2.17: Aggregate indicator of likely rates of handwashing with soap (aggregate of reported use of soap with observation of soap at the handwashing location), (% household, n=217)

Specific questions were not asked to assess knowledge or attitudes about handwashing, but respondents were given the opportunity to provide comments relating to each key survey topic, and in this case any comments relating to handwashing. Based on these responses, it is clear that knowledge of the reasons for handwashing was high – most people identified the importance of washing hands with soap was to avoid the spread of germs and to maintain good health. Many people mentioned washing hands before eating or handling food, while a much smaller proportion identified washing hands after defecating as important. This reinforces evidence from many other studies that knowledge of the importance of handwashing is generally high, and thus education alone is not sufficient to result in safe handwashing practices.

The women’s group interview participants reported that bathing most commonly took place at tap stands, which was more convenient than other water systems, although bathing in the stream was also common practice. Respondents in one village reported that babies and older people often bathed using rainwater from their household tanks, but bathing for these people was more difficult in the dry season because it relied upon people carrying water to the house, which was not always possible.

When asked whether soap was commonly used for bathing, women reported that sometimes soap was used, if it was available. In one village, women reported that they preferred to use stones, coconut husk,

a brush, or mosquito nets, to scrub their body rather than soap because of a belief that using soap turns people's hair grey:

*"Mi suppose usim soap, mi frighten grey hair"; "Soap olowe mekem man grey hair".
I should use soap [but] I am frightened [it will give me] grey hair" ; "Soap makes
people's hair grey" (Gp-Int.-K, W)*

2.13. WASH-related Health

The health and well-being of communities is inextricably linked to WASH outcomes. One of the largest causes of morbidity and mortality in children under five years of age in low and middle-income countries is diarrhoeal disease, of which a significant (>85%) portion has been attributed to inadequate WASH systems (WHO, 2018; Black et al., 2010). Over 70% of surveyed households across the eight villages reported having incidences of water-related ill health. The overall percentage of reported illnesses that were vector-related (malaria and dengue) or water-access related within the last year is shown in Figure 2.18. All villages, except Kolosori, reported incidences of malaria or dengue in the last 12 months. Scabies, yaws and trachoma were the main water-access related illnesses reported.

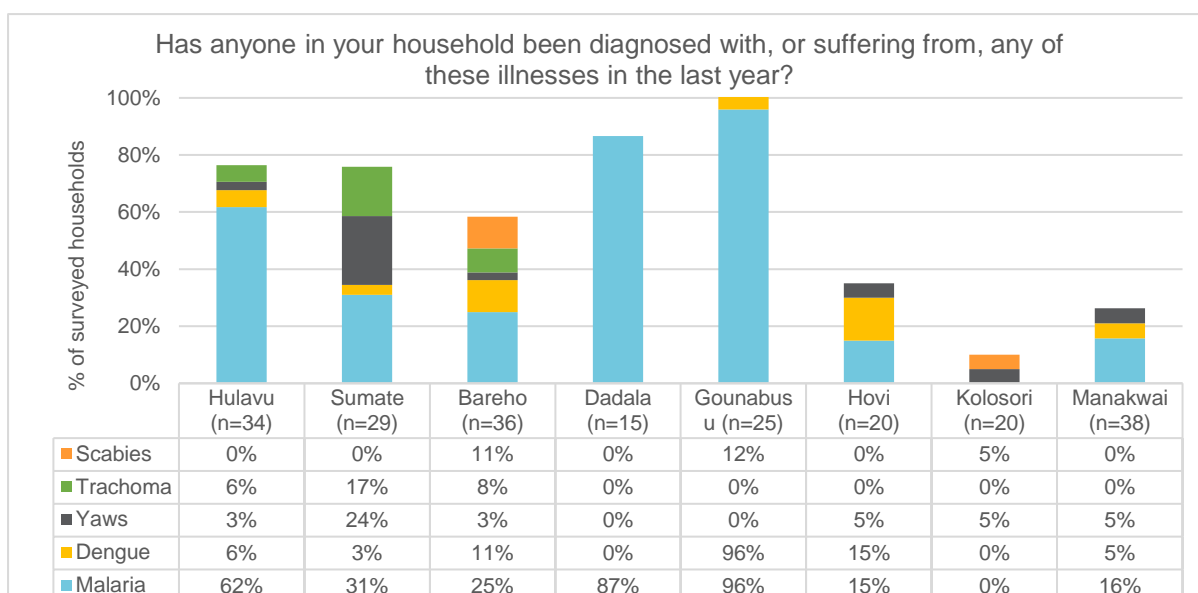
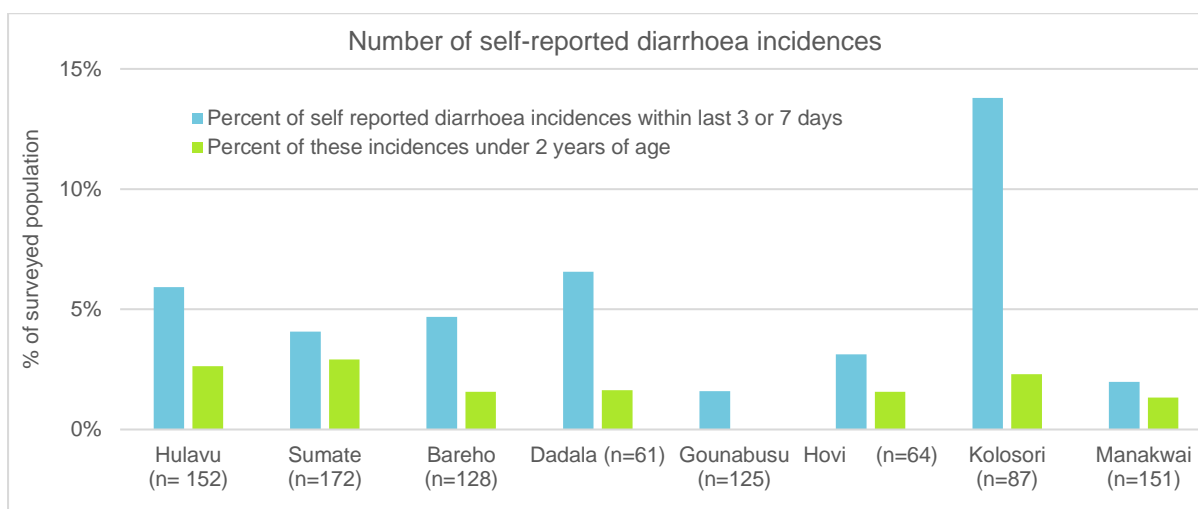


Figure 2.18: Combined water access-related illnesses (n=217 HHs) Note n = number of households surveyed in the WASH HHS

There were 35 self-reported incidences of diarrhoea from all household surveyed (representing 1,253 population), corresponding to 16% of the surveyed HH (Figure 2.19). Burnett et al. (2016) described between 5-17% of households with self-reported diarrhoea incidences, indicating that for the research villages, diarrhoea incidences may be in the higher range compared with previously reported data. On a village basis, the proportion of households that reported diarrhoea incidences ranged from 8% (Manakwai and Dadala) to 60% (Kolosori). There were no clear causal relationships or patterns observed in the data but some associations were noted between households with higher incidences of diarrhoea and households that don't treat their drinking water during the wet season.



Note: Hulavu and Sumate self-reported diarrhoea incidences within the last 3 days, while others reported incidences in the preceding 7 days. n= total number surveyed per village.

Figure 2.19: Self-reported incidences of diarrhoea within last 3-7 days of WASH HH survey (n=217 HHs, representing 1253 people)

2.14. Summary of WASH situations

In order to assist in identifying strengths in well-managed community water systems, the WASH status of the study villages was assessed, with the expectation that good WASH outcomes require well-managed water systems.

Table 2.6 (below) gives a high-level summary of the WASH situation across the eight case-study villages. Different aspects of WASH were used as indicators to make the summary assessment, including the SDG6 indicators, as presented in the first column of Table 2.6. Some of these dimensions of WASH may be considered more important than others, and such weighting will likely differ amongst stakeholders, but no weighting has been applied here.

This study explicitly sought villages that reportedly had good WASH situations, and thus they are not considered to be representative of the range of situations in villages across the whole country and are likely to have better WASH situations than many other villages.

No villages achieved the highest level of service or conditions across all aspects of WASH. Although this is the aspiration, it was not expected that villages would achieve highly in all of these dimensions, particularly given that villages receive no regular ongoing support to manage their water systems.

The villages that had the best **WASH situation** – based on the key indicators used – were Manakwai, Kolosori and Gounabusu.

Table 2.6: Overview assessment of WASH situation in the eight case study villages. (lowest level of service or situation achieved through to highest are indicated (respectively) by red, orange, yellow, pale green dark green).

	Hulavu	Sumate	Bareho	Dadala	Gounabusu	Hovi	Kolosori	Manakwai
SDG 6.1 - Drinking water service level	●	●	●	●	●	●	●	●
SDG 6.2 – Sanitation service level	●	●	●	●	●	●	●	●
SDG 6.2 – Hygiene service level	●	●	●	●	●	●	●	●
Water quality (drinking)	●	●	●	●	●	●	●	●
Drinking water risk assessments	●	●	●	●	●	●	●	●
Perceived water quality (%HH perceived water as “very safe”)	●	●	●	●	●	●	●	●
Water treatment (%HH that treat water at least sometimes)	●	●	●	●	●	●	●	●
DW availability and reliability	●	●	●	●	●	●	●	●
Accessibility	●	●	●	●	●	●	●	●
Water point functionality	●	●	●	●	●	●	●	●
Satisfaction with water situation (%HH reported being “happy” with water source)	●	●	●	●	●	●	●	●

●	VERY LOW
●	LOW
●	MED
●	HIGH
●	VERY HIGH

Although there was considerable variability between the villages, some patterns were observed:

- Whilst all study villages had 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 variations 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 yard)
- Householders and villages 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 villages
- In some villages, 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 village, 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, using SDG6.2 indicators, were consistently inadequate
- 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, with a common preference to improve water systems to enable water-based sanitation (and a suspected aversion to improving sanitation until water-based sanitation could be supported).



Sumate, Guadalcanal (Photo credit: M Love)

3. VILLAGE SOCIAL CONTEXT & CHARACTERISTICS

One of the key rationales of the formative research was to identify which, if any, contextual factors correlated with good or better community water management more than others. Put differently, we were examining what internal (within a village) and external (beyond the village) socio-economic factors exist, and exploring what the 'plus' factors in CWM+ might look like in the Pacific islands context.

Some of the specific questions explored include: Does greater access to money – income/markets and remittances – align with better or worse CWM outcomes? Do demographic particulars – population size, tribal and religious affiliation and diversity – matter to CWM? Does collective action in non-WASH domains – e.g. committee participation, fundraising levels – correlate with collective action in WASH? How might access to relatively novel technology such as mobile telephony be productively harnessed by governments or CSOs to enhance rural WASH outcomes? Given the recent and socio-historically constructed character of the 'village-as-community' in Solomon Islands, what other engagement opportunities might there be that better work 'with the grain' of local contexts (e.g. "communities within community", "communities beyond community")? These and other questions informed the methodology of this sub-component of the research.

3.1. Socio-demographic summary

Table 1.1 in chapter 1 (reproduced below) provides a summary of village demographics. Note that all villages experience a marked increase in population levels during holiday periods, especially Christmas. All but two of the villages had more than one religious denomination present, though there was general denominational homogeneity across all the villages and no acute inter-denominational tensions evident, other than in Manakwai. Bareho and Manakwai had the greatest number of tribes. All villages were demarcated by zones or groups, which are an internal administrative grouping that generally dates to missionary and colonial-era practices. Today, such groupings are often used to delineate community tasks. A common thread across all the sites was the relatively **recent settlement history** of our study villages (Table 1.1).

Table 1.1: Demographic summary

Village	Province	Population & households	Religion	Tribes	Zone/ Group
Manakwai	Malaita	~540 pop; 80-100 HHs	SSEC-Estate / Kingdom; SSEC (original)	9	5-6
Gounabusu	Malaita	~170 pop; 44 HHs (30 occupied)	SSEC; 1 HH SDA	3	4
Hovi	Isabel	~120 pop; 25 HHs	SDA	3	4
Kolosori	Isabel	320 pop; 52 HHs	Anglican; 1 HH other	2	4
Bareho	Western	~300-500 pop; 78 HHs	SDA	12	3
Dadala	Central	~130-150 pop; 31 HHs	Anglican; 1 HH other	4	2 (4)
Sumate	Guadalcanal	~300-400 pop; 70-80 HHs	Catholic; few HHs other	4	4
Hulavu	Guadalcanal	~300-400 pop; 80-86 HHs	Catholic; few HHs other	4	4

With the exception of two villages, our household village case-study demographics were slightly lower than the national (rural) average of 5.6 people per household. Sumate and Manakwai were the only villages that had more males than females (based on surveyed HHs), echoing the HIES data where Guadalcanal and Malaita had the highest gender disparity compared to other provinces (SINSO, 2015a). Village age distribution (Figure 3.1) parallels national trends, with an acute youth bulge (cumulatively, 52% of the population is less than 20 years old) (SINSO 2015a:7).

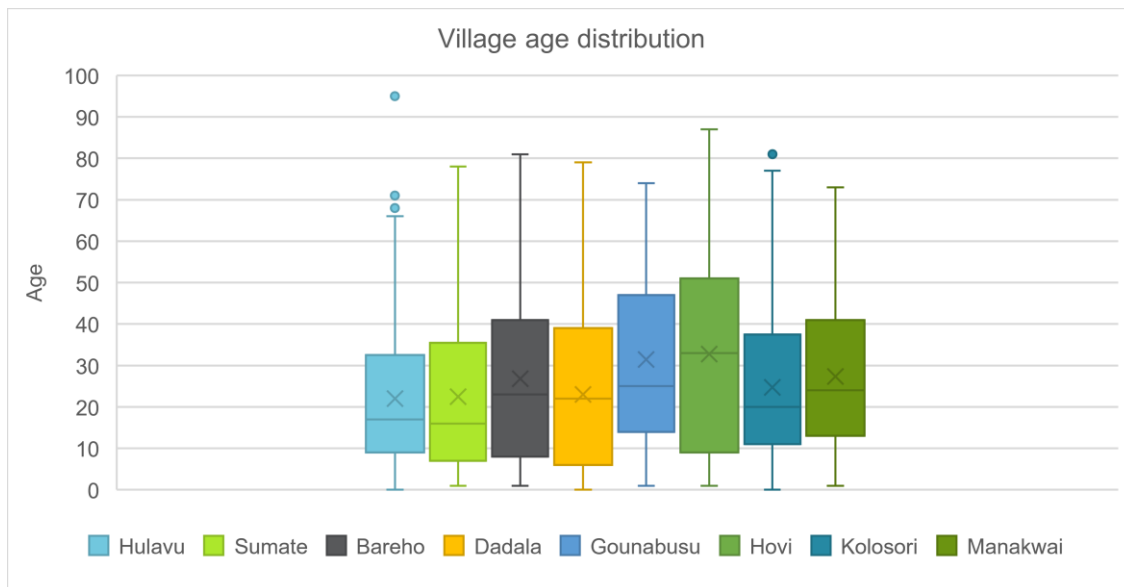


Figure 3.1: Village age distribution (box plot) (S-E HHS, n=1067 indiv.)

The number of family members residing in town varied considerably across the case-study villages (Figure 3.2).

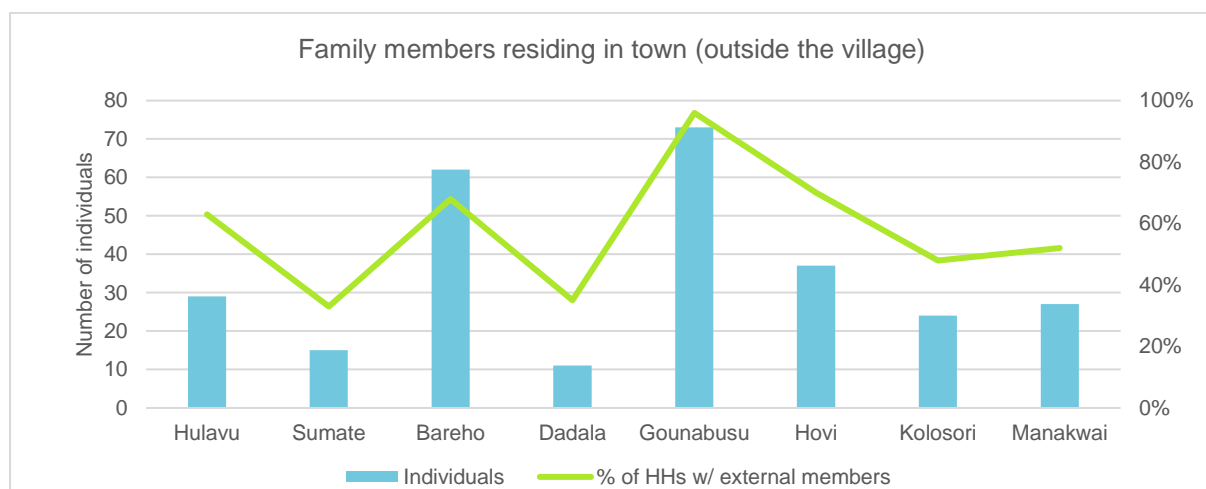


Figure 3.2: External HH members (frequency) and % of HHs with external members (S-E HHS, n=220 HHs)

In terms of external family members, there were more males than females residing in town (generally Honiara) in five of the eight villages. The mean age of external family members varied: Hulavu (36yo) and Hovi (43yo) had the oldest mean age, whilst Dadala (24yo) had by far the youngest.

3.2. Socio-economics

Most households earned money from more than one source, typically 2-3 sources. Income generating activities differed considerably across the eight villages. Gardening for market sales was practiced across all locales (most notably in Dadala and Kolosori, much less so in Bareho and Hovi). Other income streams consisted of trade stores, home baking, betel nut, [*Areca catechu*], pension, handicraft, petrol sales, chainsaw repair and hire, and other miscellaneous activities. Cash cropping – most typically copra and cacao – is in decline in many locales; however, in both Sumate and Hulavu a large number of HHs used coconut mills to extract coconut oil, which was sold to *Coconut Pacific* in Honiara and provided an easy and stable monetary revenue option.

Self-reported HH income levels varied considerably across the eight villages, but not so much outside of Guadalcanal province other than in Kolosori. There was more intra-village variation in Guadalcanal than in the other provinces, with HH income disparity highest in Hulavu, Sumate and Kolosori, whilst Dadala, Hovi and Gounabusu had the least disparity.

Remittances are an essential component of many PICs livelihood portfolio. In Solomon Islands, Malaita receives the most remittances (as a proportion of HH income), followed by the Western Province, Guadalcanal, Isabel, then Central (SINSO 2015b, 62). The socio-economic data from our case-study villages matched this trend (Figure 3.3). In some villages, a much greater proportion of HHs received remittances than in other locales, e.g. a greater proportion of HHs in Bareho, Gounabusu, Hovi, Kolosori and Manakwai received remittances than HHs in Sumate and Hulavu, but the gross amounts were generally less. Hence, households in Hulavu received the *greatest amount* of remittances in dollar terms, but less HHs received remittances overall compared to Manakwai, Gounabusu, Hovi, Kolosori, and Bareho. The percentage of HHs receiving remittances – along with other data such as village-to-town remittances, the percentage of HHs where 'people pay for other things' and fundraising – can serve as a proxies for **bonding social capital**.

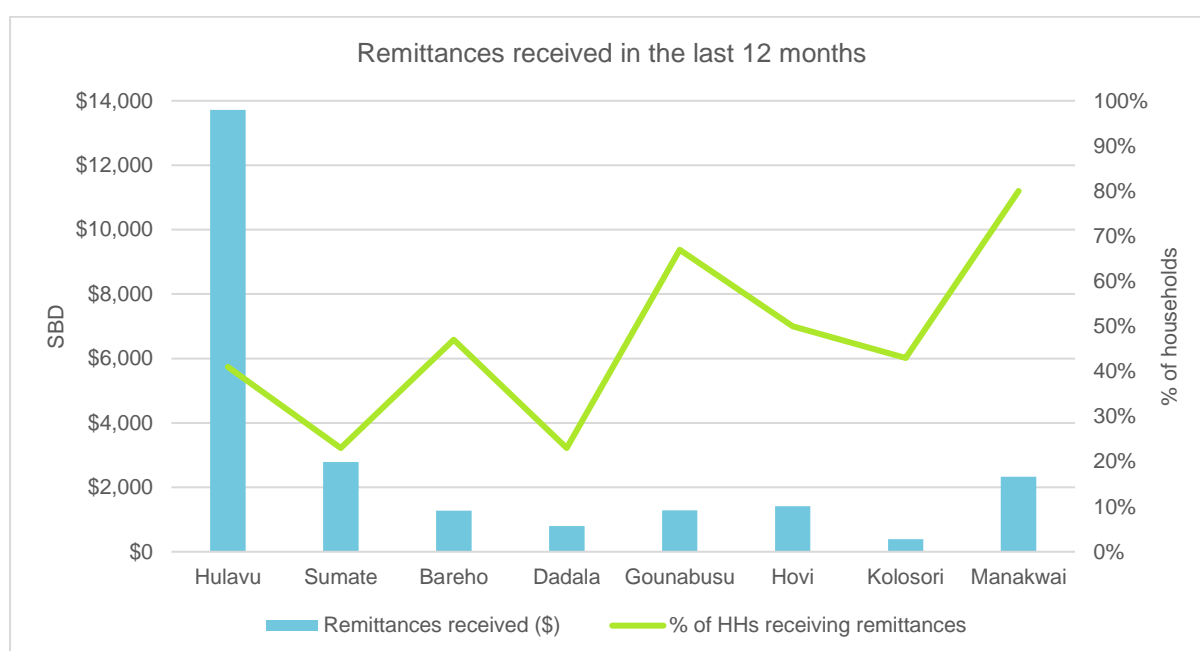


Figure 3.3: HH remittances level and % of HHs – last 12 months (n=220)

Income flows (earnings and remittances), along with trade store consumption and school fee expenditure varied considerably. Figure 3.4 (below) provides a **composite wealth indicator** for each village based on self-reported HH data associated with income, store staple expenditure, remittances, and school fees.¹¹

¹¹ Self-reported household income data is notoriously unreliable (especially in Melanesia). Using composite indicators to construct a proxy indicator, and triangulating with secondary datasets - such as national household income and expenditure surveys (HIES) surveys (e.g. SINSO, 2015b) - provides a more reliable indicator, especially for inter-village comparison.

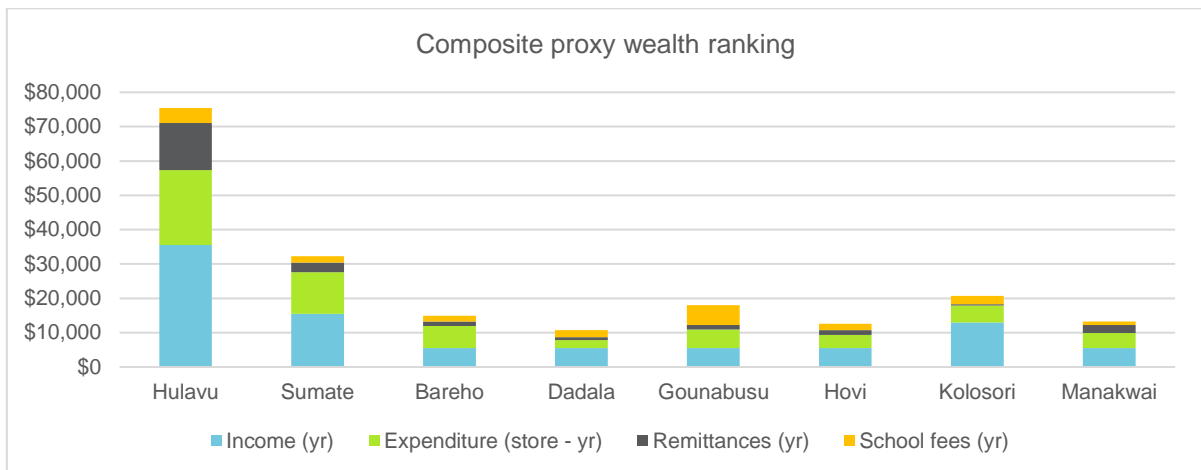


Figure 3.4: Composite proxy wealth indicator based on reported income and expenditure for the last 12 months (n=220 HHs)

In gloss, Hulavu and Sumate were the 'wealthiest' villages in our sample, Manakwai, Dadala and Hovi the least wealthy.

3.3. Village Governance

3.3.1. Structures, committees, and household participation

Governance structures varied across the eight villages. Manakwai, Bareho and Sumate were the only villages that currently had village councils, which are one of the most common forms of organised village governance structures.

Committees are a ubiquitous part of village governance across most rural villages in the Pacific Islands. In Solomon Islands, the most common sectorial committees are Church, Education, Youth and Health committees, which are all a legacy of the colonial period. Church committees were generally considered the most active by respondents. The smallest villages – Gounabusu and Dadala – had the highest percentage of HHs with a member in a village committee (Figure 3.5). However, on its own the percentage of HHs with members in a committee is not necessarily an accurate proxy for village wide collective action, social cohesion, cooperation, or self-help (especially beyond the church). For example, Sumate and Hulavu had higher proportionate levels of HH committee participation than Manakwai, yet many interviewees and respondents in the S-E HHS suggested that intra-village cooperation was very low.

A common thread across almost all the villages was the view, most often voiced by older people, that committee participation was stronger in the past compared to today:

In the past, the groups were all more active. Today, everything is different. Sometimes members will attend group meeting or work, and other times not. In the past every member always attended. Trying to do many things to make improvements in the village, but they always they fail. The failure is due to a lack of corporation. People talk, but are no good at action, at doing things. Some people cannot get together in terms of working together (KII-S, VL-M).

In the villages with a water committee, there was generally little to no ongoing cooperation with other committees, other than during the initial water supply construction phase when women and youth groups typically assisted with construction.

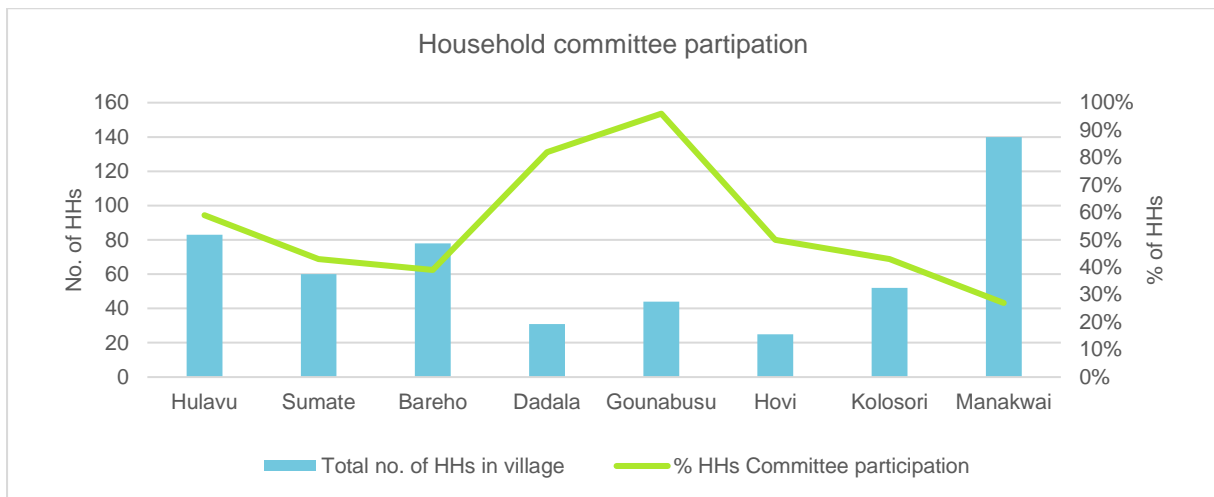


Figure 3.5: HH committee participation (S-E HHS, n=220)

A further institutional gap identified was the minimal role played by the **church** in day-to-day CWM. Moreover, note that in terms of fixing water issues, respondents in three of the villages (including both the SDA villages) explicitly stated that the Church *had a role to play* in fixing the water-related issues (cf. CWM section below). Given the strong role of the church in village life (e.g. in terms of governance, committee participation and fundraising, moral and social well-being etc.) there is an argument for a much stronger developmental focus by governments and CSOs on working more closely with faith-based organisations (FBOs) at all levels (national, provincial and village).

3.4. Fundraising

Fundraising is a crucial part of rural village life in the Pacific Islands and is closely connected to the committee and governance structures discussed above. Much fundraising is focused on church-related matters, but not all. Other examples include raising money for the construction of a community hall or a school extension. In our case-studies, Sumate and Hulavu reported the *largest* level of HH fundraising contributions, whilst Hovi and Bareho recorded the *smallest*. Note that SDA communities – Hovi and Bareho – disallow fundraising for church-related activities (Figure 3.6).

However, analysed as a percentage of reported expenditure (annual), Dadala and Gounabusu had the highest mean amount of village fundraising relative to store staple expenditure, followed by Sumate, Kolosori, Hulavu and Manakwai. This (roughly) corresponds to the village committee participation trends cited above, further elucidating that the **smaller villages tend to display a greater sense of homogeneity, cooperation and fiscal self-help than the larger villages.**

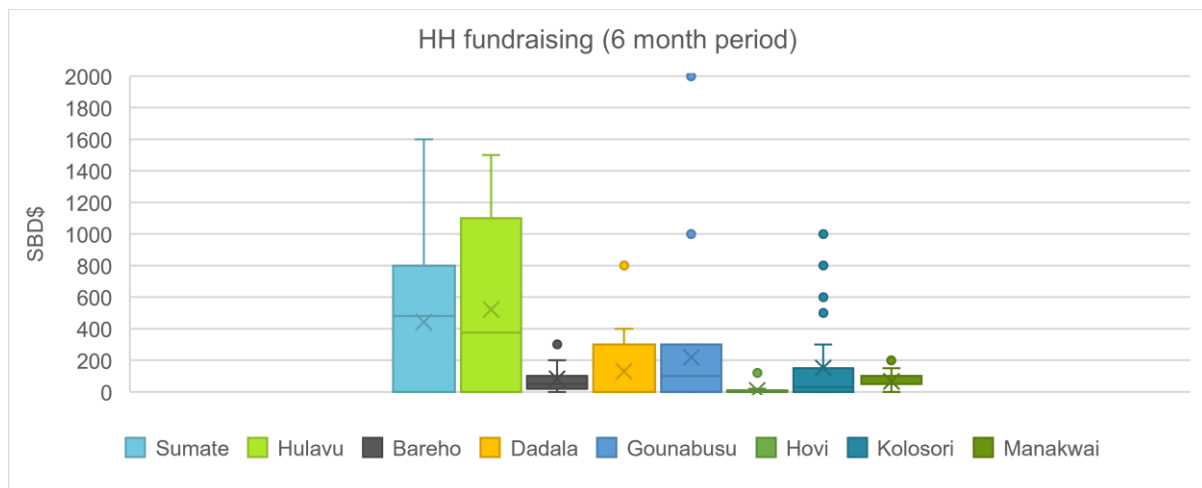


Figure 3.6: HH reported fundraising amounts (S-E HHS, n=220)

3.5. Cooperation 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. Collective action is considered critical to 'good' CWM. For our purposes, collective action can be defined simply as any action taken by a group of people whose goal is to achieve a common objective. Below (Table 3.1) provides a gloss assessment of village cooperation, based on interviews (with a wide cross-section of the village), material examples (e.g. community hall, church, school construction) and the "main Issues" question from the S-E HHS (see further below).

Table 3.1: Summary rating of village cooperation

	Manakwai	Gounabusu	Hovi	Sumate	Hulavu	Bareho	Dadala	Kolosori
Cooperation	●	●	●	●	●	●	●	●

●	VERY LOW
●	LOW
●	MED
●	HIGH
●	VERY HIGH

Gounabusu was rated "high" as there was near total consensus from most respondents that village cooperation was generally high to very high. This view was further supported by anecdotal examples and material evidence of self-led collective action (i.e. community hall, school, church building, clinic). Cooperation was weighted "medium" in Manakwai and Dadala. In the former, whilst there are extant tensions around the church between the (now) dominant SSEC-Estate adherents and some original SSEC members, the church and wider village structures work together to provide a strong locus of governance and self-reliance, evidenced by numerous activities (e.g. village hall, village police). The villages with the greatest amount of *cooperation challenges* were Sumate and Hulavu.

Examples of concerted collective action – outside the domain of the church – were rare, and *none* were identified in the realm of WASH. One of the strongest examples of **collective action** came from Sumate, but was not a village wide action but rather associated with one tribe (and zone) of the village. Concerned about the low level of school engagement in Sumate due to the government school being located a long distance from the village (20-30 minutes' walk away), in 2015 members of the Kidpale tribe (who are also located in one zone of the village) commenced building what is now the Shamael Habu Primary School, raising funds and providing the labour and most of the materials themselves. They not only built the school but also houses for the teachers and, once operational, paid the teachers' salaries for three years until the government recognised and began supporting the school. Whilst a non-WASH context, this is a solid example of how **collective action can be easier to mobilise at smaller levels than the whole village**.

3.6. Priority issues in villages

As part of the S-E HHS, respondents were asked to nominate what they viewed as the three "main issues" in their respective village. This was designed as an assessment of the importance of water, sanitation and/or hygiene relative other issues, as well as an indicator of village issues more generally. There were no prompts and the socio-economic survey did not prioritise WASH-related issues. There were 26 different issues raised by respondents across all the villages, which were subsequently re-coded and aggregated into 14 overarching 'priority issues'. The top 10 issues raised across all eight villages are appended in Figure 3.7 (below).

Overall, many issues were identified and there was considerable variability between the villages. Water and sanitation issues were commonly identified as main issues but were not always the most commonly cited concerns. The villages that prioritised WASH-related issues over and above all other issues were Dadala, Manakwai, Gounabusu, and Kolosori. In Sumate, WASH was the second most cited issue (67%), after damage from pigs. Note that no respondents in Hulavu mentioned WASH-related issues at all.

Non-WASH issues raised included **alcohol and drugs** (especially in Hulavu, Bareho, less so in Gounabusu and Kolosori) and **domestic violence** (in Kolosori, Hovi and Bareho, Sumate). Focusing solely on issues coded as 'community disharmony', 'leadership/politics' and 'land disputes', Hovi, Bareho, Hulavu and Sumate recorded the highest frequency counts. This could be considered a proxy for 'cooperation challenges' and supports the qualitative data (see also Table 3.1 above).

Damage from pigs were frequently cited as a "main issue" in both Sumate and Hulavu. Fencing pigs was common practice in the past (and the owners of non-fenced or tethered pigs attracted fines), but over the last decade or more pigs roaming freely has become the norm and is a classic example of a "collective action problem". As one respondent noted:

“When I try to keep the village clean, my brother’s pig or sister’s pigs just roam freely around the village” (KII-S, PA-M).

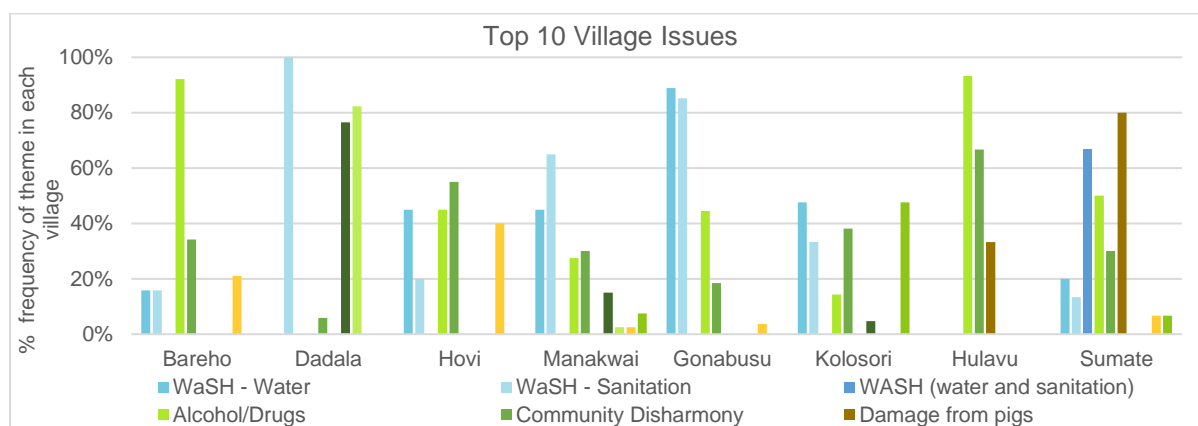


Figure 3.7: Top 10 'Main Issues' (S-E HHS, n=220)¹²

3.7. Gender equality and social inclusion

The status of women and youth in Solomon Islands is complex and varies across the nine provinces, reflecting the cultural diversity and situational differences evident in the nation. In this section, we present the results of qualitative data gathered in the case-study villages concerning women, young people, and vulnerable or marginalised individuals.

Our prime research focus was on WASH and CWM so the gender equality and social inclusion (GESI) data was never intended to offer an in-depth analyses of women's or young people's lived experiences; rather, the point was simply to capture respondents' views about whether or not they felt they had a 'voice' in the village or not.

In each case-study village, a representative of the women's church group was interviewed, as were any female members of the water committee and other female village residents (youth, older women, business operator etc.). Nearly all the women church group representatives interviewed stated that they

¹² Percentages for this figure are based on the frequency of aggregated coded 'themes/issues' in each village, divided by the number of HH survey responses.

believed that they, personally, and women more generally, had a voice in the village. However, this was very culturally prescribed, with many highlighting that at Church members of the women's group have an opportunity to speak and raise any concerns they might have. For example,

"During Sunday service in the church [...] women have the courage to talk" (KII-H, WGR-F).

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

Across the eight villages young people were typically seen as a 'problem' more than a valued member of the community; especially younger males, those with low education attainment levels, and/or young people marginalised due to cultural norms (outside the church, teenage mothers etc.). Very few felt that they had a "voice". A typical view from younger respondents was:

"A lot of time as a youth leader I want to say something to the community but they do not want to listen ..." (KII-H, YR-F).

"...the leaders in the community do not give any opportunity for the young people to voice our ideas and concerns" (KII-M, YR-M)

As the UNDP (2017) *Youth status report* for Solomon Islands recommends, more inclusive youth representation is needed across village, provincial and national levels. Given the high mean age of water committee members and the multiple responsibilities that many have (cf. CWM section), it is possible that WASH actors can help address these deficits by more actively seeking to engage youth in their village activities, simultaneously working to counter the view that youth are a 'problem' and that a lack of formal education is somehow a barrier to productive participation in village affairs.

People with disabilities are amongst the most marginalised in the world. Over the last decade, Solomon Islands Government have strongly endorsed a rights-based approaches to disability inclusive development but are struggling to gain momentum in policy development and implementation (Gartell et al., 2016). Across the eight case-study villages, fourteen individuals were identified as vulnerable and/or marginalised due to: old age, illness, being widowed, or suffering a cognitive and/or physical disability. Five individuals were interviewed (3 M / 2 F).¹³ Four of the five interviewees had trouble accessing WASH services on their own. The two older women both felt that the community did not support them. One stated,

"They never visit me [...]. I could see people visiting old people, they would give them food and soap in other villages, but here nothing like that has happened. I just stay like this" (KII-K, VM-F).

This woman continues to be a member of the Mother's Union (Anglican Church) group in the village, but most of her support comes from a woman who is a member of a minority religious group in the village. This echoes other findings that suggest that few people with disabilities are active members of their community (UNICEF, 2011:48). Notably, two of the younger male interviewees – one with physical impairment, the other with mild cognitive and substantial physical disability – were sons of chiefs; both felt they were 'respected' and one operated a small trade-store. This demonstrates that gender and status, rather than disability on its own, remains a substantial barrier to inclusion.

¹³ Interviews were conducted either with the individual directly or, in two cases, with a family member.

3.8. Mobile telephony

The emergence of new information and communications technologies (ICTs) in the Pacific islands over the last decade – and especially the last few years – has had a substantial impact at both the national and rural village level. Our case-study research specifically set-out to explore village-level mobile phone ownership and use, as well as people's attitudes towards mobile phones and whether or not they used them for educational/informational or primarily social purposes. The rationale was to better understand the potential of using mobiles for community development purposes.¹⁴

In the villages, mobile phone ownership and Facebook (FB) usage varied considerably. Analysing the total number of people with mobile phones (combing 'basic' and 'smart/internet enabled') and cross-tabulating this with the number of FB users, Manakwai (30%), Kolosori (22%) and Gounabusu (20%) had the highest percentage of people using of Facebook (Figure 3.8).

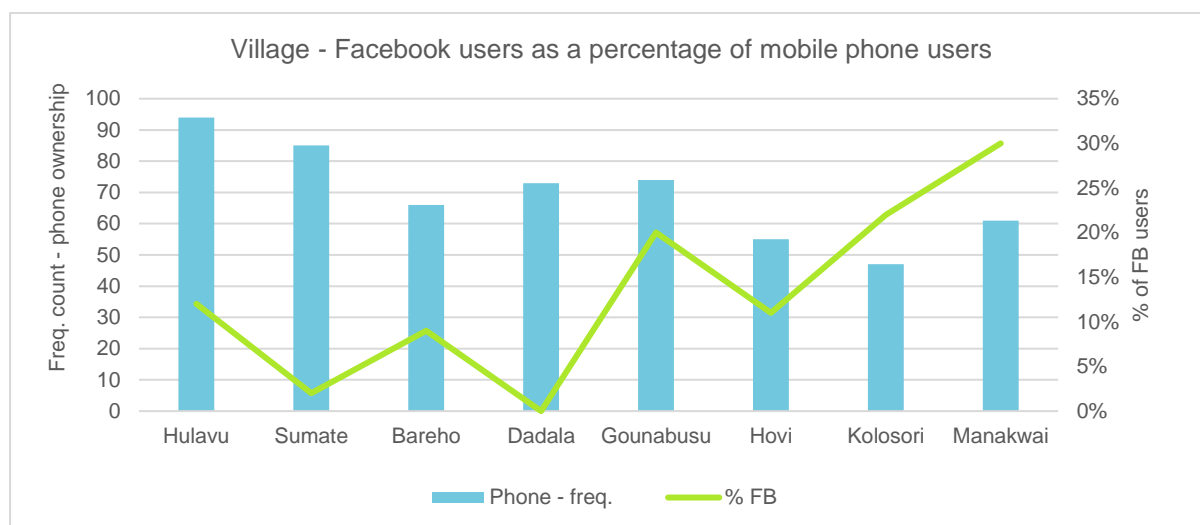


Figure 3.8: Village mobile phone frequency and % of FB users (S-E HHS, n=555 individuals)

All respondents were **positive** about the introduction of mobile phones, even if they highlighted some 'negatives' aspects as well. The most commonly cited positive benefit of mobile phones was being able to communicate with family and friends. Other benefits noted included: assisting with business; arranging the provision of goods from town to the village; organising medicine and transportation of the sick; and, liaising with government departments. **Critical attitudes** relating to mobile phone use – especially FB – primarily revolved around it being used to facilitate sexual encounters that "caused a lot of broken homes" or resulting in "young people marrying at an early age".

The challenge for government and CSOs interested in assisting with specific development objectives (such as WASH) through new technologies such as mobile phones is how to effectively facilitate messaging that gets traction at the rural level. Producing content is one thing; getting people to actively access it and watch it – especially given data cost constraints – is another. Whilst worthy of further exploration, any social media campaign designed to improve WASH or CWM outcomes must be well-thought through, trailed, and monitored and evaluated for effectiveness.

¹⁴ Information Technologies for Development (ICT4D) and/or Mobiles for Development (M4D) is a new and growing area of development practice, including in WASH.

4. PHYSICAL SETTING

To assist in identifying the suite of factors or key determinants informing community water management outcomes, a further focus of the study design was understanding the Physical Setting. Specifically, we were interested in whether environmental factors (e.g. water resource types and availability, land use practices), geography (e.g. location, transport, distance to markets, settlement layout, topography), as well as village infrastructure characteristics (housing, power, mobile reception, health and education services), inform the WASH situation and CWM outcomes. Table 4.1, below, provides a summary of some of the key physical setting attributes associated with each village.

Table 4.1: Physical setting village summary

Village (Province)	Geography (distance to nearest market, town)	Village Size	Power (solar)	Mobile coverage	Clinic	School	Disaster	Land use practices (in catchment area)
Manakwai, Malaita	Malu'u (30 min. walk) Auki (50km/4-5 hr by road)	LARGE 80-100 HHs	80% (32) ¹⁵	Bmobile Telekom	Malu'u Hospital	Manakwai Kindy, Primary & Secondary School	Flooding Landslides Cyclones Earthquakes	Gardening (incl. cash cropping); open defecation; fishing; small hamlet; walking track
Gounabusu, Malaita	Nunubilau (10-15 mins. canoe) Atoifi/Atori (boat)	SMALL 44 HHs	100% (27)	Bmobile Telekom	Gounabusu Clinic	Gounabusu Primary & Secondary School	Flooding Landslides Cyclones Earthquakes	Gardening; Pagan villages; animal husbandry; walking track
Hovi, Isabel	Tatamba (5-10 mins boat) Fera (2 hr boat)	SMALL 25 HHs	100% (20)	Bmobile Telekom	Tatamba Health Centre	Hovi Primary School	Flooding Cyclones Earthquakes	Fishing; hunting; roads; local sawmilling;
Kolosori, Isabel	Bula (10km/1 hr by road)	MEDIUM 52 HHs	86% (18)	No coverage ½ hr walk to reception	Kolosori clinic (next to village)	Guguha Primary & Secondary School	Flooding Cyclones Earthquakes	Few to no human activities
Bareho, Western	Seghe (8 km, 10-15 mins by boat)	MED. - LGE 78 HHs	97% (37)	Telekom (2010)	Seghe Area Health Clinic	Bareho Primary School	Logging (erosion; water turbidity) Agricultural disease Climate change Sea level rise Cyclones Earthquakes	Gardening; open defecation; mining; logging; road; soil erosion; hunting; local sawmilling

¹⁵ Some HHs also have access to SI power ($n=7$ HHs), bringing the HH access to power total to 92.5%.

Village (Province)	Geography (distance to nearest market, town)	Village Size	Power (solar)	Mobile coverage	Clinic	School	Disaster	Land use practices (in catchment area)
Dadala, Central	Tulagi Taroniara (3 km, 5 mins boat/ 30-60 min. canoe) Honiara (2 hr from Tulagi)	SMALL 31 HHs	94% (16)	Bmobile (2004) Telekom (2017)	St Clare's Hospital Taroniara (Rural Health centre)	Dadala Primary School	Cyclones	Gardening; open defecation; walking track; soil erosion
Sumate, Guadalcanal	Lambi (30 min. walk) Honiara (100km, 3-4 hrs truck)	MED.LG E 70-80 HHs	90% (27)	<i>Limited coverage</i> (one section of village)	Lambi Clinic Variana Health Post (logging camp)	Shamael Habu Primary School Lambi Secondary School	Flooding Cyclones Earthquakes Landslides Logging Sea level rise	Gardening (incl. cash cropping); open defecation; logging; road; other villages; walking track; wild pigs & dogs
Hulavu, Guadalcanal	Lambi (40 min. walk) Honiara (90km, 3-4 hrs truck)	MED.LG E 80-86 HHs	96% (26)	Telekom (2017)	Lambi Clinic	Lambi Primary & Secondary School	Flooding Cyclones Earthquakes Landslides	Gardening (incl. cash cropping); open defecation; fishing; local sawmilling

4.1. Environment

All the case-study villages except Bareho (Western Province) were located on high volcanic islands, and all except Kolosori (Isabel) were situated on the coast. All villages received the national average rainfall of between 3-6 metres a year, and water resources were fairly numerous and abundant in all locales except Bareho (cf. WASH Situation). Localised flooding and landslides during the wet season (November-April), or associated with extreme weather events such as cyclones, was the most common disaster issue raised by respondents. Other environmental issues included impacts from logging (e.g. erosion, water turbidity), climate change (sea level rise, storm surges and coastal inundation) and agricultural diseases.

The proximate natural environment surrounding a village informs residents livelihood options, e.g. availability and suitability of land for market gardening and cash cropping, access to the ocean for fishing and gleaning. Examining only **natural resource-related income streams**, Figure 4.1 (below) provides a comparative snapshot of the main commoditised natural resources available to residents of the case-study villages.

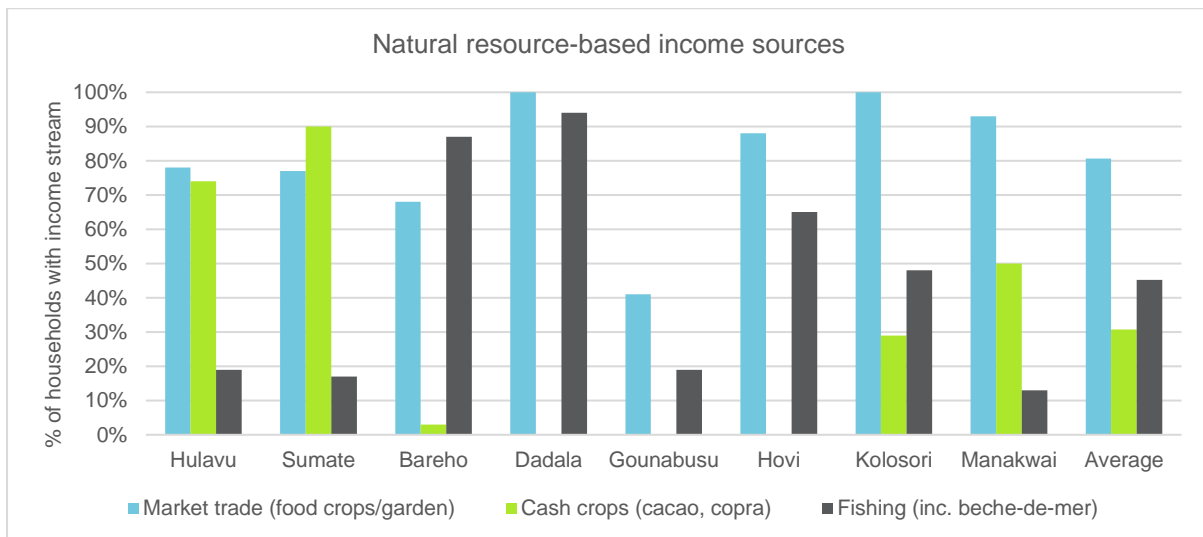


Figure 4.1: Natural resources income streams of case-study villages (S-E HHS, n=220)

Overall, gardening for market trade – e.g. vegetables for sale at local markets – was the most common income stream. Significant cash cropping was practiced in just four of the eight villages. Cash cropping generally referred to coconut and cacao, however, a number of HHs in many locales also grew and sold betel nut (the one HH in Bareho who listed cash-cropping was referring to betel nut). As previously noted, cash cropping is in general decline throughout Solomon Islands and much of the Pacific islands more generally, as the price of copra (the product made from coconut) is extremely volatile and low, and many coconut strands are nearing or have exceeded their productive capacity (75 years of age). Moreover, the quality of cacao in the Pacific is low (due to the drying techniques used), hence the price also tend to be low. However, people in locales such as Manakwai and Kolosori have little other income choices. In Sumate and Hulavu, especially, coconut oil has become a key commodity that provides a relatively easy and steady income opportunity. Fishing – which also included beche-de-mer [phylum *Echinodermata*] (especially in Bareho) and one case of diving for trochus [phylum *Mollusca*] in Sumate – was the prime source of income for residents of Dadala, Bareho and Hovi. Interestingly, a few HHS in Kolosori (our only inland case-study village) also earned an income from fishing and beche-de-mer. Lastly, it is noteworthy that 2 HHs in Sumate listed earning monies from land rents associated with logging (this is likely an under-reported figure, not only in Sumate but also in Bareho and Kolosori were logging is, or has, been a significant activity).

The income opportunities provided by the natural environment in which a village is located can and does inform CWM outcomes through: informing social cohesion and cooperation (especially in relation to logging in Bareho and Hovi, cf. Social Context). Whilst not clearly captured in our data, livelihood types can inform people's ability to galvanise in terms of collective action. Traditional cash-cropping, for example, is very labour intensive but also requires extended family cooperation. Fishing and the production of coconut oil, by contrast, are less time intensive and also more of an individual and/or nuclear family activity.

4.2. Geography

The village case-studies included a range of sites with different transport and accessibility attributes. Gounabusu, Hovi, Bareho and Dadala were totally dependent on water transport to access key services, such as attending weekly markets or, in the case of Bareho, accessing health services (at Seghe) (Table 4.1). In terms of travelling to Provincial town centres, residents in Gounabusu, Hovi, Bareho, Dadala and Manakwai faced either the longest travel distances or most arduous and expensive transportation costs.

An important but often undernoted aspect of physical setting concerns how the proximal environment, topography, and micro socio-spatial factors coalesce to inform village context and possibilities. The location of many contemporary villages in Solomon Islands (and elsewhere in the Pacific islands, e.g. Vanuatu) are a consequence of local and extra-local (e.g. missionary) contingencies, and issues such as population growth and village planning were rarely considered when people first established these villages. Some villages – such as Manakwai – were settled on previously un-inhabitable land; in this case swamp lands drained through the laborious construction of a series of hand dug drains after people moved closer to the coast in the 1950s/1960s (KII-M, LH-M). Many villages – such as Hulavu, Sumate and Gounabusu – are located on small terrestrial fringes wedged between the ocean and mountainous hinterland, meaning that the only option for settlement expansion is to spread-out further along the coast. In other locales, such as Manakwai, population increase (and internal social dynamics) have led to people moving further up-hill, away from the original settlement centre. In other cases, local topography simply dictates that some households are situated on higher ground than others (e.g. Kolosori, Dadala). As seen in the WASH Situation, these physical factors have implications for water system operation (e.g. water pressure) and intersect with and inform social dynamics (see Social Context and Water Management sections).

A further social geography factor of note includes neighbours: Who resides in, near and/or has rights over a water catchment area has consequences for all the people who ultimately use the water resource. Logging operations are the most obvious example of a land use practice that can have a detrimental effect on water uses down-stream (e.g. Bareho, Sumate). But other factors, such as villages and gardens, also impact water resource health. However, not all 'neighbour' issues are necessarily agonistic. Gounabusu, for example, was established in the 1950s-1960s by newly Christianised Kwaio who had abandoned their traditional ancestral religion and moved to mission settlements on the coast. Many 'pagans' remain in the hinterland to this day and retain primary rights over the freshwater sources that the coastal villages use as the main village water source. Among other things, the Kwaio belief system is shaped by strong norms or taboo (*abu*) hinged on notions of purity/impurity, which strongly informs their views and practices on sanitation, water, birthing, menstrual hygiene, and more (see Akin 1993; Keesing, 1967, 1982). This has implications for how those on the coast can and cannot use this water. These beliefs have led to challenges and tensions between the pagans and coastal Christian villages (cf. Water Management section). Given the number of pagan villages in the catchment area, concomitant with the high levels of gardens and animal husbandry practices relative other villages (see Table 4.1), one could expect that water quality tests from Gounabusu would have a high *E.coli* count; however, it had the lowest. This may very well be related to the strong cultural norms associated with *abu* and which include norms around protecting water resources.

The key point here is that geography and the environment cannot be neatly disconnected from the social - they are deeply intertwined.

4.3. Infrastructure

Village infrastructure was mapped through observation, background case-study reviews and the S-E HHS. In sum, there was not a large degree of disparity between the sites: most HHs had solar power (and many generators), most had mobile connectivity (except Kolosori, where the tower had recently been damaged, and Sumate which only had connectivity in one small area of the village); all but Bareho had a clinic in the village, or another medical facility in very close proximity; all had a primary school (except Hulavu) and four had a Secondary School (Table 4.1). Some of these buildings – e.g. the school in Sumate, the school, hall and clinic in Gounabusu – were locally led developments. There was a range of housing construction types (permanent and semi- permanent/local material) with Bareho and Hulavu having the least amount of permanent dwellings, and Dadala, Gounabusu, Kolosori and Hovi having the most.

5. ENABLING ACTORS AND POLITICAL ECONOMY

To help support our two key research objectives, a component of the research was designed to identify and explore some of the key external 'plus' factors that currently, or could potentially, shape community water management at the rural level. To this end, we examined the enabling environmental and the ways that external actors currently operate in regard to WASH programs. This section presents the results of this aspect of the study, specifically:

- An analysis of attitudinal data gleaned from interviews with village-level 'project actors' concerning past projects – both WASH and non-WASH related
- A political economy analysis of WASH projects, which draws on the findings of a Master's research project (Rodgers, 2019) undertaken as part of PaCWaM+ project
- A summary of external village relations; specifically, people's views on whether external village members ('town cousins') could or could not potentially be a useful medium for: i) promoting and disseminating WASH and WM messaging; and ii) sourcing and/or distributing spare parts back to the 'home village'.

5.1. Rural WASH government policy

Solomon Islands Government (SIG) recognises WASH as central to the overall development of the country. The Rural Water Supply, Sanitation and Hygiene (RWASH) Policy (2014) outlines its core vision: *'All Solomon Islanders with easy access to sufficient quantity and quality of water, appropriate sanitation, and living in a safe and hygienic environment'* (SIG, 2014). The policy establishes community-managed water systems and application of an integrated approach promoting conservation and protection of water resources, and collaboration and coordination of sectors, as key to achieving this vision.

The management of water resources is the shared responsibility of three government ministries - Ministry of Mines and Energy (MME), Ministry of Provincial Government and Constituency Development (MPGCD), and the Ministry of Health and Medical Services (MHMS) (SIG, 2014). The Solomon Islands Water Authority (SIWA) is responsible for urban water and sanitation provision. Presently, at the national level, WASH sector governance is managed by the MHMS Rural Water Sanitation and Hygiene (RWASH) Department throughout most of the country, and by SIWA in the metropolitan areas of Honiara, Auki, Noro and Tulagi (SIWA, 2013).

The Solomon Islands RWASH Strategic Plan (2015-2020) operationalises the RWASH Policy by setting out a goal of achieving universal WASH coverage by 2024, supported by Strategic WASH Targets (SIG, 2015). Implementation of the RWASH Policy and Strategic Plan is the responsibility of RWASH program team within the MHMS Environmental Health Division (EHD) (SIG, 2015). The work of this program is complemented by the World Bank-financed Rural Development Program (RDP), who finance construction of rural water infrastructure. Both programs have requirements relating to community governance of water systems, and have developed guidance and training materials.

At the village-level, the governance of water supply is largely determined by each village, with some influence by funders, government and CSOs. As a consequence, a diversity of community-level water governance structures exist, such as the house of chiefs, churches and community water management committees. Regarding water projects, a cost-sharing component has been introduced making communities "fully responsible" for operation and maintenance (e.g. replacing washers and taps and repairing broken pipes) and dictates that women be more involved and represented "equally with men in WASH committees and as caretakers", and also encourages persons with a disability to participate. The focus of allocating most if not all available resources to implementation delimits the ability for regular – or even ad hoc and opportune – follow-up visits to villages by RWASH or other actors.

Similarly, the edict to boost gender equity in water governance and caretaker responsibility has proved challenging, although some progress is in clear evidence.

5.2. Projects as the means for external actor engagement

Based on our qualitative data, across the eight villages 53% of all externally-instigated projects in the villages were **WASH related**, and 47% **non-WASH related** (Figure 5.1). Sanitation projects made up 28% of total WASH projects ($n=10$). As described below in the WASH PEA section, the strong WASH focus may reflect the political economy of WASH projects, wherein external actors consider WASH projects as a valuable contribution to community development as well as a means of strengthening political gains. Also echoing results from the PEA, the villages closest to town, e.g. Hulavu ($n=12$), had the greatest number of total interventions.

According to village-level 'project actors', although projects were seen to deliver important infrastructural improvements, a number of internal (village) and external challenges were identified (e.g. delivery / implementation / construction / operation) that impinged on project success. The key issues / challenges raised by respondents were:

- Lack of funding for facilitators and equipment
- Lack of internal drive and cooperation in the village
- In some cases, materials provided were sold and the money given to the church
- Lack of follow-up from the external facilitators
- Inadequate or inappropriate engagement processes (include videos not just hand-outs)
- Lack of capacity / training to install / maintain materials
- Unused or uninstalled materials (e.g. toilet pans)
- Complaints around the unequal distribution of toilet materials to HHs in a village
- Allegations of the misappropriation of funds by a project 'middleman'
- Inappropriate siting of materials (e.g. toilets installed in high water table areas)
- Cultural barriers in implementation or adoption of materials (e.g. water supply not allowed for sanitation purposes; communal toilets not welcomed or used due to gender norms).

Overall, the most commonly cited issue was a lack of proper training and follow-up. It is further noteworthy that four of the total thirty-two non-WASH projects were sourced through relatives (in town).

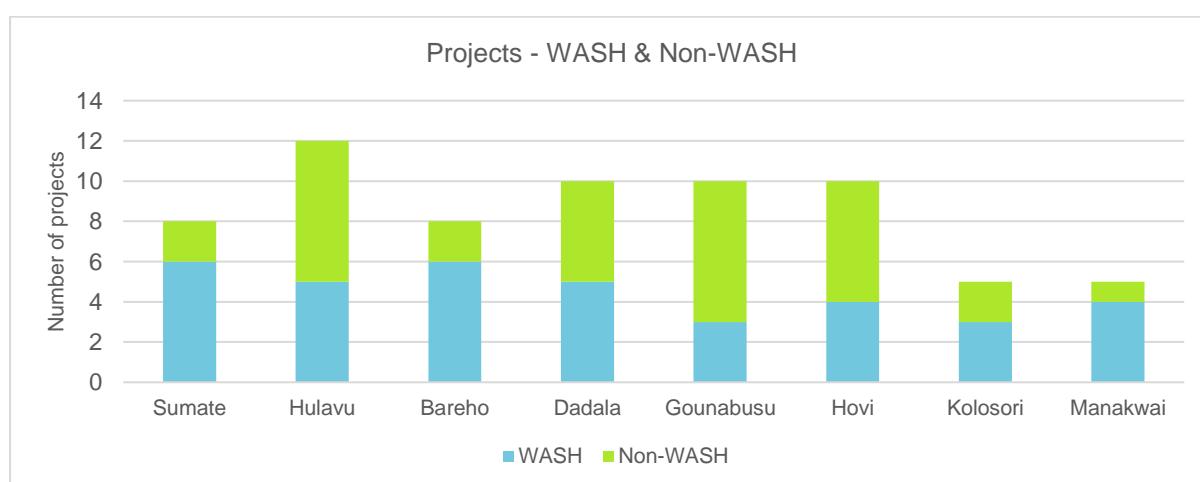


Figure 5.1: WASH and non-WASH related projects ($n=68$)

5.3. WASH political economy analysis

Political economy analysis (PEA) aims to situate development interventions within an understanding of the prevailing political and economic processes in society, specifically, the incentives, relationships, distribution, and contestation of power between different groups and individuals. The approach taken to the political economy analysis in our research was drawn from USAID's PEA framework (Figure 1.4, replicated below, Rocha Menocal *et al.*, 2018). This framework uses four pillars to investigate the structures impacting aid implementation:

- **Foundational (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
- **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 they affect, reinforce or work against each other (Rocha Menocal *et al.*, 2018).

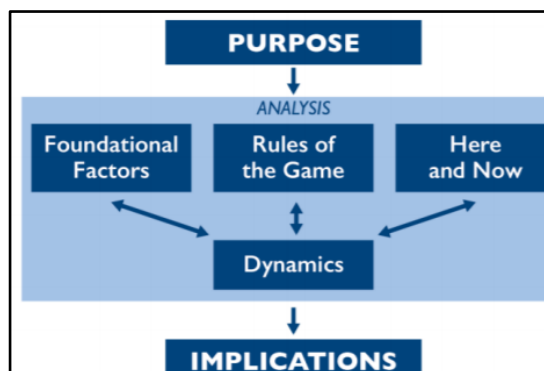


Figure 1.4: USAID's PEA framework.

Source: Rocha Menocal *et al.*, 2018.

The PEA analysis highlighted that the WASH sector is heavily influenced by long-standing structural or **foundational factors** that affect the ability of WASH actors to implement and maintain water and sanitation systems:

- There is a **very small pool of technically proficient WASH staff** with backgrounds in engineering, monitoring and evaluation and community engagement
- WASH actors must also work within the **existing cultural attitudes towards aid projects**, water use practices and rights to water and land. The issue of aid dependency evident in the research has had a particularly strong effect, with RWASH supporting direct implementation models fitting with community expectations, rather than demand-driven approaches¹⁶
- RWASH indicated that complaints about **no-subsidy models** are more common with the implementers than with communities, whilst provincial EHD stated that the handout mentality was limited to villages near urban centres
- **Implementation is constrained** by the higher costs associated with implementing projects in isolated locales, with numerous interviewees stating that more isolated villages are being deprioritised in the provision of infrastructure.

In terms of **Rules of the Game**, the key findings were:

- There are **clear policy and technical standards** and these documents have been well written¹⁷
- However, at the Provincial level, there is a **poor understanding of the WASH Strategy and National Sustainable Sanitation Plan** (at least in both the Guadalcanal and Western Province Provincial offices).¹⁸ Nevertheless, RWASH's planned introduction of technical staff to

¹⁶ This has also been identified in previous reviews (Craig & Porter, 2013b:8).

¹⁷ This is consistent with the positive feedback on the standards provided by (Bautista 2018, WaterAid 2016 and Manning 2014).

¹⁸ This is consistent with Bautista's (2019) findings.

provincial offices to develop 5-year WASH plans could remedy this and will need to be examined as it progresses

- An interesting finding was the community's **negative attitude towards community management of projects** in contrast to the **positive attitude towards CWM from the NGOs**. Reviews of RDP's work praised the community-driven development (CDD) approach in heterogeneous communities.¹⁹ However, in the two peri-rural villages where this research was undertaken, respondents don't feel that their voice is heard, and perceived that **CWM was unproductively dominated by big men on the water committee or by chiefs**
- A common attitudinal trend was that Constituency Development Funds (CDF) are only used to the benefit of the MPs and was not **constructively aligned** with what is best for the village as a whole.

A current event, the **here and now**, most influencing the WASH sector was:

- The uncertainty around EU funding, which could lead to distrust of the Technical Advisers overseeing the RWASH governance and technical programs.²⁰

The **dynamics** within the WASH sector were punctuated by:

- A **lack of coordination** between actors, leading to poor knowledge of RWASH policy outside of implementing actors, and a lack of consistent policy application by several actors (e.g. the Clean Water for Life hand pump construction)
- The **lack of capacity** highlighted in the foundational / structural factors, the larger and varied number of implementing and governing actors in the sector, combined with uncertainty around funding (due to the reliance on the EU grant), has led to a **highly transient staff and changes in institutional knowledge**. This was noted by an NGO representative, stating that it had lost all its WASH capacity within just 4-years.

Based on this analysis, the **implications** for how government, donors and NGOs seek to improve rural CWM include:

- Focusing on improving factors that can be influenced in a short-medium timeframe, whilst being aware of, and navigating around structural factors that require longer-term changes, is important
- Project-based delivery of support for CWM is entrenched with benefits to communities and political systems, and will continue, but acknowledge this constrains the types of engagement with communities
- Consider ways to engage with communities beyond the project model - there is some evidence that sanitation programming is moving beyond the project cycle approach in terms of cluster coordinators and facilitators and structured follow-up. Given the aid / project dependency in evidence and the non-sustainability of CWM outcomes, this may be a good model to explore in terms of CWM and deserves further attention
- Acknowledging the constraints of a governance sector that is delimited by the number of technically-skilled human resources
- Policies in the sector do not seem to need adjustment in terms of governance, but more education on the policies is required so that community members and implementing agencies know what is expected. This could be accomplished through social advocacy models or through the expansion of the institutional triggering programming being conducted through the WfW program
- The primary problem with resource allocation seems to be the continued prioritisation of funding to CDF. The research did not shed further light on how to either encourage the government to

¹⁹ See: Neelim and Vecci (2013) and World Bank Group (2017).

²⁰ Note that the research was undertaken before the COVID-19 pandemic.

move funding from the CDF, but expanding transparency and accountability levels in CDF should be explored further

- The research did not produce strong conclusions as to why inter-organisational communication is perceived as poor, which should be studied further
- The mixed views on effectiveness of community-managed systems (at the village level) needs to be acknowledged: Whilst the sample size is very small, there was a grass-roots view that CWM was not working in its current form (due to a lack of transparency in the selection of water committee leaders and their decision making processes, and a history of poor project outcomes). Current RWASH community engagement processes tackle this, but further explicit emphasis and triggering around this specific issue is worthy of further consideration.

5.4. Village-town relations

As part of our overarching research objective to better understand what 'plus' factors inform CWM in the Pacific context, we explored village-town linkages, both current and potential. There were a number of other kinds and types of generative village-town linkages identified during our research. Below is a **summary** of the most relevant examples (excluding the discussion in the social context section above):

- In most villages, family members residing elsewhere (mainly in Honiara, but also other Provincial urban centres) often contributed to some village-wide fundraising or provide other ad hoc assistance. However, this was generally *not* in the WASH arena (e.g. tended to be church related, raising funds for the community hall, the school in Sumate, providing books to the school etc.). The exception in regard to WASH was Hovi, where people now resident in town but with a house in Hovi, are still required to pay the water fee. In contrast, in Manakwai, one respondent noted that people in town won't assist with the water fee or water committee because they think that "in the village water is free" (KII-M, WC-M)
- Gounabusu had a structured (but not registered) Gounabusu committee in town (based in Milestone, east Honiara) who regularly assist in fundraising and via other means. For example, during fieldwork they sent rations for the contractors who were building the village community hall. They were referred to by one respondent as the "Second Gounabusu community" (KII-G, WCR-F)
- Some people resident outside the village are still considered to have active governance roles / power in regard to the village. For example, in Manakwai, a key village emigrant of influence employed by the SIG in Auki has been instrumental in formalising the Manakwai 'Baboa House of Chiefs' and drafting and registering the village constitution.

In each village, a selection of respondents were ask: *In your view, is there a way that government (& MPs) or NGOs could work with village people residing elsewhere to better share information or direct resources to help the community?* Below (Table 5.1) is a summary of responses by village.

Table 5.1: Perception of town cousins as middlemen – material support (parts, not money)

	Positive	Mixed	Negative
Manakwai	•	••	•••••
Gounabusu	••••	•••	••
Hovi	••	••••	•••
Sumate	•••	•	•••
Hulavu	••••	•••	•
Bareho		••••	•••
Dadala		••	•••••••
Kolosori	••	••••	••

Overall, the majority of respondents were generally critical (negative to mixed) of using 'town cousins' as 'middlemen' for spare parts, and definitely not for direct monetary support; there was a high degree of mistrust in evidence.²¹ Despite its inclusion in the question, reference to "sharing information" (e.g. distributing messaging on WASH or CWM topics such as 'how to clean a rain water tank, the importance of regularly cleaning the dam etc.) was not always asked correctly and when it was, most people tended to focus solely on spare parts and funding and ultimately only one person (from Hulavu) mentioned sharing information, and they were positive.

This questions and hypothetical were primarily included to explore ways that both spare parts and information could be distributed. Mobility between town and island is a regular occurrence – especially at Christmas – and given that capacity constraint are an issue, exploring alternative means of distributing parts and information through existing networks was considered a worthy avenue for exploration. Clearly, the 'town cousin' network is not an avenue considered productive by the majority of respondents in regards to spare parts. However, it may still be a medium worth considering in terms of further cementing and distributing key messages. During stakeholder workshops and discussions with the SINU team, Provincial days were suggested as a potential medium through which centralised agencies (such as CSOs) and even Government departments such as RWASH and Provincial EHD might be able to disseminate key information, such as the importance of rainwater and HH container cleaning and tap maintenance. More research and perhaps trials are required to see if this approach would be effective or not.



Sumate, Guadalcanal (Photo credit: M Love)

²¹ Interestingly, in Fiji, respondents were overwhelmingly positive.

6. COMMUNITY WATER MANAGEMENT

Central to the research objective is better understanding the current water supply system activities, challenges and enablers associated with achieving sustainable and 'good' community-based water management in the rural Solomon Islands context. Whilst we have noted there is no single example of what constitutes successful or good CWM, this section describes a range of water management processes and activities that allow for a fulsome characterisation of the critical factors that tie together all the elements of 'good' CWM.

6.1. Water management institutions

Water management can be broadly defined as people being organised and undertaking water management activities. We deliberately did not assume that a water committee was an essential component of water management. Rather, the data collection tools enquired about who and how a water system was managed, allowing for open responses. Five of the eight villages – all but Gounabusu, Hulavu and Sumate – had a formal and recognised water committee at the time of the fieldwork. Hulavu had an informal, ad hoc group (many located in an area of the village closest to the reservoir and dam); post-fieldwork it has since been expanded and formalised.

As advised by RWASH, all formal water committees are organised into "executive" and "membership / technical / caretaker" branches or groupings, with executive positions being chairman, treasurer and secretary. In our case-studies there are some minor exceptions / innovations to this structure. Based on detailed water committee membership attributes, combined with the qualitative data, our analysis highlights four key points:

- i) **Water Committee member representativeness:** Not including gender and age, representativeness is generally reasonable (inclusive in geographic and socio-cultural representation)
- ii) There is evidence of **leadership/membership 'burden'**: Dual responsibilities of water committee members, with many holding other roles in the community, was very common
- iii) **Water committee dynamism and sustainability issues:** Water committees tend to come and go, shrink and expand, over time (little evidence of sustainability)
- iv) **Water committee membership age disparity:** There is generally a disproportionate absence of youth in water committee leadership and general member roles.²²

Youth are valued as "muscle" through providing physical assistance, but they are not valued as potentially constructive contributors to CWM more widely (e.g. management strategy formulation, administrative responsibilities, problem solving). Representing such a large proportion of the population, combined with the multiple obligations evidenced by water committee members²³ and the sustainability issues surrounding water committees, underscores the merit in exploring how both Government and CSOs might better engage young people in water management into the future.

²² The mean age of WC members across all sites was 45 years old. Not including Dadala – which has an outlier of young committee members relative the other case-study sites – the mean age is 47.4 years, with a median age of 50.

²³ It is noteworthy that in Fiji, official advice from the Water Authority of Fiji regarding water committee establishment includes the edict that members do not have other key roles and responsibilities in the village (other than the village chief, who must be a member).

6.2. Village water management, gender and social inclusion

The water committee membership attributes assessed in our case-studies show that 31% (18 out of a total of 59 individuals) were female, and eight of these women held executive positions (38% of all women members). There is evidence that the RDP 'mandate' to have at least one woman in the water committee has resulted in some attitudinal changes amongst male water committee members and leaders. As one WC chairman, who remarked that this is "*no kastom blo mifela*" [not our custom], stated:

"RDP advised the community that women must also be included in the water committee, although in our culture women were not allowed to have a say in any decision making [...]. We [now] realise that it's easier in terms of teaching other women to look after the water supply and tap stands. When we need teaching and giving awareness to other women in the community, we send the female members to carry-out the task. This makes work easier for us men, not having to deal with teaching the opposite gender" (KII-M, WCR-M)

In this respect, the quota rule has had some positive impact. However, there is some evidence that the quota does not necessarily allow for the nuance needed to navigate the full suite of complexities around gender; e.g. it is not just about having females on the water committee but also from which tribes / clans they come from, what their kin relationships are to key water committee members and, ultimately, a question of whether they have the agency to raise concerns and advance women's WASH issues through membership in the committee. Wider evidence from gender and WASH research in the Solomon Islands certainly demonstrates that women's participation in water committees can have unintended consequences (UNICEF, 2018). Regardless, while senior men dominate decision-making processes at the village-wide level, women's generative role in supporting village well-being through church-based groups is widely acknowledge (e.g. Mother's Union, Dorcas, etc.). Moreover, women can and do have some influence on community decision-making processes through 'indirect' or 'passive' means, via their husbands, brothers, and sons (but this is difficult to assess and is under-explored in the literature).

Of related importance is the question of **zone / group level**. There is a paucity of information on the role and influence of women in decision-making at these sub-village levels. However, observation and some cognate qualitative data suggests that as neighbouring households are more likely to consist of extended family members (especially pronounced in Hulavu and Sumate where zones are made-up of a single tribe), women may be **more likely to have greater agency at this level** than at the village-wide, community level.

Given the relatively high median age of WC members (45-50yo), the multiple responsibilities held by many WC members, and the fact that many WCs seem to come and go, shrink and expand (and this is sometimes related to WC member ill-health and morbidity), there is merit in considering not just increasing women's involvement in WC membership but also the role of youth: Young people are the leaders of tomorrow and more effort is required to include young people in CWM.

Overall, in terms of equity of access to water, most village respondents felt that everyone had equal access to water. That said, there were numerous examples of unequal access to water relating to *poor function* (e.g. living in elevated parts of village where there was poor water pressure), or *reduced access* where there was unequal distribution of standpipes where

"...people who have authority in the village have their own standpipe but many others do not" (KII-K, RL-M).

6.3. Water system maintenance activities and risk management

All sites 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. Youth (younger males) were often central to these tasks across all villages. Only a few case-studies showed evidence of households or the water committee actively fixing taps on their own. Some villages showed evidence of *proactive* maintenance activities, including regular dam cleaning and weeding around tap stands – but this was not observed to be the norm. Maintenance activities, reactive or proactive, were not always performed by water committee members but rather one or two (usually but not always) males that had informally slipped into this role through location (e.g. living in close proximity to infrastructure), status (e.g. leader, son of leader) or incumbency from a previous water committee role.

In regard to **rainwater tanks**, few household or communal tanks were reportedly cleaned regularly, and a number did not have a mosquito screen. This maintenance deficit was evidenced in the WQ results, with only three of the six tanks tested being "safe" or "low" in terms of *E. coli*.

In terms of collective water management actions, and not including financing, other collective water management actions – at community, zone / area or household levels – were mixed across the sites. Beyond the water committee alone, high or very high levels of wider collective action was not in wide evidence. Nonetheless, there was evidence of considerable collective action beyond the domain WM (e.g. the school in Sumate, community halls in Manakwai and Gounabusu, church programs in many villages).

Most water committees displayed limited awareness of **risk mitigation measures**. Typical risk management measures, when in evidence, were rules regarding activities / animals above the drinking water source (e.g. dam) (Dadala), managing drainage and rubbish before and after rainfall (Gounabusu), and minimising / prohibiting animals near village water sources (e.g. tap stands) (Manakwai, Dadala). Half the villages had some formal rules or policies around water management – i.e. the *RWASH Trainers Guide* or *Caretaker Manual*.

6.4. Water committee community engagement and collective action

In the villages with a water committee, there was generally little ongoing **cooperation with other committees**, other than during the initial construction phase when women and youth groups typically assisted with water supply system construction: Women groups (and/or nominated households) cooked and supplied food to workers, whilst Youth groups provided the labour. In terms of ongoing cooperation between a water committee or group of water managers and other village-based committees, there were few concrete, evidenced-based examples of inter-committee cooperation. In Hovi, the Health committee was reportedly working with the water committee through promoting hygiene and cleaning-up the surrounding environment (e.g. ensuring there was good drainage and waste disposal practice), but in Bareho, Gounabusu, Manakwai and Kolosori there was little or no structured coordination between these committees and the water committee.

In terms of **general awareness raising**, all villages reported some degree of messaging around water issues and management by either the water committee or village leaders (Figure 6.1). Again, this data needs to be triangulated with other data to provide a fuller picture of the WM situation. For instance, in Gounabusu, HH respondents unanimously reported that there were "awareness activities" undertaken by the water committee or other village leaders; however, there was no water committee and the uniformity of answers suggests some respondent bias. Common examples of the main messaging cited by HHs across all sites included: "Not wasting water and leaving taps running", "looking after tap stands", and "not letting children play with taps".

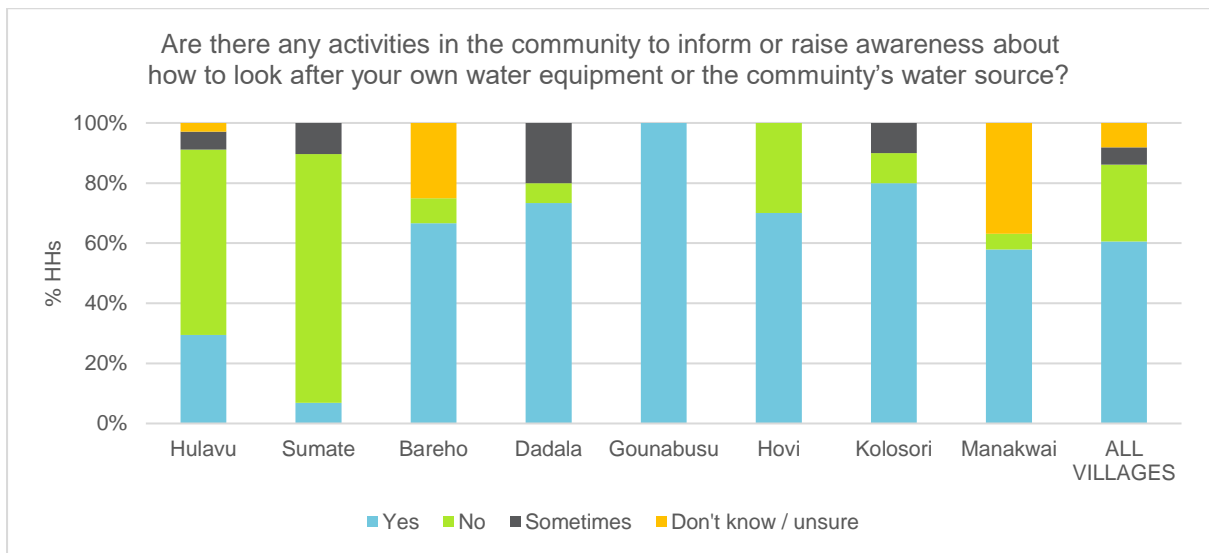


Figure 6.1: Water management awareness activities – HH (n= 216)

6.4.1. Collective WM action

Managing a water system is typically taken as "common pool resource" (CPR) issue that poses a "collective action problem", which describes a situation in which multiple individuals would all benefit from a certain action, but has an associated cost that often makes it implausible that any individual can or will undertake and solve it alone. Water systems and communal tap stands are an example of a "commons problem". Indeed, numerous respondents, in multiple sites, stated that if every single household had their own tap stand, they would be more motivated to maintain and use it 'properly'.²⁴

Not including financing (see below), other collective water management actions – at community, zone / area or household levels – were mixed (Table 6.1). Hovi had "very low" collective action (but the WS is newly installed). Kolosori was weighted as "low", and the remaining sites were all "medium". Young people were involved in clearing-out the dam and assisting in many villages, and in all sites the community worked together during construction (providing labour, assisting with cooking and feeding workers etc.). Overall, however, beyond the water committee alone, high or very high levels of wider collective action was not in wide evidence. Nonetheless, as already noted, there was evidence of considerable collective action beyond the domain of CWM (e.g. the school in Sumate, community halls in Manakwai and Gounabusu, church programs in many villages).

The paucity of WC engagement and limited collective WM actions raises questions of whose responsibility people feel it is to solve water issues in the village.

Table 6.1: Summary rating of collective WM action

	Manakwai	Gounabusu	Hovi	Sumate	Hulavu	Bareho	Dadala	Kolosori
Collective WM action	●	●	●	●	●	●	●	●

●	VERY LOW
●	LOW
●	MED
●	HIGH
●	VERY HIGH

²⁴ Some RWASH staff have noted that this ideal has not translated to practise in their experience (*pers. comm*, Stakeholder workshop, Sept. 2019)

6.4.2. Responsibilities

When asked whose responsibility it is to fix WASH issues, "Community Leaders", "Government and/or MPs", and the "Whole Community" were the most commonly cited responses, followed by "Church" and "Water Committee" (Figure 6.2). There is a preference for community-led solutions (leaders and the community as a whole), but external agents – government and MPs – were also seen as important actors. The fact that Sumate ($n=3$) and Manakwai ($n=2$) only mentioned community leaders sparingly, only two HHs in Hovi and Bareho mentioned the 'whole community', three in Sumate and none in Manakwai or Kolosori, likely reflects local micro-issues (logging in Hovi, Sumate and Bareho, social segregation / hierarchy in Kolosori and church / intra-community tensions in Manakwai). This, perhaps, feeds into the desire for external support (Gov./MP) evident in Sumate and Manakwai. Health committee was only mentioned once (in Hovi) and the WC was only cited in Bareho ($n=4$) and Kolosori ($n=1$); although 'unspecified village committees' were mentioned 5 times in Kolosori. One HH in Manakwai mentioned "parents", but no further details were given other than the issue being "water supply". Respondents in Bareho and Hovi – the two SDA villages – were the only villages that saw a role for the church in 'fixing' water issues.

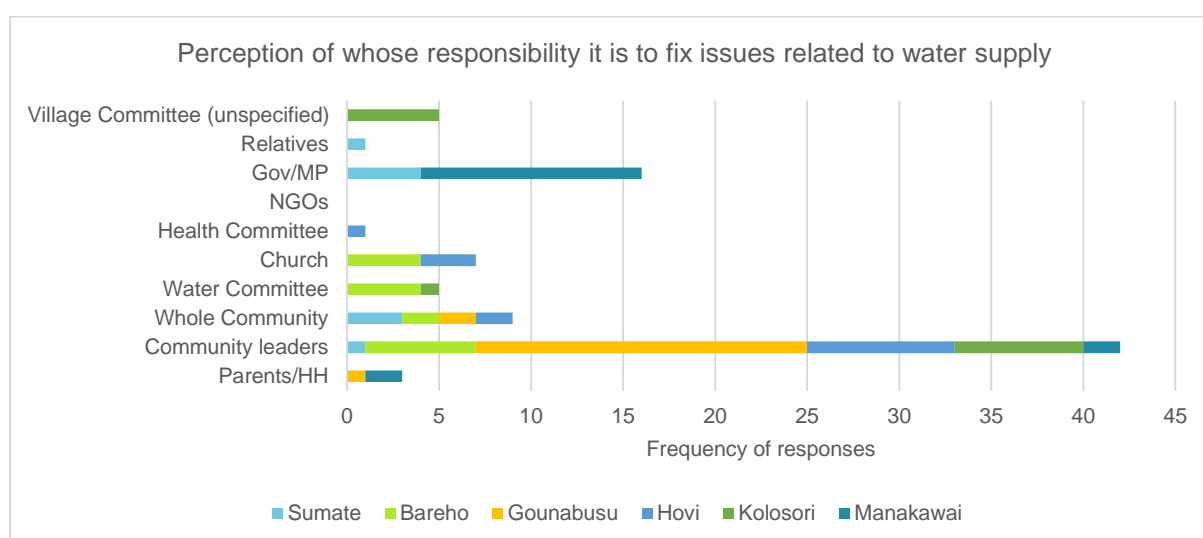


Figure 6.2: Perception of whose responsibility it is to fix issues related to water supply ($n=89$)

6.5. Water system financing

Formal fees, HH financial contributions and village fundraising were the 3 main ways of generating funds for the water system (Figure 6.3). Two villages, Hovi and Manakwai, stipulated that households must contribute towards a monthly fee. Half of the case study sites reported that there was a monthly water fee; either per individual household (e.g. Hovi – SBD\$20.00, Kolosori SBD\$5.00) or by communal tap stand and shared amongst proximal households (Manakwai, SBD\$10.00). Many of the villages reported having a water fee in the past but stated that it had failed within a year (e.g. Sumate, Dadala, Gounabusu, Hulavu and Dadala). In Gounabusu, there were historical issues with fiscal transparency and reported impropriety in the management of water fee funds. Only 39% of households surveyed said there was some sort of financial contributions towards supporting water system maintenance, with 13% stating "sometimes". The lack of water fee sustainability, and limited community contributions to support water system maintenance generally, is a critical issue and reinforces the need for community consultation, good financial literacy, regular reporting and active system maintenance.

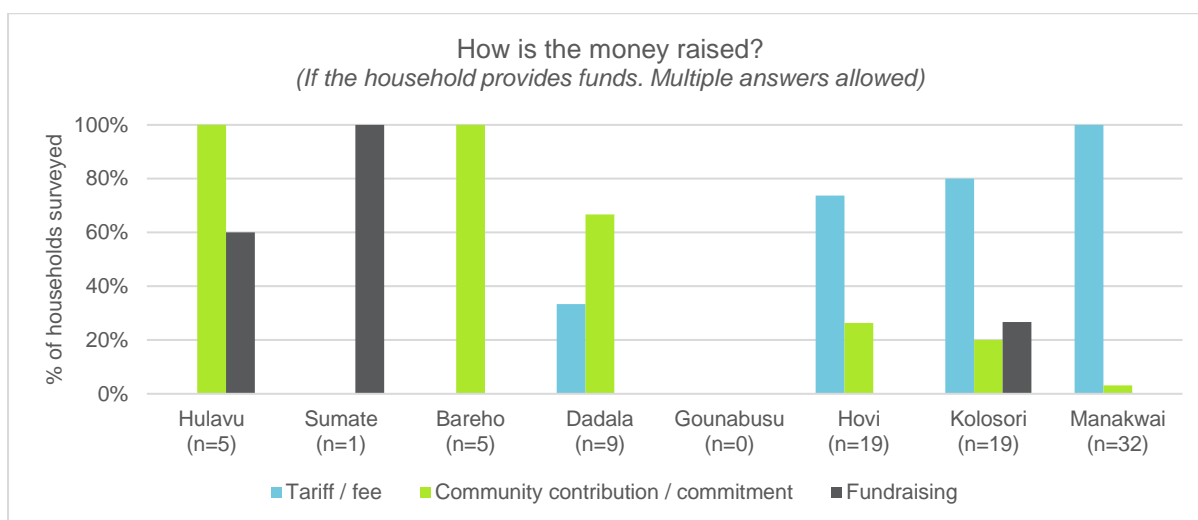


Figure 6.3: Community water system fundraising methods (n=90)²⁵

6.6. Perceived water management challenges

Most interview respondents were asked what they thought were the **main challenges** associated with water management in their respective villages. Table 6.2, below, is a summary of the key challenges elicited from this direct question, with a frequency indicator of how many times a given issue was raised by different respondents.

Table 6.2: Water management challenges (frequency summary as elicited from respondents) (n=54)

	Manakwai	Gounabusu	Hovi	Sumate	Hulavu	Bareho	Dadala	Kolosori
Lack of village &/or HH cooperation	••	•	•	•	•••		••	••
No awareness by WM to village			•		•			
Lack of WM organisation - activeness	•				••	•	•	••
Private connections				•	•••••	•		
Water pressure - inconsistent flow				•	•	•		••
Money	•	••••	••••	••	••••	•	•	
Animals (pigs)				•••	•••••			
Damage by people (deliberate)					•••••			

²⁵ Note: Hulavu and Sumate reported how money was raised only if participants had answered “yes” to raising money. In the remaining villages, answers for how money was raised was only collected if respondents had answered “yes” or “sometimes”. n= total number surveyed per village.

Blocked pipes			•					•••
Spare parts/resources		•	•			•••		
More demand/pop. increase			•	••		•		
Nature (floods breaking system)	•		•		•			

A lack of village and/or household **cooperation** was cited as a challenge for water management in every case except Bareho, and most frequently in Hulavu and Sumate. These related to social cohesion and collective action problems (e.g. maintaining taps, dams; paying fees; protecting infrastructure from animals).

Drawing on the whole data-set – not simply people's attitudes – the following are some of the critical challenges to CWM identified during the Phase 1 research.

- Committee or other responsible people not doing enough **active maintenance** (e.g. leaky pipes, blocked pipes and dam, not cleaning dam enough)
- **Lack of attendance** within the water committee (e.g. lack of cooperation; burden; absence)
- **Lack of knowledge and skills** to deal with all WS maintenance, including some specific technical problems (e.g. calcium deposits causing disruptions - Kolosori)
- Not enough **assistance from external actors** (lack of follow-up / support after installation)
- **Collecting water fee** (inconsistency in frequency of collecting fee; too high; non-payment)
- **Cultural norms** influencing water use and disruptions (esp. Gounabusu)
- **Water demand for sanitation** aspirations for water-based sanitation (esp. Hovi, Manakwai, Gounabusu, Dadala)
- **Lack of cooperation and support for community actions:** social cohesion / collective action challenges (e.g. maintaining taps, dams; paying fees; protecting infrastructure from animals; illegal connections)
- **Sharing taps stands** delimits / challenges HH responsibility (“tragedy of the commons?”).

6.7. Water management satisfaction

Community satisfaction with current water management was ascertained through the WASH HHS and qualitative interviews. Overall, 53% of respondents in the WASH HHS reported that they believed that their water supply was "managed very well" (Figure 6.4). However, responses in the WASH HHS did not always reflect the answers to other HH survey questions nor the qualitative data. Although more research is warranted, there is some evidence to suggest that **past experience** informs perceptions, expectations, satisfaction and motivations. For example, Sumate and Hulavu have experienced better water system situations in the past (greater access, more functional water points, less disruptions and leaks etc.) and both had low *water source satisfaction* and *management satisfaction* (see further section 7.2.1 below).

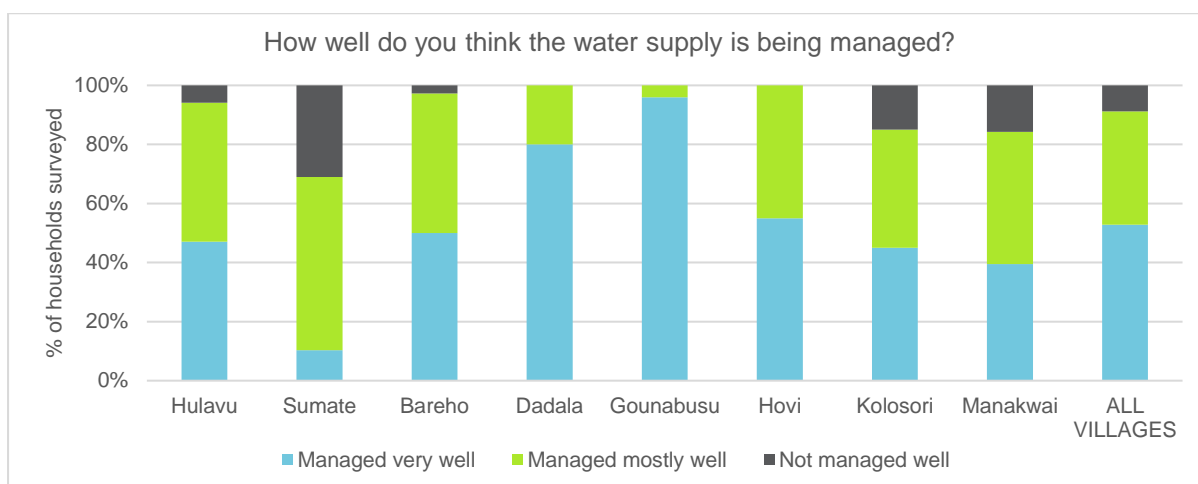


Figure 6.4: Water management satisfaction (n=216 HHs)

6.8. Summary of Community Water Management findings

The objective of this research was to learn lessons from villages where community water management was considered to be ‘good’; that is, supporting good WASH outcomes including resilient, sustainable and inclusive water supplies (as defined in the WASH section) and also considered by community members to be ‘good’. However, it is clear that although there were some strengths in particular aspects of community water management, all eight study villages were struggling with some aspects of community water management.

This is not a surprise given the global evidence that communities left to manage water systems on their own will typically struggle to sustainably deliver inclusive, reliable, available, safe water systems.

The key findings summarised here relate to observed governance and management arrangements, conditions, challenges and strengths.

6.8.1. Water management institutions

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

- 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 have been identified as factors in poor water committee longevity.

6.8.2. Gender equality and social inclusion

- Despite the women's group representative generally presenting an affirmative expression of their role and agency within the village (see Section 4.10), in terms of WM a few explicitly noted that they had never been directly consulted about WM issues
- Women may be more likely to have greater agency at zone / group level than at the village-wide, community 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. 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 village 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).

6.8.3. *Water management operation and maintenance activities*

- Some villages 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
- 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 by some water committees)
- Levels of maintenance activities varied across the villages. All case-studies 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
- Small groups of people (not always recognised members of a water committee), and particularly youth (younger males), were often central to maintenance tasks across all the sites
- Some water committees engaged in *proactive* maintenance, such as regular dam cleaning and keeping communal tap stands free of weeds and rubbish
- Only a few villages 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 villages
- Where “good” risk management was observed, it was associated with cultural / religious beliefs and social norms (e.g. ‘purity’ and taboos).

6.8.4. *Water management community engagement and collective action*

- Beyond the water committee alone, high or very high levels of wider collective action was not in wide evidence and there clearly needs to be greater mobilisation of village 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 villages (particularly Health committees and possibly Church [esp. in the SDA communities]).

6.8.5. *Water management issues and community satisfaction*

- The main water management issues identified through the WASH HHS related to lack of village or household co-operation and a lack of WM organisation
- Insufficient funds to maintain or upgrade water systems was a major challenge
- Despite the range of WM challenges identified, people were somewhat satisfied with 53% of all the respondents in the WASH HHS reporting that they believed that their water supply was “managed very well”
- Water management challenges strongly related to co-operation and organisation. Combined with the somewhat underwhelming ‘satisfaction’ ratings from respondents suggests that improvements in community engagement, whole of village co-operation and collective action, and general improvements in communication, are at least as important, if not more important, than the technical challenges underpinning successful CWM.

7. WHAT IS 'GOOD' COMMUNITY WATER MANAGEMENT?

This phase of the research sought to identify features of 'good' community water management and characterise the influential factors of CWM (village social context, external / enabling environment, physical settings), to identify and offer guidance about what types of support and engagement by external enabling actors, such as governments and civil society, might best contribute to improved village CWM and support resilient, sustainable and inclusive WASH outcomes.

As noted in the WASH and Community Water Management chapters, there was a range of experiences within the eight study villages, with some villages achieving better outcomes than others and displaying differing strengths and weaknesses. Given these villages do not currently benefit from ongoing support for community water management, their varying experiences has provided an opportunity to identify persistent challenges – features of community water management that villages have struggled to manage on their own, even those villages considered to be amongst the 'stronger' performing villages. These persistent challenges offer guidance as to which features of community water management communities might need support with – the PLUS requirements of "Community Water Management PLUS" – bearing in mind that not all may be features that external actors are able to directly influence.

Furthermore, the inclusion of data describing social and economic context and physical settings has allowed the research to explore whether, and how, these settings are aligned with Community Water Management. Some of these contextual factors may be structural – difficult to change within the short-term nature of community development projects – and therefore they must be navigated during community development initiatives. Identifying the status of these structural factors early in the community engagement process would productively inform the nature of further engagement.

7.1. Features of 'good' water management

Water management can be broadly defined as people being organised and undertaking water management activities. We deliberately did not assume that a water committee was an essential component of water management. Based on existing literature and the strengths observed and problems encountered from our research, we have identified a suite of key features that constitutes 'good' water management in the rural Solomon Islands context. 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** (across different socio-spatial levels); and iii) **External actors role** (in each village relating to WM).

Actions by a group:

- **Maintenance** (proactive, timely, innovative)
- Managing / encouraging **WQ Risk management** (mitigate hazards e.g. promote sanitation, maintenance, treatment / promoting HH treatment of poor water)
- **Planning and managing supply** (multiple sources, storage capacity, plan for future demand and changes)
- Managing **demand** (supply strategies with multiple water sources, awareness activities, community messaging about why, when and how to conserve water)
- Efforts to achieve **inclusion** – physical accessibility, participation of gender, youth, vulnerable, all parts of village
- Use of **policies and rules** (formal, informal)
- **Managing finances** transparently and competently
- **Monitoring** to guide improvements and report to community
- **Consulting with and reporting** to community for transparency and accountability
- **Linkages, coordination and leverage** between community committees / groups

- Ways, means and capacity to **access external support**
- Motivate and coordinate **collective action**.

Actions by all water users:

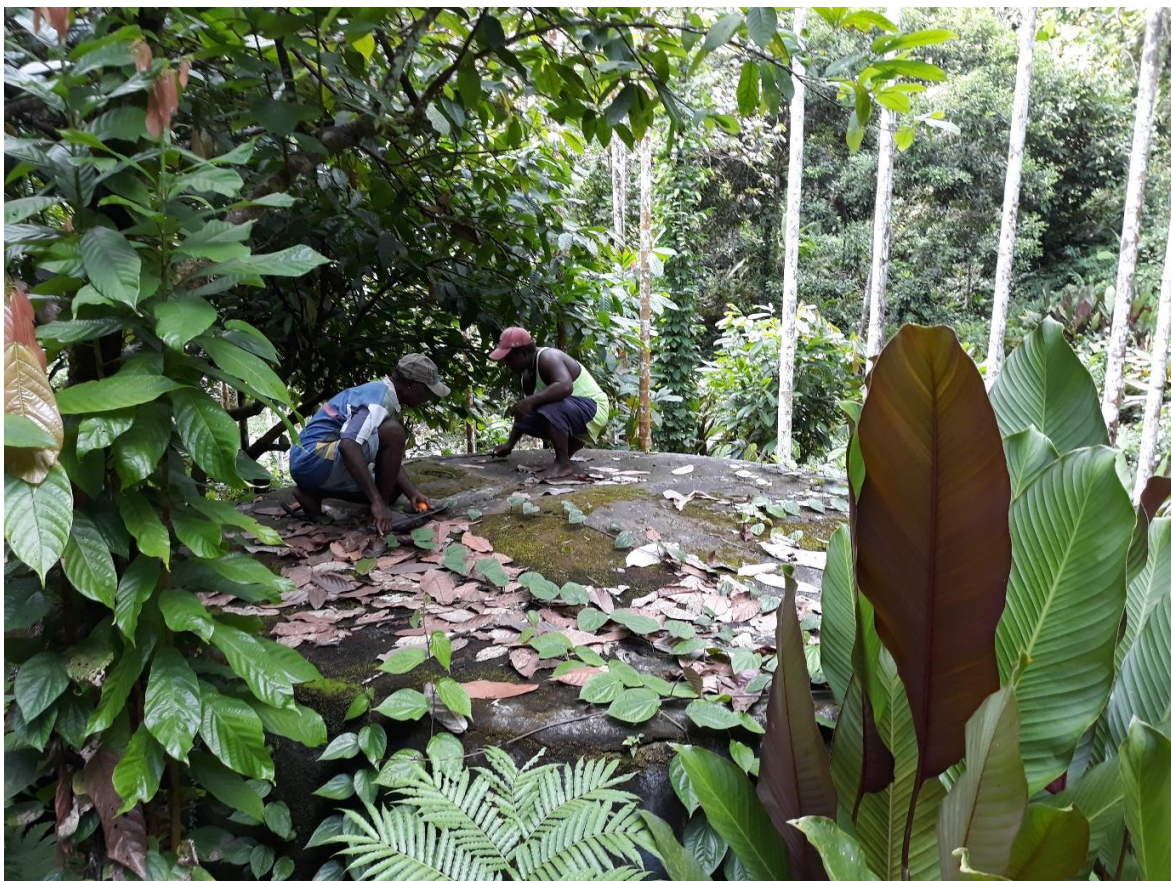
Collective action (from individuals, HHs / families, groups / zones, village-wide – all water users)

- Financial contribution
- Other direct action: maintenance (reporting, doing); operations: conserving water use and using multiple sources

External actors' roles (in each village relating to water management):

- Technical advice (suited to current and future context): planning, designing, construction, managing
- Finance – capital
- Spare parts
- Maintenance support
- Monitoring

These are the key features that most influenced CWM outcomes in our case-studies and, based on our findings, constitute and support 'good' water management in Solomon Islands. Using the same rating scale introduced in the WASH Situation section, Table 7.1 is a summary snap-shot of 13 key WM indicators associated with two of the three core areas identified above: i) **Actions by group**; and ii) **Actions by all uses**.



Water committee members at village reservoir, Hulavu, Guadalcanal (Photo credit: D Gonzalez-Botero)

Table 7.1: Overview assessment of the key features of CWM in the eight case study villages

	Manakwai	Gounabusu	Hovi	Sumate	Hulavu	Bareho	Dadala	Kolosori
Water committee / nominated people (identified responsible group)	●	●	●	●	●	●	●	●
Maintenance activity	●	●	●	●	●	●	●	●
DW risk assessments	●	●	●	●	●	●	●	●
Risk management	●	●	●	●	●	●	●	●
Water supply management (multiple sources being used, planning & mgmt. of supply)	●	●	●	●	●	●	●	●
Water demand management actions (managing usage, promoting conservation)	●	●	●	●	●	●	●	●
Inclusion (processes, actions)	●	●	●	●	●	●	●	●
Policy, rules or norms	●	●	●	●	●	●	●	●
Monitoring (encourage feedback)	●	●	●	●	●	●	●	●
Consulting & reporting to community	●	●	●	●	●	●	●	●
Linkages with other committees or groups	●	●	●	●	●	●	●	●
Collective action: financial	●	●	●	●	●	●	●	●
Collective WM action - other	●	●	●	●	●	●	●	●
OVERALL	BEST	MIDDLE	2ND BEST	WEAK-EST	WEAK	WEAK	WEAK	MIDDLE

●	VERY LOW
●	LOW
●	MED
●	HIGH
●	VERY HIGH

As evidenced by the colour rating, Manakwai, Hovi and Kolosori were the 'best' examples amongst the eight villages in terms of thirteen of the key WM features highlighted above.

It is important to qualify the above ratings with the following points:

- Eight sites is a small sample: A larger sample may add further features, or alternatively dismiss some
- Some features were not as deeply explored during fieldwork due to time constraints, ethical reasons, methodological challenges, or because they have emerged as features / needs during analysis after data collection, e.g. frequency of WC meetings (in many cases the data could not be triangulated); financial accountability (ethically problematic to directly scrutinise and thus was only included if it came-up)
- In terms of the **inclusiveness** of the water manager group, the inclusion of youth and women does not necessarily translate to agency and active participation
- As with qualifications regarding the water quality tests, these CWM features were identified though case-study assessments at *one point in time*. As elucidated above, CWM actions tend to wax and wane; an active WC today may be weak in a year or two, a water fee recently instigated (e.g. Hovi) may be dropped in a month or so.

Importantly, there are different strengths and weaknesses in different villages, as each village often has different situations (socio-economic context, physical setting) and thus will do things differently. Concomitantly, different villages will also require different kinds of external support. Hence, not all features of good CWM are 'equal' in every case. Some examples of how the *physical setting* and *social context* intersect with and informs both the WASH situation and CWM status, are summarised below:

- **Physical Setting:**
 - Villages with varied topography will often struggle to achieve inclusive access with a gravity fed system, often resulting in some households having poor function (Manakwai, Kolosori)
 - Land use practices such as logging can impact the water system (Bareho, Sumate), affect infrastructure and water quality, and are out of villagers control
 - The water source may be located on land where non-village residents have primary rights (Gounabusu)
 - The environment in which a village is located informs livelihood activities, which in turn inform social dynamics (economic status, availability).
- **Social context:**
 - Smaller villagers tend to have stronger bonding social capital, but their smallness means raising monies for spare parts through community contributions via fundraising or fees is more of a struggle (Gounabusu, Hovi)
 - Villages close to urban centres (and with ready public transport) tend to have weaker collective action (Hulavu, Sumate)
 - Villages with extant community tensions (especially relating to logging, land and chiefly disputes) are difficult to mobilise for collective action (Sumate, Bareho)
 - Smaller villages may be less likely to need a formal, codified WM Policy, as amity and contiguity may support effective regulation on its own (view from Gounabusu)
 - Wealth is not an driver of good CWM - Manakwai was amongst the economically 'poorest' of the eight case-study villages but had good, long-term (8 years) CWM.

7.2. Links between WASH and CWM features

Examining the key CWM features presented above and scrutinising this alongside the wider CWM assessment (e.g. including structured observations of water point and water system functionality) and the WASH situation, is instructive (Table 7.2). Whilst the sample size is too small to confidently extrapolate too widely, some connections and potential correlations of note that are worthy of further investigation include:

When there was a strong **nominated water group** (e.g. 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 systems as a whole
- Greater water infrastructure functionality.

As noted in the WASH chapter, there are also some *inconsistent* correlations of note; namely, between people's **perceptions of water safety** and household **water treatment practices**. Another disconnect concerns **water management satisfaction**; the villages with comparatively 'better' water management (Manakwai, Kolosori and Hovi) all recorded *lower management* satisfaction levels than Dadala and Gounabusu. This is examined below in section 7.2.1.

Table 7.2: Overview assessment of WASH situation and assessment of community water management in the eight case study villages.

		Hulavu	Sumate	Bareho	Dadala	Gounabusu	Hovi	Kolosori	Manakwai
WASH SITUATION	SDG6.1 - Drinking water service level	●	●	●	●	●	●	●	●
	SDG6.2 – Sanitation service level	●	●	●	●	●	●	●	●
	SDG6.2 – Hygiene service level	●	●	●	●	●	●	●	●
	Water quality (drinking)	●	●	●	●	●	●	●	●
	Drinking water risk assessments	●	●	●	●	●	●	●	●
	Perceived water quality (%HH perceived water as “very safe”)	●	●	●	●	●	●	●	●
	HH water treatment (%HH that treat water at least sometimes)	●	●	●	●	●	●	●	●
	Drinking water availability and reliability	●	●	●	●	●	●	●	●
	Accessibility	●	●	●	●	●	●	●	●
	Water point functionality	●	●	●	●	●	●	●	●
	Satisfaction with water situation (%HH reported being “happy” with water source)	●	●	●	●	●	●	●	●
	COMMUNITY WATER MANAGEMENT ASSESSMENT	Water committee / nominated people	●	●	●	●	●	●	●
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		●	●	●	●	●	●	●	●
Reporting to community (finances)		●		●	●				●
Monitoring		●	●	●	●	●	●	●	●
Consulting, reporting to community		●	●	●	●	●	●	●	●
Linkages to other committees/ groups		●	●	●	●	●	●	●	●
Capacity to access external support									
Collective action: financial		●	●	●	●	●	●	●	●
Collective WM action - other	●	●	●	●	●	●	●	●	

●	VERY LOW
●	LOW
●	MED
●	HIGH
●	VERY HIGH

7.2.1. WM satisfaction, perceived water quality safety and past experience: Are there correlations?

There is some **general correspondence** between *management satisfaction* and *perception of water safety* across the eight sites (Table 7.2, above). Those with high perceptions of water safety ("mostly" or "very safe") had higher levels of management satisfaction ("mostly" or "very well managed") (Table 7.3, below). There is also general correspondence between *water source satisfaction* and *management satisfaction* in seven of the sites – Hulavu, Sumate Bareho, Dadala, Manakwai, Gounabusu and Kolosori – but not with Hovi, where 85% (wet season) and 95% (dry season) were "not happy". This symmetry is intriguing given the high access, perceived safety of the water, and relatively high management satisfaction levels.

A key point of interest here is the fact that the villages with comparatively 'better' water management outcomes in practice (Manakwai, Kolosori and Hovi) all recorded lower *management satisfaction* levels than Dadala and Gounabusu. Moreover, Kolosori and Manakwai also recorded lower management satisfaction levels (in terms of "very well" and "not well") than Hulavu. How might this be explained? One factor may be historical experience.



Kolosori, Isabel
(shortened tap to increase water pressure)



Sumate, Guadalcanal
(standard black rubber repair)



Manakwai, WC repair and improvement over Manakwai river (after pipe was destroyed by flood)
(Photo credits: [Kolosori] C Benjamin; [Sumate & Manakwai] M Love)

Table 7.3: Water system history, experience and satisfaction

VILLAGE	Past access to 'better' water system (less disruptions, more access points, better pressure, less leakages)	Water system history	Water source satisfaction	Management satisfaction
Hulavu	Yes	1979, 1994 (GP-RWSS)	35-38% happy (seasonal)	'managed well' (47%) 'mostly well' (47%)
Sumate	Yes	1977 (BSIP), 2009 (GP-RWSS)	14-21% happy (seasonal) [28-35% not happy (seasonal)]	'very well' (10%) 'mostly well' (59%)
Bareho	No	1988 (SIG-WP), 1999 (ADRA), 2012-16 (EU RAMP) RWT	53-61% happy (seasonal) 39% neutral	'very well' (50%) 'mostly well' (47%)
Dadala	No	1970s (BSIP), 2010 (RWASH)	100% satisfied	'very well' (80%) 'mostly well' (20%)
Gounabusu	No	World Vision 1982 (breakdown), ADRA (NGO) 1990 (various disruption with pagans)	96-100% happy (seasonal)	'very well' (96%)
Hovi	No	1978 (BSIP), 1990s, 2011 (LLEE), - exp. low pressure. 2015 (LLEE-school only), 2018 (RWASH)	0% happy; [85-90% not happy (seasonal)]	'very well' (55%) 'mostly well' (45%)
Kolosori	No	1977 (BSIP), 1996 (dispute - go back to old system), 2011-13 (RWASH)	55-80% satisfied (seasonal)	'very well' (45%) 'mostly well' (40%)
Manakwai	No	Experienced failure & breakdown: World Vision system - vandalism, breakdown - people moved up river, experienced sickness - applied for RDP WS 2012	76-79% happy (seasonal)	'very well' (40%) 'mostly well' (45%)

	VERY LOW
	LOW
	MED
	HIGH
	VERY HIGH

closer to the river for ease of collecting water, and then got sick and submitted the RDP application for a new source. Gounabusu also had a World Vision system which failed. Similarly, both Kolosori and Dadala have had worse water system situations in the past relative to today. All four villages recorded greater levels of water source and management satisfaction, even though in Gounabusu and Dadala CWM was

relatively poor in actuality.

Conversely, Sumate and Hulavu have experienced better water system situations in the past (greater access, more functional water points, less disruptions and leaks etc.) and both had low *water source satisfaction* and low *management satisfaction*. WM satisfaction aside (they did, in actuality, have poor WM), the source is the same as it has always been. Bareho and Hovi are outliers and inconclusive in our (small) sample. More research is warranted, but if this trend was replicated across a larger sample size it may suggest that **past experience** informs perceptions, expectations and motivations. Research from natural resource management certainly suggests that community and individual experiences of degraded or depleted resources shapes the effectiveness of resource management proscriptions (see Albert et al., 2013). If further CWM research supported the trends highlighted here, this information could potentially be a useful adjunct to any community profile tool used by CSOs and government in the pre-installation phase and, in the case of villages who have experienced 'worse' situations, be inserted and highlighted during community engagement processes as a CWM mobilisation tool.

Table 7.3 (left) displays the eight case-study villages, comparing "water source satisfaction", "management satisfaction" (from the WASH HHS) and two other potentially determinate factors – "past access to a 'better' water system" and "water system history". Given the small sample size further research is needed to verify if this trend is representative, but it *may* suggest that a communities past experience with better and/or worse water systems shapes people's expectations and motivations. For example, Manakwai and Gounabusu have both experienced worse water system situations in the past. Manakwai experienced the failure of the World Vision system, which was ultimately vandalised by disgruntled residents and most villagers moved further up-stream to be

7.3. Considering structural factors in achieving CWM PLUS

In section 7.1 we identified key features we believe constitute 'good' water management, based on the strengths observed and problems encountered in our case study sites. All these “good” water management features are important to achieve sustained, safe and functional water and WASH outcomes. Therefore, the *what* of good CWM has been identified; however, the *how* of CWM is critical to whether the PLUS is successfully implemented. For example, it is clear that mobilisation and motivation of a group of people (be it a formal water committee or an informal collection of individuals) is an important feature of good CWM, but how this is actually achieved must be informed by the contextual factors specific to each village.

Some of these are structural – unlikely or difficult to change within the timeframe of water or WASH project. These structural factors strongly influence CWM outcomes and thus need to be incorporated into the village diagnostic tool or pre-awareness activity *prior* to implementation of a water or WASH project.

Some key structural issues to be aware of include:

- Village history:
 - Experience of water projects, including failures and disruptions, may influence expectations and satisfaction, and likely the ability to mobilise for water actions
 - Extant community tensions (especially relating to logging, land and chiefly disputes) are difficult to mobilise for collective action
- Demographic factors: Population and size of the village; number of tribes; socio-spatial dynamics (zones / groups); religious denomination(s); mobility and livelihood particulars, influence the levels of strongest social cohesion (i.e. opportunities for mobilising collective action may work better at smaller levels, rather than focusing solely on the whole-village)
- Wealth was not a driver of good CWM (Manakwai was amongst the economically 'poorest' of the eight case-study villages but had good, long-term [8 years] CWM)
- Governance: Leadership specifics, dynamics, tensions; committee numbers, activeness, ability (and willingness) to potentially link with WM group
- Potential WM group members: Age, inclusiveness, other roles and responsibilities; willingness to link with other committees; ensure against redundancy (through mentoring and including young people)
- Physical Setting:
 - Topography affected inclusive access to gravity fed systems
 - Sources can be located on land where non-village residents have primary rights
 - Environment influences livelihood activities, which in turn influences social dynamics
 - Villages close to urban centres (and with ready public transport) tended to have weaker collective action
- Political Economy of WASH projects: all support for communities is delivered through the modality of projects, with a start and end to the engagement on the issue of water and WASH. Although projects can and have delivered many benefits to communities, they are not without disadvantages, such as the project dependency and disempowerment that has arisen from the style of previous projects, the constraints of budget / time-limited engagement, and the tendency for pre-determined project activities and outputs.

Government and CSO engagement in the sector needs to focus on improving factors that can be influenced in a short-medium timeframe, whilst navigating around structural factors that require longer-term changes. To do this, the status of structural factors in a given locale need to first be assessed through a diagnostic – such as a rapid village assessment. Cognisant that there is a small pool of technically proficient WASH staff with backgrounds in engineering, monitoring and evaluation, and community engagement, any diagnostic must be easy to train, learn, and implement.

8. CONCLUSIONS

Building on the persistent challenges in achieving the features of 'good' CWM discussed above, there are a number of recommendations that can be made based on the insights generated from the Phase 1 analysis.

Beyond existing actions and activities, enabling actors such as CSOs and provincial and national governments can further strengthen CWM outcomes by either influencing (through direct support) or by improving their awareness of community context prior to engagement (diagnostics and pre-awareness activities). Irrespective of the mode of support, it needs to be pragmatic and place-based; where the balance is struck between fostering dependency (undesirable) and encouraging self-help (desirable).

The support that is given by enabling actors needs to be locally appropriate and contextualised within the village dynamics and specific needs and capabilities of communities. The following are recommendations of actions and approaches that can be implemented for improving CWM outcomes based on the Phase 1 research:

Mobilising collective (pro)action in a community to improve water (and WASH) management outcomes. Maintaining on-going collective actions beyond when there is an emergency or urgent need. This may include *regular*:

- *Water financing* through community contributions and fundraising
- *Work activities* (men, women children/youths) to maintain a well-functioning water system (dam, tanks, pipes, tap stand, water tanks)
- *Water conservation actions* and water saving awareness activities.

Village specific diagnostics to better inform the CSO about pre-existing factors that influence community attitudes about water management. This may include:

- *Identifying and working with existing levels of social cohesion* where a village's multiple social structures (e.g. zones, tribes, geography) is leveraged as a strength rather than a potential limitation. This is an example of 'working with the grain' of existing and functioning social networks that are already active in collective action terms
- *Consideration of past experience with external support* and the level of project dependency that a village might have (as this can potentially limit motivation for collective action)
- *Understanding past experience with water systems* where positive or negative experiences can affect expectations and motivation for collective action.

Maintaining strong management group / committee using education and motivation to form and maintain strong water / WASH management group / committee. This may include:

- *Mobilising the water committee* to reach out and tap into existing strengths within the village, e.g. help them to identify and make links that may not have been clearly mapped out before
- *Working with existing social capitals and community skills* to reduce redundancy and multiple responsibility fatigue within the water committee
- *Strengthening water committee linkages and communication* with other committees or groups in villages (e.g. village nurse, women's and youth groups).

Strengthening technical capacity in the village to foster proactive and appropriate maintenance rather than reactive and "band-aid" maintenance. This may include:

- *Technical backstopping* to provide technical information about solving unfamiliar or recurring technical problems

- *Demand management* (water conservation; fit-for-use approach to multiple sources);
- *Identifying and managing risks* to water quality to promote 'proactive' maintenance and hazard management (e.g. water quality hazard identification) (e.g. water container contamination)
- *Technical education* brochures to provide technical information indirectly via town cousins, or directly to village residents on key water management activities.

The recommendations described above are based on village characteristics, patterns of CWM approaches and insights identified in the formative research component and are derived from (primarily) only eight villages, thus they may not all be relevant, suitable, or achievable for implementation in all Solomon Islands village contexts. Notwithstanding this, the recurring theme that emerged during the Phase 1 research was the need for more place-based understanding of the wider socio-cultural dynamics that were limiting (or enabling) functional, proactive and collective management of water systems. Successful delivery of the recommendations above, or any modifications of them, are more likely to be achieved through pilot implementation first, which is monitored and evaluated by the community as well as the implementers.

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