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Promoting water conservation and water-saving sanitation in Fiji communities

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Acronyms and abbreviations

FGD	Focus Group Discussion
JMP	Joint Monitoring Programme
HfH	Habitat for Humanity
HH	Household
IWC	International Water Centre
WASH	Water, sanitation and hygiene
WHO	World Health Organisation
VIP	Ventilated Improved Pit

Summary of key recommendations

Drawing from the findings of this research, a series of key recommendations have been outlined for Habitat for Humanity for future implementation to answer the following research qiestions:

RESEARCH QUESTION 3: BASED ON THE INSIGHTS GAINED, WHAT STRATEGIES COULD BE IMPLEMENTED BY HABITAT FOR HUMANITY TO IMPROVE OVERALL WATER SECURITY, INCLUDING INFLUENCING SANITATION AND CONSERVATION BEHAVIOURS?

In addition to some specific recommendations outlined below, we also recommend the following:

- Both new behaviours – of water-saving sanitation, and water conservation – should be addressed at the same time, as this will make it more likely that each behaviour is improved. Promoting water-saving sanitation will be more likely to be successful if there is broader promotion of the need to conserve water.
- In order to design and implement a behaviour change program, it is crucial to understand that a **"one size fits all" approach is not effective**. Findings from this research clearly show that there are a series of different specific behaviours to be targeted - for each one it is recommended that a specific strategy is designed and used.
- In addition, **considering the different target audience, or segments**, is extremely important. For example, households that already have access to water and a flush toilet in their house are very unlikely to adopt waterless toilets, while in villages that have very little access to water, and households with a pit toilet, adopting a VIP toilet can be seen as very positive, given the right behaviour change tools to influence them.
- For behaviour change to occur, understanding of the needs and wants of the target audience is essential. A **"what's in it for them**" mentality is helpful to achieve change. It is also important not to assume that people will adopt behaviours because it is good for them. Very often people are aware that certain behaviour is not good for them, and they will still continue the harmful behaviour (e.g. smoking, alcohol drinking, sedentary behaviours, etc). Therefore, strategies that go beyond providing information and knowledge and telling people what to do, are needed.
- A **normative approach**, which seeks to establish new social norms for desired behaviours, is frequently considered one of the most effective, since people are influenced by what others around them do and think they should do. The following strategies recommend creating new positive social norms as an effective approach – this involved **creating the belief that people should do an action/behaviour because everyone else is doing it, and they expect me to do it too**.
- Approaches that **appeal to the emotional**, rather than cognitive are also very successful. Strategies that aim at giving a sense of self-identify, role model, or associating the new behaviour with a positive feeling are examples of this approach.

Promoting water-saving sanitation

Target Outcomes:

- Increase awareness and knowledge of alternative sanitation options and their link to water use
- Increase self-efficacy to build and maintain appropriate alternative toilets
- Create positive attitudes toward VIP toilets
- Adoption of behaviour (increase use of water-saving or waterless alternative toilets)

The research indicates two main target audiences/segments, and different target behaviours are recommended for each group. For each village, either strategy A or strategy B should be used. The target behaviours are different for each of these groups, however but the mechanisms (the types of activities) to bring about change are the same – the detail of which behaviours is promoted during the activities is different.

Strategy C, targets government and should be implemented alongside Strategy A and B.

Strategy A: For the target audience: Households that currently have a pit toilet (and all villages with water scarcity), promote the adoption (construction, use and maintenance of VIP latrines)

Strategy B. For the target audience: Households that currently have a water-based toilet and higher water availability: promote low-water using toilets, achieved either by:

- Modifying existing cisterns to reduce the volume water used for flushing (e.g. filling cisterns with blocks/rocks)
- Promotion, supply and adoption of the SaTo pan – a low-water using toilet seat for pour-flush toilets.

Mechanisms of Change, to support Strategy A or B: combination of mechanisms and activities is recommended:

- Positively promoting personal and social benefits and social norms – designed to positively motivate adoption of new/adapted toilets and create social norms of their use. Combined promotional and education materials and activities are recommended.
- Education and awareness - designed to increase knowledge of new/adapted toilets, including why they are beneficial and how to construct and maintain them. Combined promotional and education materials and activities are recommended.
- Improve Identity and Self-efficacy - designed to improve confidence and leadership to construct new/adapted toilets. A train-a-trainer approach is recommended.

Strategy C: Target audience: government. Target behaviours: promote water-saving sanitation (VIPs, cistern-modifications, Sato-pans).

The mechanism recommended to influence government's behaviours is to use education and awareness-raising to advocate for water-saving sanitation options which provide both health and water-saving benefits, rather than the current promotion of only water-based sanitation for health reasons).

Promoting Water Conservation

Target Outcomes:

- Increase knowledge of how to conserve water
- Increase positive social norm for water conservation actions at the household level and village level
- Adoption of water conservation behaviours

For water conservation, different strategies are not required for different village settings. However two strategies are recommended – BOTH should be implemented.

Strategy D. Target audience: Householders in all villages, to conserve drinking water by using less and saving more.
Target behaviours: Conserve drinking water by adopting the following specific behaviours

- Use of alternative water sources (e.g. rivers) for non-drinking and cooking purposes
- Increase storage of rainwater in water tanks for drinking purposes
- Storage of rainwater for non-drinking uses, such as washing and bathing, in other containers (e.g. buckets, barrels)
- Closing of taps after using, and whilst bathing
- Fix leakages and breakages in household water storage, pipes and taps
- Report broken pipes and leakages in shared systems

Strategy E. Target audience: Community-leaders / water managers
Target behaviours:

- Limit community water supply during dry season (e.g. to a few hours in the morning and afternoon)

- Repair of broken pipes and leakages

The mechanisms to bring about the changes for Strategy D and Strategy E, include:

- Positively promoting personal and social benefits and creating social norms - designed to positively motivate adoption of new/adapted water use behaviours and create social norms to support their use by all. Combined promotional and education materials and activities are recommended.
- Education and awareness - designed to increase knowledge and raise awareness about water conservation actions, including specific information on how to use less or save more.
- Strengthen identity and social norms relating to water saving actions – achieved by assisting the existing water committee, or a newly created water saving group, to raise awareness and promote water saving actions.
- Reminders/cues/social norms – visually reminding people of simple but important water practices, using public notices and posters helps to remind people what to do, how and why, and doing this using public notices helps to create a positive social norm.

Water conservation and sanitation in Fiji

Fresh water is very scarce and is a critical issue in many countries and because it is an important finite resource, management of fresh water is very vital for the survival of environment and the people. The continuous population growth increases the conflict over limited water resources (Jonch-Clausen & Fugl, 2001). According to the 2017 JMP (joint monitoring programme) for water and sanitation report, 844 million people globally, and 54% of the people in the Pacific islands Oceania Region, that is excluding Australia and New Zealand, still lack basic drinking water service (WHO & UNICEF, 2017). The limited availability of water in the environment has become a threat to human health and the ecosystem. In Fiji, the accessibility of water is limited particularly in the rural areas and is becoming more of an issue for survival needs (Letras, 2016).

A feasible solution to lessen the burden on the inadequate access to fresh water in the islands is to shift from water-based sanitation technologies to using low water or waterless sanitation technologies. The objective of using low water or waterless sanitation technologies is to minimize the use of water in sanitation facilities. Examples of waterless sanitation are VIP (Ventilated Improved Pit) toilets and composting toilets.

The most commonly found waterless type of toilet, especially in more water scarce villages, is the pit latrine. It consists of a dug pit with a slab that covers the pit with a squat hole. This type of toilet is common in rural and remote areas due to its affordability and easiness to build and maintain. A lot of people in the peri-urban and rural areas use pit latrines because they cannot afford a more hygienic latrine (Chungu et al., 2017). According to JMP standards, it is regarded as unimproved sanitation system (WHO & UNICEF, 2017). An alternative to pit latrine which is also a waterless toilet is the ventilated improved pit (VIP) toilet. This type of toilet has its design similar to the pit toilet, however the VIP is an improved version due to the fact that it has a ventilated pipe attached from the hole and up the superstructure. The vent pipe releases bad odour from the pit and helps to remove flies from the toilet. The vent is often painted black to attract heat where convection process takes place removing the bad odour and preventing flies to fly back into the pit. The VIP toilet also is sealed all around the floor to prevent waste coming into contact with humans and a seat with a cover (Schouten & Mathenge, 2010), which means it is safer and more hygienic than a pit latrine toilet..

Because Fiji island communities have challenging access to water supply, it is important to change behaviours of current practices that can control the issue of inadequate water supply of fresh water as a strategy to manage their water resources. To successfully achieve positive outcomes for a behaviour, change intervention, it is important to understand social norms, attitudes that influence a certain type of behaviour and barriers that prevent positive behaviours from being practiced contributing to the desired outcome (Dreibelbis et al., 2013). As emphasised by Watson (2017) that a good understanding of the audiences social, cultural and economic environment essential for a successful strategy implementation.

Composting toilets are on-site systems in which the waste is collected and treated on-site and is not piped out (Massoud et al., 2009). In composting toilets, there are two compartments, the toilet and the collection chamber which is where the waste is collected and decomposed. Dry grass or sawdust is added the waste collection compartment to help with the decomposition (Yadav et al., 2010). The waste gets decomposed and is used as fertilizer. However, it is crucial that waste be managed well as it can be hazardous to health if not. This waste becomes hazardous due to the many different pathogens (bacteria/viruses/protozoa) present in the faeces, which can lead to contamination by contact (Wichuk & McCartney, 2007).

As with any behaviour change program, adoption of the new behaviour requires an in-depth understanding of the communities that are targeted for the adoption of such behaviour. Behaviour change is complex, and requires more than an education approach, or telling people what they should do. Gaining insight into the communities' attitudes and perceptions to sanitation and types of toilets allows an intervention to be designed and implemented more effectively. People are more likely to adopt the behaviour if specific

strategies are designed considering important aspects such as the normative environment they are surrounded, their attitudes, knowledge, perceived benefits and barriers, and other psychological factors.

Influencing water and sanitation behaviours

Influencing people to change their behaviours for the better are crucial to improve societies all around the world. Behaviour change campaigns and programs have been successful in the areas of health, environment, among others (Lee & Kotler, 2016).

There are several behavioural models and techniques that can be used as frameworks to guide researchers and practitioners in the design, implementation and evaluation of behaviour change programs. Some mechanisms of change commonly used in campaigns or behavioural programs include advertising campaigns to raise awareness, education programs focussing on increasing knowledge and providing information, repetition in order to develop habituation, exposure to cues, social support, influencing social norms, influencing self-identity (e.g. role model), creating positive behavioural associations, environmental or structural changes (Michie et al., 2013).

A successful approach to behaviour change is social marketing. Social marketing is the process of using commercial marketing tools to create a valued exchange in order to influence behaviour change to occur (Andreasen, 2002). social marketing embraces the tools and techniques of commercial marketing such as the concepts of consumer orientation, exchange theory, audience segmentation, competition, a marketing mix, and continuous monitoring (Andreasen, 2002; Grier & Bryant, 2005), so that behaviour change can be achieved.

In contrast to public health campaigns and other approaches, social marketing has behaviour change at its core. It goes beyond approaches that focus on solely raising awareness and using promotional tools. Programs are developed based on audience research and competitor analysis ensuring social marketing gains necessary insights to meet the needs and wants of the target audience. Social marketing, with its audience-oriented focus, provides a bottom-up research philosophy where insights gained from the target audience can be used to inform program improvement. This research was conducted and recommendations developed using a social marketing and behaviour change lens.

Models that have been proven to be effective in behaviour change include Theory of Planned Behaviour, Social Cognitive Theory, and Health Belief Model, among others (Truong & Dang, 2017). A particularly well known and widely used framework in the area of WASH is FOAM (Focus, Opportunity, Ability, and Motivation) (Coombes & Devine, 2010). FOAM is a behaviour change framework that draws from the most commonly used social cognition models. This was the framework used to analyse the findings from this research.

Project background

This research project was undertaken for Habitat for Humanity in Fiji, as a part of their Water for Women Project. Water for Women, a program of the Australian government, managed by GHD, partnered with Habitat for Humanity in strengthening community resilience and inclusion through improved WASH services in Fiji. The aim of that project is to use participatory and socially inclusive community development to strengthen the resilience of 50 communities through increased access to equitable and inclusive WASH (https://www.waterforwomenfund.org/en/project/water-for-women---fiji.aspx)

Over 4.5 years, this project will address the WASH needs of 8,682 people across Ba and Ra Provinces. These locations were chosen due to remoteness and have been identified as highly vulnerable to the impacts of climate change, such as droughts, sea level rise, coastal inundation, severe storm surges and tropical cyclones.

The International WaterCentre (IWC) at Griffith University, has a partnership with Habitat for Humanity, to support their WASH project in Fiji and contribute to research to improve community water management (https://watercentre.org/research/research-impacts/pcwm/). As part of this partnership, Habitat for Humanity and IWC undertook this research on promoting water conservation and water-saving sanitation in Fiji.

Water scarcity is an increasing concern in Pacific Island Countries, including Fiji. Rural Fijian communities depend on rain water for drinking and to recharge groundwater for other uses. Changes in rainfall season are evident as drought seasons are becoming more common (Pearce, 2017). The quantity of water available to meet basic domestic needs is becoming increasingly variable. Currently, many rural villagers in Pacific Islands commonly use multiple sources of water, such as drinking, cooking, cleaning, personal hygiene.

In addition, rising severity and frequency of storms is increasing damage to water infrastructure, adding to water insecurity. Water quality is further compromised by human activities, including inadequate sanitation of human and animal waste.

The contamination of fresh water, especially if water that is used for drinking and cooking is contaminated by inadequate sanitation, poses significant health hazards and increases the incidence of water-related diseases.

Improving sanitation practices and ensuring human waste is safely managed and prevented from contaminating water and food sources can improve the quality of local drinking water sources. However, where sanitation has been encouraged, water-based sanitation has been commonly adopted by villagers. The use local water sources for flushing toilets is adding to local water insecurity.

Therefore, there is potential for water-saving sanitation to contribute to both (i) local water security by using less local water resources for flushing toilets, and (ii) improved health by safely managing human waste so as not to contaminate local water sources.

Smalls-scale trials of composting toilets, one type of water-saving sanitation, have had variable success. The approach has been to promote the water-saving aspects of composting toilets, as well as the benefits of using compost in gardens. However, this approach has overlooked the strong cultural desire for water-based sanitation; flushing toilets are viewed as the aspiration type of sanitation – it is what most urban dwellers use and rural dwellers consider this the ‘best’ type of toilet.

People’s perception on the type of sanitation technology used in their households influences their willingness to accept a new intervention. Habitat for Humanity in Fiji are working with rural communities to introduce water saving toilets, such as composting toilets and ventilated-improved-pit latrines (VIPs), however they recognise the need to more fully consider strategies to influence the existing behaviours and attitudes.

Adapting to using different sanitation options requires a change in behaviour and attitudes of the toilet users. In seeking to influence these, the basis of people's existing behaviour and attitudes need to be carefully understood. In addition, factors that prevent the 'desired' behaviour from being practiced, or barriers, need also to be understood, as well as those factors that encourage positive change of behaviours. These positive factors, or positive divers, typically include social norms, emotions and personal motivations.

This research will seek to understand the existing attitudes, social norms and behaviours relating to both sanitation and water conservation, as well identify barriers and positive drivers to influence these behaviours, in order to help inform future interventions to improve access to sanitation and improve water conservation.

Research questions

This research aimed at understanding how Habitat for Humanity can influence and support water conservation and waterless sanitation practices in rural Fijian communities. The research questions set out at the start of the project were:

1. **What are the existing water conservation behaviours, attitudes and knowledge of rural Fijian communities and what are the barriers preventing adoption of water conservation behaviours?**

2. **What are the rural Fijian communities' perceptions on existing sanitation facilities, including their attitudes, knowledge, social norms, benefits and barriers?**

3. **Based on the insights gained, what strategies could be implemented by Habitat for Humanity to improve overall water security, including influencing sanitation and water conservation behaviours?**

Methodology

Research project setting

This research project was conducted in two main locations in the Ba Province, Fiji Islands: Yasawa Islands, and Viti Levu. The study was undertaken in a total of four villages, being two in the Yasawa Island and two in the mainland (see Figure 1 for specific project locations).

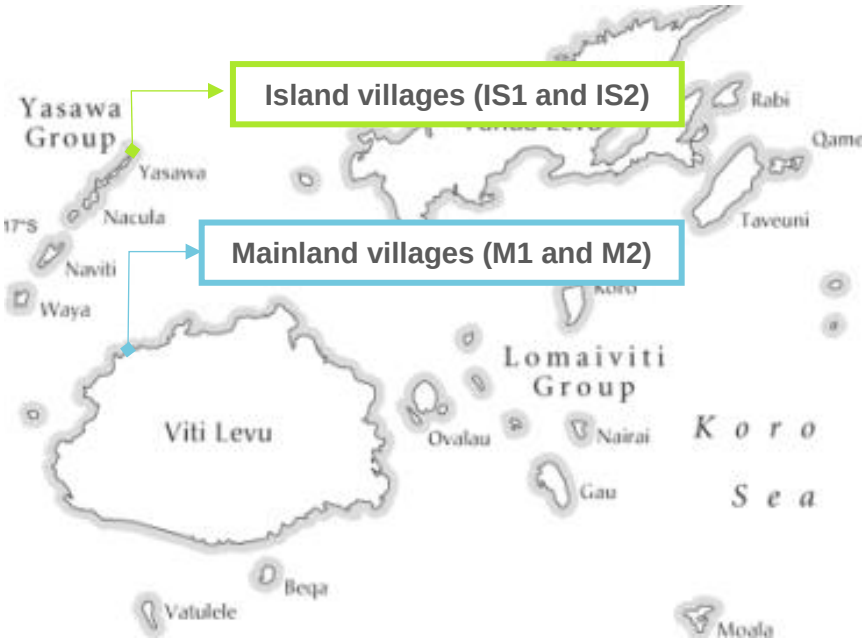

FIGURE 1. PROJECT LOCATION MAP

Study design and data collection

The study design consisted of using a mixed method approach, collecting data in four villages to maximise reach and ensure a general understanding of rural Fijian villages.

Most people in the village understood the questions better in Fijian and felt more comfortable. Therefore, due to language constraints, data collection was conducted by the staff of the NGO Habitat for Humanity (HfH) Fiji.

Prior to data collection, a two-day training was delivered to the HfH staff by Dr. Patricia David. The training included an overview of behaviour change foundations, training in each research methodology with application tips, and workshop to practice the learnings. All research instruments were reviewed in detail, and adaptations to the local context were made. In addition, the research instruments were all translated to Fijian.

In each village, data collection involved the following procedure:

- **Quantitative household surveys**; questions were mostly multiple answers and were usually verbally asked to the respondent, due to low literacy level. Researchers aimed to survey approximately 50% of the available households in each village. The surveys gathered quantitative insights into the community's current water use, perceptions on existing and available toilets, and their attitudes, barriers, and perceived social norms.

- **Semi-structured in-depth interviews**; respondents were pre-selected, based on their attitudes and toilet type, to ensure an even representation. Interviews were conducted aiming to gain a deeper understanding of attitudes, motivations and barriers to water conservation, as well as perceptions on existing sanitation practices.

- **Focus Group Discussions (FGD)**; to ensure participants felt safe and comfortable to speak out, two FGDs were organised in each village: one for males and other for females. There were five to eight people participants in each FGD. The objective of the FGDs was to explore common barriers, motivations and opportunities to promote specific water saving practices, including waterless toilets.

Data were collected in March 2019. Table 1 summarises the demographic information of all four villages, and the number of respondents per research method in each village.

TABLE 1. VILLAGE INFORMATION AND NUMBER OF RESPONDENTS

Research site	Village demographic Information	Number of respondents
M1	***Households:*** 43HH and 43 families, 12 people living with disabilities (7 female, and 5 male). ***Total population*:**185 people; 94 males, 91 females\ ***Main water source*:** Dam – piped to households ***Alternative sources:*** Streams, river, creek, and rain water tanks. ***Toilet options:*** Flush (septic), simple pit and water seal (pour-flush to pit)	***Household Surveys:*** 62 ***Interviews:*** 5 ***Focus Groups:*** 2
M2	***Households:*** 38HH and 43 families. 2 persons living with disabilities (all male) ***Total population*:** 222 people; 121 males, 101 females ***Main source of water*:** Reticulated water system serving half the village, the rest use stream, river and creeks ***Alternative sources****:* Rainwater catchment tanks ***Toilet options:*** Flush (septic), water seal toilets	***Household Surveys:*** 19 ***Interviews:*** 4 ***Focus Groups:*** 2
IS1	***Households:*** 43HH. 2 persons living with disabilities (all male) ***Total population:*** 236 people; 119 male, 117 females *Main source of water:* Rain water harvesting and well *Toilet options:* Water seal toilets, flush (septic)	***Household Surveys:*** 24 ***Interviews:*** 7 ***Focus Groups:*** 2
IS2	***Total population:*** 136 people; 64 male, 72 females ***Households:*** 26HH ***Main water source*:** Reticulated system from a spring. Other water sources include boreholes and rainwater collection in tanks. ***Alternative water sources:*** seawater and streams ***Toilet options*:** Water seal toilets, flush (septic)	***Household Surveys:*** 16 ***Interviews:*** 5 ***Focus Groups:*** 2

Challenges with data collection need to be acknowledged since they limit analyses (and generalisability) of results. Some of the limitations included language barriers and short time for translation of research instruments. In addition, qualitative data collection was also a challenge, despite delivery of training prior to data collection, due to researchers not experienced in conducting in-depth data collection (feelings, thoughts, behaviours) and participants not being used to be asked their thoughts, hence struggled with understanding and responding to questions about their feelings and thoughts. The research team often struggled with probing and facilitating conversations during interviews and FGDs and notes taken were also limited.

Ethics statement

This research project was conducted in strict compliance with IWC's and Habitat for Humanity's child protection policies, and with the Australian National Statement on Ethical Conduct in Human Research. The project was granted full approval by Griffith University Research Ethics Committee (GU 2019/123). Additional ethics approval was granted by University of South Pacific to the IWC research project, *'Rural Community Water Management in Fiji'*, which is the umbrella research project.

Data analysis methods

The FOAM framework was used to guide data analysis, where themes for analysis were identified using the determinants identified in the framework. Focus determinants are target behaviours and audiences, in this case, behaviours around water use and the target audience are the household members. Opportunity determinants are opportunities to practice water saving in the household such as using buckets to store water and tanks. Ability determinant is the knowledge, how and why to save water and how much water is saved in the household. The last determinant is motivation which are the attitudes and emotional drivers such as feelings of anger towards water being wasted.

Results

Water usage

Household size and reported water use

For the 120 households surveyed, the average number of people reportedly 'usually present' in each household was '3 to 5 persons'. Water usage was also asked to be reported. And about 50% of households that reported using water 'a lot' (n=53) had a 6 to 9 persons household size, and about 38% were households with 3-5 person usually present. Similar trends are seen in all responses, suggesting that the larger-sized households reported a higher usage of water than smaller-sized households with less people usually present in the house (see Table 2 below).

TABLE 2: HOUSEHOLD SIZE VS REPORTED WATER USE

Village	Reported water use	Number households in household size (usually)					Total no. HH each water use category
		1-2 people	3-5 people	6-9 people	10-13 people	14+ people	
M1	a lot	1	6	19	2	1	29
	some	1	9	14	0	0	24
	not much	4	4	1	0	0	9
	Total number of households	**5**	**19**	**18**	**2**	**1**	**62**
M2	a lot	1	7	4	0	0	12
	some	0	5	0	0	0	5
	not much	0	1	1	0	0	2
	Total number of households	**1**	**13**	**5**	**0**	**0**	**19**
IS1	a lot	0	2	3	1	0	6
	some	1	3	7	1	0	12
	not much	2	3	0	0	0	5
	Total number of households	**3**	**8**	**10**	**2**	**0**	**23**
IS2	a lot	0	5	1	0	0	6
	some	2	6	0	0	0	8
	not much	0	1	1	0	0	2
	Total number of households	**2**	**12**	**2**	**0**	**0**	**16**
All villages	a lot	2	20	27	3	1	53
	some	4	23	21	1	0	49
	not much	6	9	3	0	0	18
	Total number of households	**12**	**52**	**51**	**4**	**1**	**120**

Estimated water use and reported practice

The estimated water use per household was calculated by multiplying by the number of containers used per day (reported as how times a day a container is filled and used), with the volume of the commonly used container. It is important to note that each village reported varying container sizes. (see Table 3). These results indicate that most participants had good knowledge of how much water consumption occurred at their household level.

TABLE 3: HOUSEHOLD WATER USE PER DAY

Village	% of HH using 1L-50L per day	% of HH using 51L-100L per day	% of HH using 101L – 250L per day	% of HH using per day 251L-600+L
M1	34	14	28	11
M2	21	58	16	0
IS1	8.3	25	33	29
IS2	25	0	25	44
All villages	32	26	33	21

Further comparison was made for variations between how estimated use and reported use. For M1 village, most of the households' reported use was equal while in the other villages there was little variation in whether the households reported a *higher, equal* or *less than* estimated use (see Figure 2)

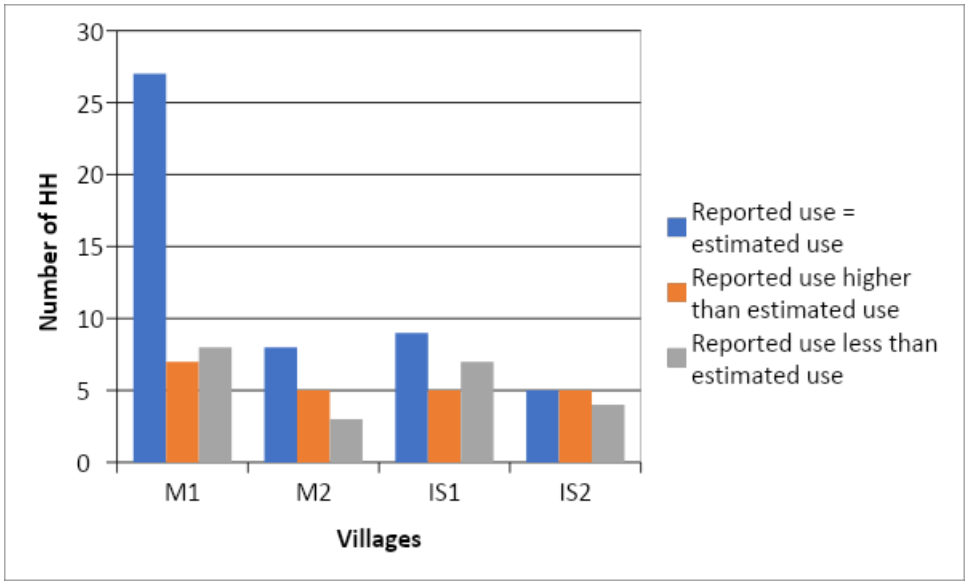

FIGURE 2: REPORTED USE VS ESTIMATED USE

Reasons reported for high water use

Washing of clothes and other cleaning was reported by 61% of all respondents as the reason for high water use, with the mainland communities reporting a higher figure of 65% and 68% as compared to 46% and 53% reported in the island communities. In the villages with reticulated water systems, M1, M2 and IS2, and where over 50% of the respondents reported higher water use, observations made by the researchers showed that cleaning of utensils and laundry was done under directly under running water while for laundry buckets were used.

Use of water for toilet cleaning was also reported by 33% of respondents as a season for high water use. In their response, out of the 108 households interviewed, 99 reported using water based flush toilets, which they reported as a preferred choice because they were perceived as clean, plus sanitation programs conducted by the Ministry of Health promoted this as a better toilet option.

Use of water to prepare *kava* (see Figure 4) for drinking ceremonies, a popular traditional practice, was reported as a reason for high water use by 31% of the respondents. During the fieldwork, the researchers witnessed this practice, where *kava* ceremonies were performed before focus group discussions and some

household interviews. Further, the researchers observed that a *kava* ceremony, used 20 litres of water for preparation of the drink, which would explain why this was reported as a high-water use practise.

FIGURE 3: KAVA PREPARATION

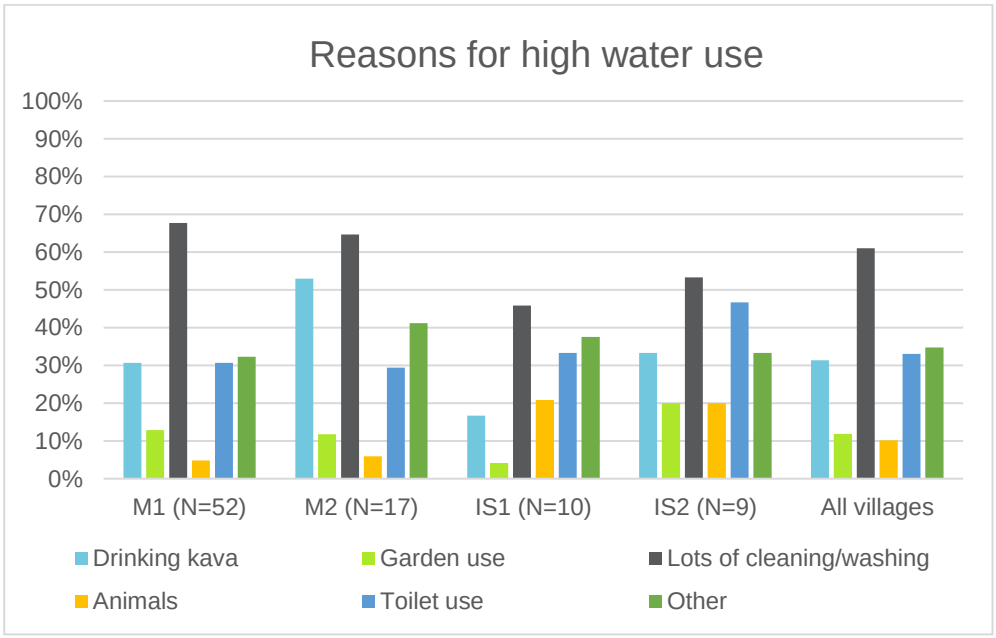

FIGURE 4: REASONS FOR HIGH WATER USE

In the villages with reticulated water system, they expressed that if there was a payment for water, then people would take better care in how they used water. For example, during observations and informal conversations, residents in village M1, where there is a reticulated system, there was a perceived feeling that who held non-positive attitudes about water conservation, did so because they had not experienced the hardships of collecting water in the period prior to the installation of the more convenient reticulated system. They felt that this system, closely located to homes, created the perception that water was in abundance.

Other reasons for high water use reported were; in on the villages, residents reported that broken water pipes were hardly fixed; increased usage when there are a lot of visitors at home; households with infants or many children who required more cleaning and laundry for especially napkins; larger households needed more water for extra utensils, clothes, cooking, toilet use; unsupervised children bathing at the taps.

Water conservation

Existing water conservation action

In M1 most respondents somewhat agree that people in the community do enough to save water. This community has a good reticulated water system and all households have access to a tap in the household. Access of water is not a problem, and the great majority of households have a flush toilet. M2 also has a reticulated water system, however not all households have access to a water tap in the households. In some areas of the villa, households are sharing a tap with other 14 households. The results for these two villages indicate that with full access to water supply, more people somewhat agree than strongly agree that people in the community do enough to save water. In the other two communities (IS1 and IS2) water scarcity areas on the islands are evident. IS1 has no water supply piped to households and mainly rely on rainwater catchments. People use a considerable amount of drums, tanks and buckets to store water, which gave the people in the village a strong perception of people in the village doing enough to save water (see Table 4 below). IS2 has a reticulated water supply, however it is only used for cleaning and washing (laundry and bathing), drinking and cooking water is collected from rainwater tanks. Thus, similarly to IS1, a high percentage of respondents strongly agree that people in the community do enough to save water.

TABLE 4: OPINIONS ON WHETHER PEOPLE IN THE COMMUNITY DO ENOUGH TO SAVE WATER

Do people do enough to save water?	Strongly disagree	Somewhat disagree	No opinion	Somewhat agree	Strongly agree
M1	8%	18%	3%	41%	30%
M2	11%	11%	0%	42%	37%
IS1	0%	4%	0%	25%	71%
IS2	0%	6%	0%	31%	63%
All villages	6%	13%	2%	37%	43%

Perceived control of water use in household

Residents *strongly agreed* (61%) that individual households should be responsible for how water is used in their homes.

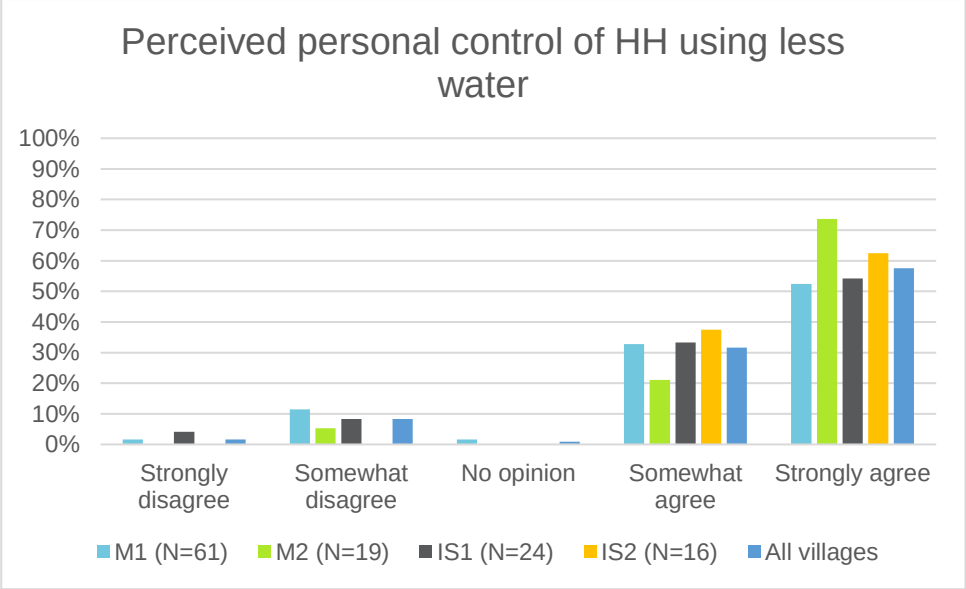

FIGURE 5: PERCEIVED CONTROL OVER USING LESS WATER IN HOUSEHOLD

Further look into each village results shows that there is a link between types of water sources on how much control households felt they had in using less water. In the M2 village which is more reliant on communal water taps showed that 74% of the households *strongly agreed* that they felt they have personal control over their household using less water. However, in the M1 village where all households had individual connections, 52% *strongly agreed* that they felt they had personal control over their household use of water. Analyses showed that in cases where communities have less abundant access to water and more shared use, a larger proportion of the population felt they had personal control in using less water when compared to communities with individual connections.

FIGURE 6: ILLUSTRATION OF AN INDIVIDUAL TAP IN THE VILLAGE

Social norms associated with water conservation

To understand what community members' expectations are about water conversation behaviours, householders were asked (i) whether they thought important people want their household to use less water, (ii) whether those important people would approve of them using less water, and (iii) whether those important people should use less water. The important people were people who the household defined as important to them, which included household heads, village headman and other leaders in the community. Most respondents strongly agreed that other households should use less water (Figure 7).

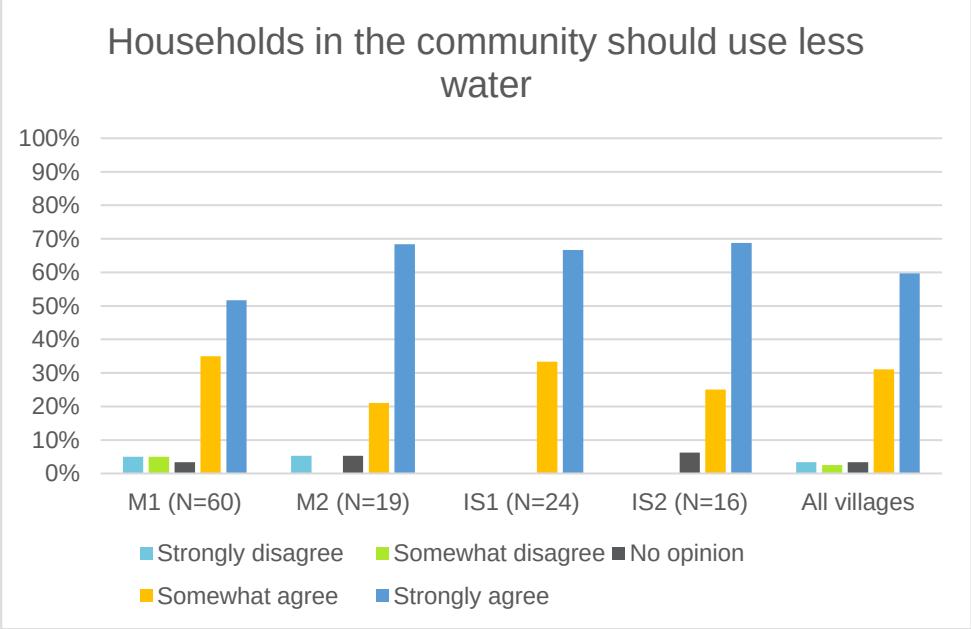

FIGURE 7: PERCEPTIONS THAT OTHER HOUSEHOLDS SHOULD USE LESS WATER

From the question about whether important people expected the household to use less water, most participants indicated that they were expected to use less water in their households, and that that people who were important to them would approve of them using less water (Figure 8).

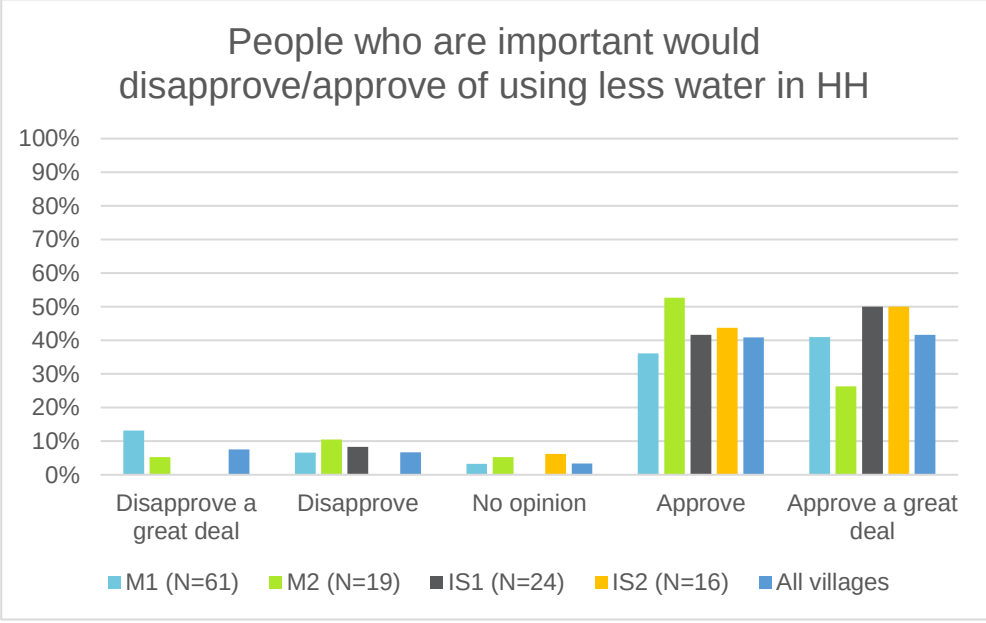

FIGURE 8: PERCEPTIONS ON OTHER PEOPLE'S APPROVAL FOR USING LESS WATER

Most participants also agreed that other people in the village do try to use less water in their household (Figure 9).

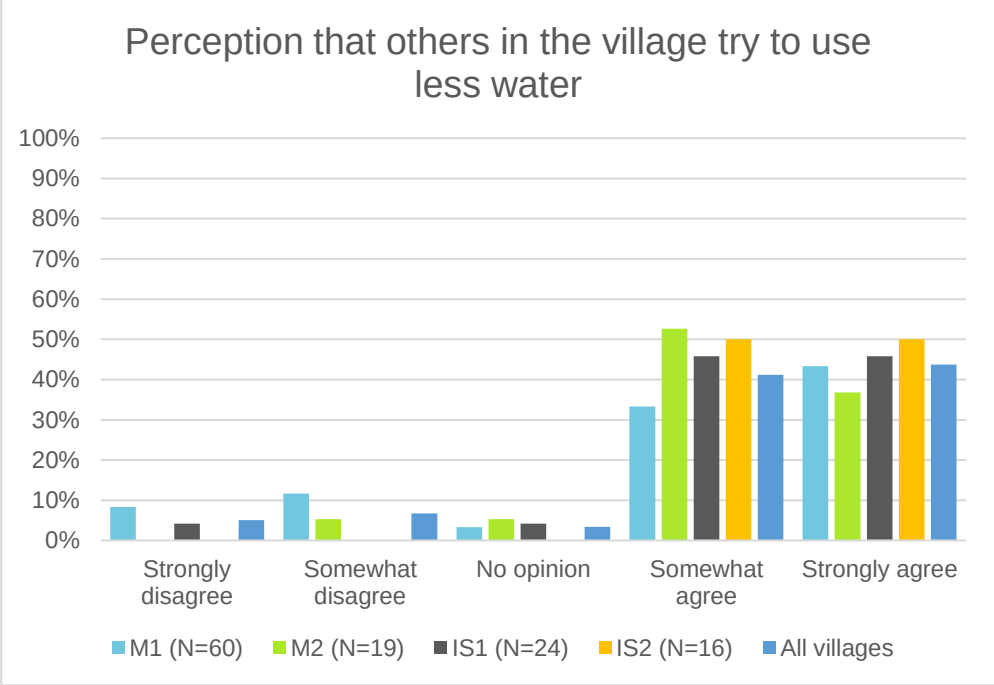

FIGURE 9: PERCEPTIONS THAT OTHERS ARE LIKELY TO USE LESS WATER

FIGURE 10: WATER STORAGE EQUIPMENT

Over 40% of the households believe that enough is done in to save water in their communities (Figure 11). More participants in the islands *strongly agreed* that people do enough to save water, compared with villages on the mainland. In IS1, a water scarce community, which had the highest expectation that more is done to save water, it was observed that they rely heavily on rainwater for cooking and drinking, use wells for toilets and laundry, in many households there were water tanks and other storage containers

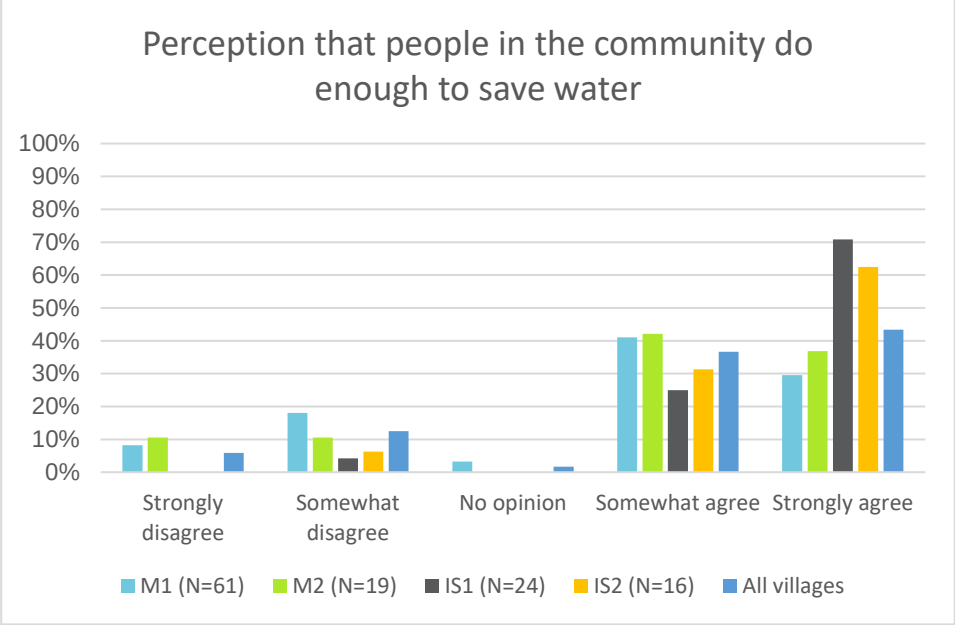

FIGURE 11: EXPECTATION THAT PEOPLE ARE DOING ENOUGH TO USE LESS OR SAVE WATER.

From the household interviews it was indicated that although people were expected to use less water those with negative attitudes do not practice water conservation. These attitudes are reflected on how they view the water services or high value placed on non-basic need services like drinking *kava* where there were instances of water stolen from households for preparation of *kava.* For example, a participant reported that in her husband's village, it is normal sight to see people letting the tap run whilst washing clothes, for those that come from other villages where water bills are paid.

> "*Firstly, I was so concerned I felt so puzzled, so I asked my husband when I saw my sister in law washing the clothes and letting the water run; do you guys pay water bill? why? No because she is washing the clothes with the tap open, and my husband said, "we don't pay water bill", and then laughed out loud. I was worried of our water bill."* [Female respondent, household interview, M1 village]

In showing who had the most responsibility within the household, one male participant reported the wife was the most influential in how water was used in his home, he said:

> *"Yes, it is important, for my wife, water is part of her life every day, water is what she needs most to do her daily chores. She will always remind everyone to close tap after using it. So, we are always worried about being penalized for abusing water, which will lead to the closure of the supply of water to our tap. So, saving water is very important to all of us at home."* [Male, Household interview, M2 village]

In other instances, the husband was also reported to have an influencing role in the water use practices of the household members

> *"I encourage my wife to wash the clothes in the river and dishes should be cleaned in the basin and not on running tap."* [Male, household interview, M2 village]

Knowledge about water conservation actions

During interviews and focus group discussions, community members from village IS1 reported there has been non-government organisations and government ministries coming in the village and working with the

community to address water needs. They also demonstrated awareness that it is a water scarcity area, and for that reason, people are now aware of how to save water. Other communities such as M2, reported they have not much influence from the outside regarding water projects and they have tried to help themselves over the past years. In M2, they reported the Provincial Works Department, who have helped in constructing the first water supply, have not continued to assist or follow up. See Table 5 for details.

TABLE 5: HOW MUCH INFORMATION THEY THINK HOUSEHOLDS HAVE IN KNOWING HOW TO USE LESS WATER

Information about using less water	Very little information	Little information	No opinion	A fair amount of information	A good amount of information
M1	16%	20%	2%	20%	43%
M2	5%	16%	11%	32%	37%
IS1	0%	13%	0%	38%	50%
IS2	13%	20%	13%	7%	47%
All villages	11%	18%	4%	24%	44%

During the focus group discussions, the community members identified water conservation actions that could be implemented, which indicated a high level of specific knowledge about water saving actions. The suggested actions are outlined in Table 6.

TABLE 6: WATER CONSERVATION ACTIONS SUGGESTED BY THE COMMUNITY

Water conservation actions
Individual actions
Close the tap properly after use, and whenever someone see a tap running, he/she should take responsibility and turn it off
Decrease the amount of kava drinking
Reusing water. If water is fetched in dishes for washing the dishes, the same water can be reused to wash pots
Use alternate water sources for non-drinking purposes such as washing of clothes and dishes
Water system actions
There should be scheduled times for opening and closing of water taps
Community members should limit (fetching water from the tap) from 10 to 5 buckets per day
All households should buy storage equipment to save water
Village-level actions
Introduce and enforce penalties for misusing water or not following rules set by leaders on water use. Rules on public places to encourage people to practice saving water
Education: All household should be advised about how to save water

Self-efficacy to conserve water

To understand respondents' self-efficacy in taking action to use less water, they were asked if they thought it was easy to use less water. Half of the households stated they *strongly agreed* it was easy to sue less water, 45% *somewhat agreed*, and only 4% *somewhat* or *strongly disagreed.* Findings suggest respondents have a strong confidence in in their ability to take actions to save water (for more details see Figure 12.

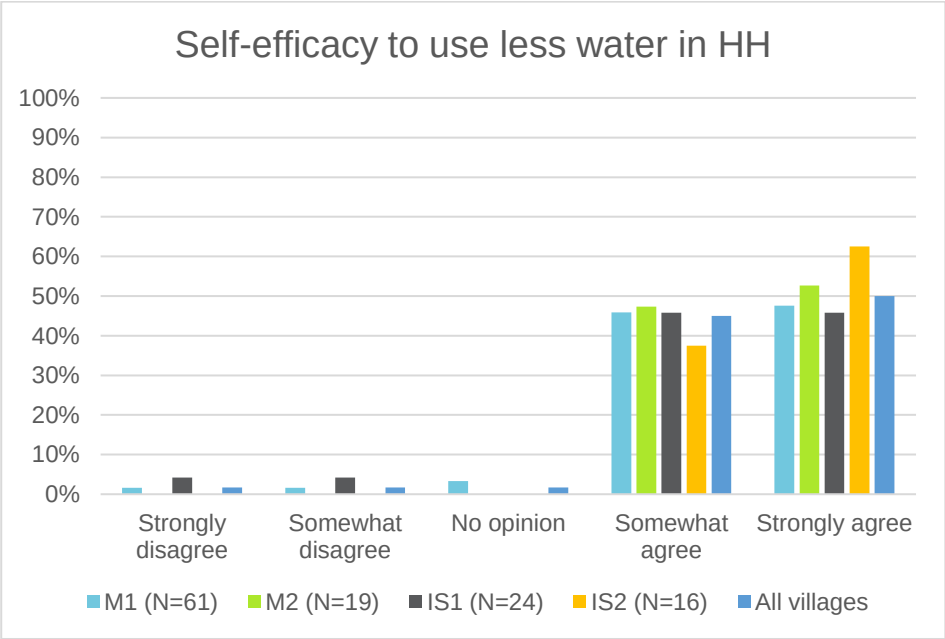

FIGURE 12: SELF-EFFICACY OF WATER USE

Attitudes towards water security and water conservation

There was a common perception that having storage units reduced the fear of lacking enough water for household needs and that those who did not have them would need to borrow from those who did. For example, one participant reported that:

> *"For me I don't have all the tanks, so I really care about using less water and that goes also for the people who don't have tanks. Yet, those who don't care end up to us (who care or save water) to ask for water especially for drinking."* [Female respondent, Household interview, IS1]

The same fear was expressed by a female respondent who described how she used less water so that she couldn't run out of water at future date.

> *"The members of my household always follow what I do with water, they just follow. There are only two things that concern me more at home, firewood and water. I always chase those at home to go and look for it when we run out."* [Female respondent, Household interview, IS1].

For other participants, they reported that in addition to the need for a tank, they also reduced the amount of water used for some of the household activities such as laundry as a way of reducing water usage.

> *"Yes, in a week I just wash (laundry) twice. Yes, my tank does not have a stand when that is done then I can save water."* [Female respondent, IS1 household interview]

When asked how concerned they were that water may run out in their community, 76% reported being *very concerned,* with all respondents in M2 reporting this feeling (Table 7).

TABLE 7: CONCERN OF WATER RUNNING OUT IN THE COMMUNITY

How concerned that water might run out in the community	Really not concerned	Not concerned	No opinion	A little concerned	Very concerned
M1	3%	3%	0%	26%	67%
M2	0%	0%	0%	0%	100%
IS1	0%	0%	0%	29%	71%
IS2	0%	0%	0%	13%	88%
All villages	2%	2%	0%	21%	76%

When it came to concerns that individual households may run out of water, 82% reported that they were *very concerned* and only 3% reporting as *really not concerned* (Table 8). Further assessment on whether they felt that all households should use less water, 64% *strongly agreed* and only 4% *strongly disagreed* (Table 9).

TABLE 8: CONCERN OF WATER RUNNING OUT IN HOUSEHOLDS

How concerned are you that water might run out in the household?	Really not concerned	Not concerned	No opinion	A little concerned	Very concerned
M1	5%	3%	0%	20%	72%
M2	0%	0%	0%	6%	94%
IS1	0%	0%	0%	8%	92%
IS2	0%	0%	0%	6%	94%
All villages	3%	2%	0%	13%	82%

TABLE 9: AGREEMENT THAT HOUSEHOLDS SHOULD USE LESS WATER

How much do you agree that your household should use less water?	Strongly disagree	Somewhat disagree	No opinion	Somewhat agree	Strongly agree
M1	7%	3%	5%	34%	50%
M2	5%	0%	0%	21%	74%
IS1	0%	0%	0%	25%	75%
IS2	0%	0%	0%	25%	75%
All villages	4%	2%	3%	29%	62%

Importantly, unstructured observations showed that in M1 village, where more access to water was reported compared to the other villages, taps were left to run for a long time, which residents reported was a mechanism to deal with high pressure in the system. In contrast, some of the communal taps in M2 often had no water, and many residents shared the one functional tap.

Attitudes towards water conservation were captured by asking participants how important they perceived water saving was, how useful it was to save water and if saving water was convenient or pleasant. When asked about convenience, 62% of all households reported as *very convenient* and 8% as *really not convenient*. Responses were similar in the four villages with most finding the conservation actions very convenient, with only M2 village where 21% of the respondents reported as inconvenient, which may be attributed to lack of water reported during the research period. See Figure 13 for details.

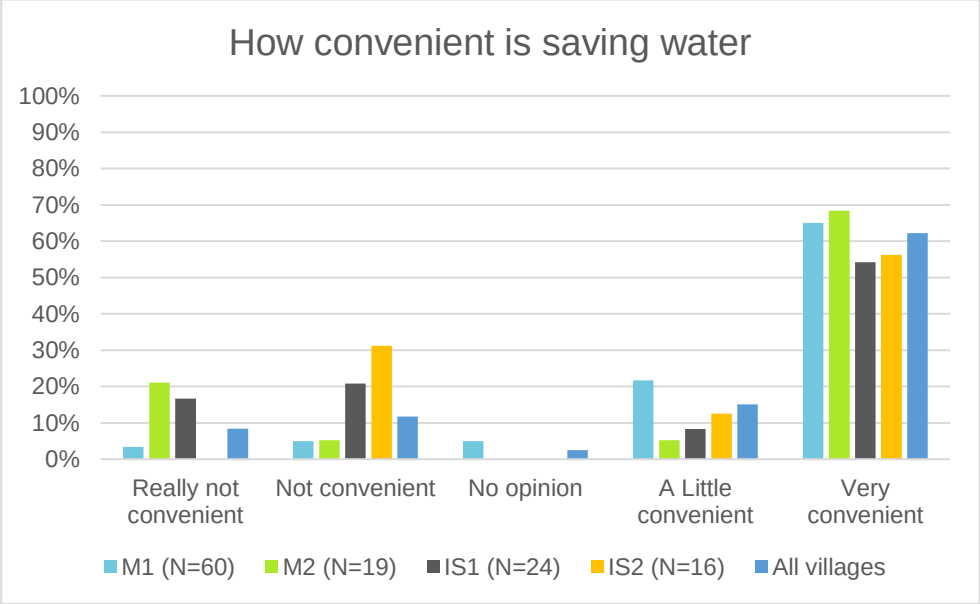

FIGURE 13: CONVENIENCE OF SAVING WATER

Findings indicate that there are various reasons why residents consider saving water important, with reasons varying from coping with drought, health, for living, and other social factors. The most common reported are outlined in Table 10 below.

TABLE 10. REASONS GIVEN BY COMMUNITY MEMBERS ABOUT WHY SAVING WATER IS IMPORTANT

Reasons why saving water is important
Water is essential for health and living
To deal with constant droughts that had become a norm for the communities
Storage helped with saving water due to fear of running out of water for use specially during drought season
If water is not saved, they felt using of alternative sources such as rivers as not safe for activities such as children bathing or fetching water
If water is saved then there will be enough during drought seasons and schools do not have to eb shut down, as is the case now
It is not easy to look for water during the dry season dur to drying up of sources
In rainy season there is fear of system shut down due to flooding
When water is saved then there is an opportunity to use sources for community projects such as the hydro dam that is generating activities in M1 village.
One member of the water committee mentioned that water saving was very important because some people are ignorant, he has seen a lot of people abusing water.

Barriers towards water conservation

A lack of equipment for storing water such as buckets, containers or water tanks was often identified as a critical barrier.

> *"They don't have things for storage like drums, buckets. Some have one tap to share amongst many households". [*female respondent, household interview, IS2 village]

Competing demands or priorities for time and energy required to do water saving actions were also mentioned as something that made it difficult for households to use less water.

> *"For us who have small grandchildren it will be difficult to use less water".* [Female respondent, household interview, IS1 village,]

> *"Yes, sometimes I get tired from the farm, so I have my bath home. Laziness, - we used water from the tap to wash our pots and utensils, if my wife is hurt or sick then she will use the water from the tap and may be because the river is far from home".* [Male respondent, household interview, M2 village]

Sanitation

Existing toilets in the villages

Respondents were asked specific questions about the existing toilets in their households, and in the villages. Questions were asked to gain insight into the communities' knowledge, attitudes, knowledge, and overall perceptions on each type of toilet. Existing types of toilets differed significantly across villages (see Figure 14).

The types of toilets in villages include:

- Pit Latrine – a basic dry pit latrine (not a VIP latrine)
- Water seal – a pour-flush with a pit (a wet-pit latrine)
- Flush toilet – a cistern flushing toilet with a septic tank
- Composting toilet – dry-based sanitation with potential for waste to be accessed and reused in gardens

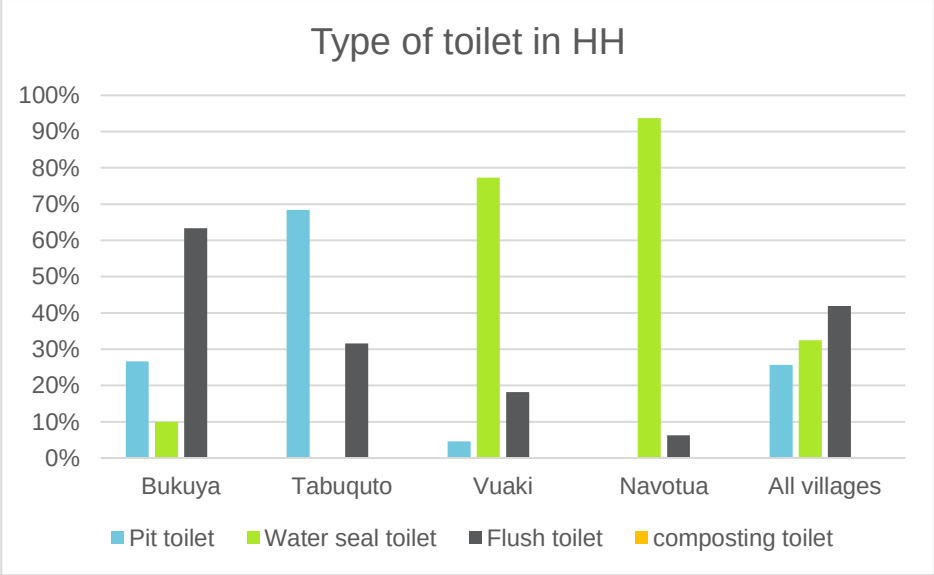

FIGURE 14. TYPES OF SANITATION SYSTEMS IN THE VILLAGES

Perceptions on water based and waterless toilets attributes

Respondents were asked what their likes and dislikes about the different types of toilets were in quantitative surveys and focus discussion groups. Thematic patterns were identified for each type of toilet and are shown in Table 11.

TABLE 11. TOILETS LIKES AND DISLIKES

Toilets characteristics	Pit toilet	Water seal	Flush
Likes	Affordable Waterless Convenient Do not like anything	Clean	Clean Easy to use No bad smell Convenient
Dislikes	Dirty Bad smell Difficult to use Outside location	Dirty Difficult to use when have no water Gets full quickly Uses a lot of water	Difficult to use when have no water Outside location

When asked to indicate which was their preferred type of toilet, over 90% of the respondents of M1, M2 and IS1 indicated flush toilet. While the majority of IS2 residents also indicated flush as their preferred toilet type (63%), 31% responded composting toilets. Most important characteristics of preferred type of toilet mentioned were *cleanliness*, *easy to use* and *convenience*.

Most common positive themes emerging from the respondents that owned a *pit toilet* were that they were affordable and did not depend on water. Some respondents stated there was nothing positive about this type of toilet. Characteristics that they disliked were bad smell, dirtiness, difficulty to use, and the fact that the toilets are located outside. For *water seal toilets*, the main positive aspect was that it was clean. Main dislikes included the fact the toilet is dirty, difficulty to use when there is no access to water, gets full quickly and it

uses a lot of water. *Flush toilets* positives included that they are clean with no bad smell, convenient and easy to use. Similar to water seal, lack of water is a problem for this type of toilet, and some respondents mentioned outside location as a downside.

Knowledge about sanitation options and waterless toilets

Respondents demonstrated awareness of sanitation and hygiene needs to avoid spreading of diseases, with some villages being previously visited by government officials, health minister and researchers.

> *"[…]village being visited most times by researchers and government officials / ministry of health and they said that having flush toilets would minimize spread of diseases in the village, it's a big village and houses are close together, there is a risk of disease outbreak such as typhoid and dysentery."* [female respondent, household interview, M1]

All research participants were familiar with **pit toilets**. When asked whether respondents thought people in the village should have pit toilets, distinct answers were delivered. For interviewees from M1, where access to water was significantly higher, flush toilets were preferred, with statements that it was time to change toilets to flush type toilets. In the villages where shortage of water was evident, respondents believed pit toilets were the best option, due to being waterless and with that they could save and share water within the community. However, they also emphasised the need for improved, well-built pit toilet, with a seat and improved ventilation to avoid flies and bad smell. One interviewee gave an illustration on how her mother tries to improve their pit toilet to become more pleasant.

> *"[…] So, my mom keeps it clean at all times. She places fragrant flowers and covers the walls with posters and curtains so that it is pleasing for everyone at home to visit.[…]"* [female respondent, household interview, M2]

None of the research participants had previous knowledge of **VIP toilets** (Ventilated Improved Pit). They were exposed to a photo and an explanation of how it would work. Reactions observed in focus group discussions were very positive, as most believed that due to the ventilation system toilets would be cleaner with less smell and flies. They also liked the fact that the VIP toilets had a seat as it would be easier to use, especially for people that were sick, pregnant, overweight or elderly.

While the majority of people in the mainland villages had never heard of **composting toilets**, majority of respondents from IS1 and IS2 had heard, seen or tried composting toilet before. When asked about their opinions on composting toilets, there was broad agreement that composting toilets help to save water. Other positive themes identified were that it was good use of manure, and generally "good". On the negative side, there were a few comments on the bad smell and dirtiness of this type of toilet.

During the Focus Group Discussions, participants were asked when comparing the toilets types, which would be a better option, flush toilets was the preferred option. When financial barrier was considered, or water scarcity, participants mentioned pit as the better option. Results need to be considered in light of what most people know, as most were not in direct contact with both VIP or composting toilet.

Attitudes toward water-based and waterless toilets

To understand respondents' attitudes toward waterless toilets, they were asked to report on their thoughts of how important it is to use waterless toilets. Findings demonstrate that most respondents from all villages think it is important to use toilets that use less or no water as illustrated in Figure 15.

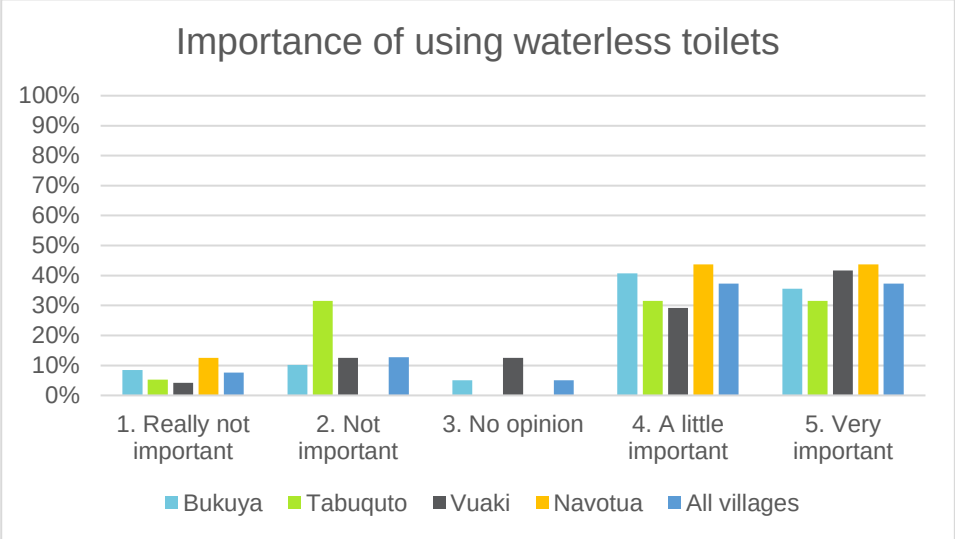

FIGURE 15. INSTRUMENTAL ATTITUDES TOWARD WATERLESS TOILETS

To uncover affective attitudes, respondents were asked to respond how pleasant they felt it is to use waterless toilets. Figure 16 shows a more even distribution in "not pleasant", and "a little pleasant". However, these findings should to be taken cautiously since it was observed that respondents at times did not understand the questions or be able to, or confident to, express their emotions.

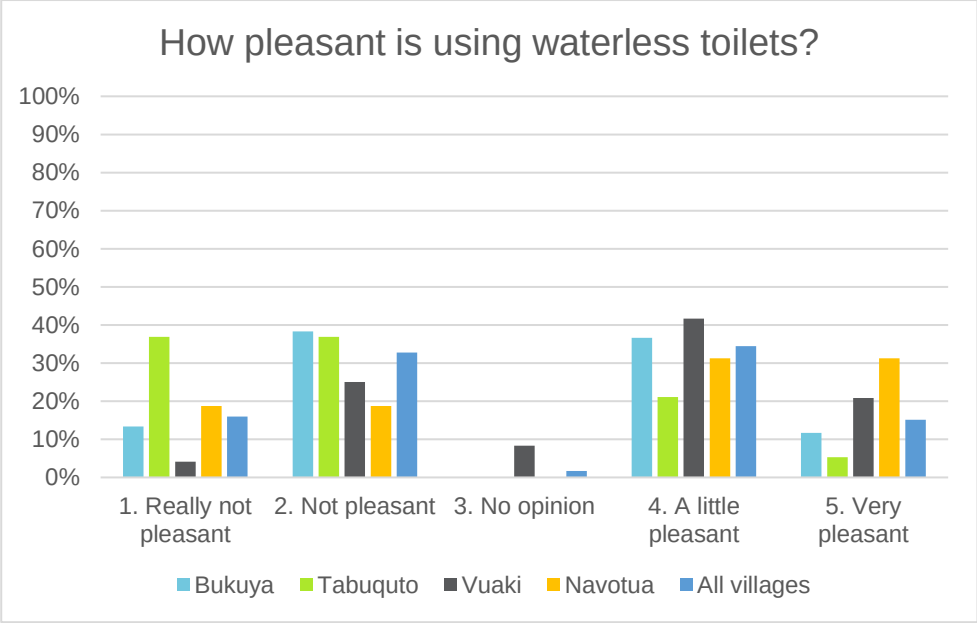

FIGURE 16. AFFECTIVE ATTITUDES TOWARD WATERLESS TOILETS

PIT TOILETS

In addition to previously stated negative perceptions about pit toilets, some participants expressed their view that this is an outdated type of toilet. This was particularly true when respondents or someone around them had access to flush toilet.

> *"This is not the time of using the pit toilet. Since everyone else in the village is using flush toilets we should have one too. I keep urging my husband to construct a flush toilet as I am tired of walking very far to use the toilet" [*female respondent, household interview, M1]

> *"My parents said it's outdated to use pit toilet even though they've been using all their lives. My two nephews and my niece also dislike the fact that we are using pit toilet. May be because they are using flush toilet in school."* [female respondent, household interview, M2]

Despite acknowledging issues with pit toilets, such as not being a permanent toilet, being unpleasant to use, and need to use ashes (or other methods) to prevent flies, most people who currently have a pit toilet see the importance of using a waterless toilet due to the water scarcity.

> *"I feel at peace using pit toilet. It matches the need in the family, since we don't have much water in the community. I have the materials for two flush toilets but due to the shortage of water there is no use of having it installed. But at the moment I think we're saving water for the rest of the village by using pit toilet and also it is environment friendly."* [female respondent, household interview, M2]

In addition, having a pit toilet is considered positive when considering its affordability and the fact that having one is better than having no toilet (which also minimises open defecation).

> *"Even though it is unpleasant to use, I reckon it is important for a family to have a toilet.[…] So yes, pit toilet is important to me compared to open defecation"* [female respondent, household interview, M2]

Respondents stated that most people in their household would agree with their opinions, however, when asked about the perceptions of other people in the village, the views were split with a respondent from M1 answering that water committee and village health volunteers are trying to eradicate pit toilets from the villages and another from village IS2 stated the minister of health wants to build pit toilets for all houses.

WATER-BASED TOILETS

Attitudes were mainly positive to water-based toilets, due to the perceived cleanliness and hygiene. Respondents stated they had very positive feelings towards this type of toilet, and that other people also have positive perceptions of this toilet, but may cannot afford to have it.

> *"She stated this toilet is a very important. She stated the following: It makes them maintain cleanliness, makes them want to use it, also gives them the feelings of enjoying its use and they are willing to use it and clean it"* [male respondent, household interview, IS1]

Views of water-based toilets were positively associated with water access in the villages. The less people had access to water, the less they saw value of having a water-based toilet, as they saw it as wasteful due to their limited water, as well as not practical since they very often do not have water to use them.

One respondent of IS1 mentioned they see the importance of waterless sanitations such as pit and composting toilets, although she clearly stated her negative attitudes toward attributes associated with pit toilets.

"The pit and composting toilet are good toilets to use as it does not need water. But she clearly expressed that for the pit toilet - her body dislikes its - she feels disgusted with that" [female respondent, household interview, IS1]

ALTERNATIVE WATERLESS TOILETS – VIPS AND COMPOSTING

To understand how respondents felt about usage of waterless toilets, they were exposed to a picture of a VIP toilet as well as a composting toilet and were given a brief explanation of how they work, as most respondents had not been exposed to these types of toilets previously.

Initial attitudes on composting toilets were generally positive by respondents that currently have a pit toilet. Qualitative analyses showed a positive instrumental attitude toward composting toilets, which means respondents cognitively understand the benefits of a composting toilet.

"By the picture that that you showed me, I would be more than happy to have one at home. It saves a lot of water, I don't have to buy fertilizer, it does not have a foul smell" [female respondent, household interview, M1]

However, when asked about whether the community would be supportive of having composting toilets, views differed, with respondents from the village IS1 stating that the community would strongly support, where a respondent from village M2 stating they thought the community would not support this type of toilet in the village.

Experiences with composting toilets

None of the villages within the research study had experience with proper composting toilets (previously built 'compost toilets' were badly constructed or not well-maintained and were had not been built as household toilets – they were either for the school or tourists, and effectively weren't being used as composting toilets). Interviews were conducted with people that had direct contact and experiences with composting toilets in Somolevu primary, Ratu Meli primary and Navotua. The aim was to gain insight into attitudes and perceptions of the people that use composting toilets.

Respondents explained that when the toilets were built they received instructions on their use. For example, they reported that only grass or toilet paper could be used in the toilets. They were always advising the students to use only grass and implemented systems to replace grass such as students bringing grass from home to school.

Evidently aware of water scarcity issues in the island, interviewees stated the importance of having waterless toilets such as a composting toilet and would recommend to other schools as well.

"Well for us water is a very important element because we rely on rain water in this island and therefore I highly recommend this type of toilet for other schools as well." [male respondent, school interview, Somolevu primary]

Most respondents had very positive attitudes from having composting toilets in the schools stating it is the best option for shortage of water, and that it is useful because the waste can be used later for farming. In addition, while most people thought using composting toilet was very easy, there was some concern that they did not have control over what the students used to clean themselves, even though they advised all students to use only grass or toilet paper.

Low self-efficacy in how to properly maintain and discharge the waste was also noted, acknowledging the need for more education and better training.

> *"[…] For our case we have not cleared out the pit and smell is starting to come out, so probably after discharging those waste probably we'll be trying to learn from our mistake and improve and put new strategies in place."* [male respondent, school interview, Somolevu primary]

Respondents expressed that most people around them had the same positive perceptions about composting toilets due to the two major benefits of using them: 1) help saving water, which is crucial as they have no water during the dry season; and 2) use of waste in gardening.

Additionally, it was pointed out that most people that understand how composting toilets work when used properly, support their use, as they can see the benefits that it brings to areas where water is scarce, such as the Yasawa Islands. They mentioned that even tourists that visit the island use the toilets and can see the value of having a composting toilet. The high value placed on water due to the water scarcity in the region seems to be proportional to the perceived benefits of having a composting toilet.

> "*I think the important thing is awareness, if they know more about the benefits and importance of composting toilets, they will care about composting toilets*" [male respondent, school interview, Ratu Meli primary]

> *"It is important to help other things like planting in the future, because the idea of composting toilet is to help fertile the soil later in life and also to help the children know more about recycling. Yes, we do recycling like leaves and grass we put back into the gardens, so hopefully with the idea of composting toilet, human waste will be our great advantage for our farming system."* [male respondent, school interview, Somolevu primary]

Summary of findings – opportunities, abilities and motivation for water conservation and water-saving sanitation

The FOAM (Focus, Opportunity, Ability and Motivation) framework was used to guide the design, and analyses of the results, especially to assist in identifying the determinants of water conservation and water-saving sanitation. Determinants are the factors which influence, or determine, whether a person will or can adopt changed behaviours.

This section will summarise the findings described above using the FOAM framework to uncover the determinants of water conservation practices, and the determinants of using water-based and waterless toilets. This section provides a summary of the key insights which were then used to develop the recommendations for future action. The summarised findings also allow answering Research Questions 1 and 2, as follows:

RESEARCH QUESTION 1: WHAT ARE THE EXISTING WATER CONSERVATION BEHAVIOURS, ATTITUDES AND KNOWLEDGE OF RURAL FIJIAN COMMUNITIES AND WHAT ARE THE BARRIERS PREVENTING ADOPTION OF WATER CONSERVATION BEHAVIOURS?

RESEARCH QUESTION 2: **WHAT ARE THE RURAL FIJIAN COMMUNITIES' PERCEPTIONS ON EXISTING SANITATION FACILITIES, INCLUDING THEIR ATTITUDES, KNOWLEDGE, SOCIAL NORMS, BENEFITS AND BARRIERS?**

Focus – water conservation and sanitation behaviours and target audiences

A clear definition of the behaviour and identifying who is the target audience are critical elements for any behaviour change program. The table below provides an analytical summary of the findings of this research related to existing behaviours and segments within the target villages.

Focus – behaviours and target audience		Summary of Findings
Target behaviour	• Existing water saving and sanitation behaviours	*Water conservation practices* • Village residents agreed that most people do something to save water • Villages differed in the systems or methods they use to access water. This was mostly due to the availability and types of water sources that were accessible. • Some people use non-drinking eater sources for non-drinking uses, which saves drinking water (e.g. bathe and wash clothes in the river) • Some people remind others to close the taps or not leave the water running *High-water use practices observed* • Kava drinking • Running tap with no one using it

		• Leakages from broken pipes *Types of toilets linked to water availability* • The main types of toilets were similar in different villages (pit latrines, pour-slush/water seal pits, flush-septic) but the water-based toilets were more common in villages with higher water availability, and dry pits more common in water scarce villages.
Target audience	• Target groups (or segments) for water conservation and for sanitation behaviour change	*Household level* • Women are the main managers of water in the household • Men have the authority for which type of water storage is available at the household level • Men are the decision-makers for which type of toilet the household will have as they are the ones who build it. *Village level* • Village leaders and water committees determine and manage water-related actions • Village leaders have a strong influence on types of toilets the community should have *Government level* • Government officials (e.g. Ministry of Health staff) have an influence in progressing actions within the community. They can influence village leaders and in turn, community members. • Government officials are currently promoting replacing waterless sanitation with water-based sanitation.

Opportunity – external factors influencing adoption of changed water conservation and sanitation behaviours

Opportunity within the FOAM framework considers whether the target individuals have the resources to perform a behaviour. This section will consider the external factors that are related to the target behaviours. A synthesis of the findings related to the access/availability, product attributes, and existing perceived social norms is described below.

Opportunity		Summary of Findings
Access/ Availability	• Water storage equipment • Alternative water source • Perceived behavioural control • Financial access	• Limited access to appropriate equipment to store water (e.g. tanks) • Access and use of water-based toilets restricts water conservation practices • Well or river were available as alternative sources of water suitable for some uses (non-drinking) • In villages with less access to water and more shared use of water, a larger proportion of the population felt they had personal control in using less water, when compared to communities with individual connections. • No or limited financial access to buying products to build flush toilets was a common reason for people to have other types of waterless toilets
Product attributes	• Perceptions of types of toilets	Common themes for characteristics of each type of toilet are summarised below: *Pit toilet* • Affordable, waterless • Dirty, bad smell, difficult to use, outside location *Water-seal toilet* • Clean • Dirty, difficult to use when have no water, gets full quickly, uses a lot of water *Flush toilet* • Clean, easy to use, no bad smell, convenient • Difficult to use when have no water, outside location • Expensive? *Composting toilet* • Waterless • Difficult to maintain

Social norms	• Saving water is important • Acceptance of some high-water use practices • Waterless sanitation is acceptable but undesirable	• Strong perception that most people try to save water, and that this is everyone's responsibility in the community • Saving water is perceived as their way of life, and would be seen as abnormal if someone would start using a lot of water and showed no concern • Disapproval of the high use of water to drink kava was expressed, but it is ingrained in the culture and it is highly accepted as normal practice • In most villages, waterless toilets are acceptable (for costs and water access reasons), but not desirable. It is perceived by some as bringing shame to the family and embarrassing to have a visitor using pit toilet • Not having a flush toilet for M1 residents (where most toilets are flush) is very negatively perceived. Strong perception that this should be the norm from individual and community levels. • Having flush toilet is seen as the goal for most respondents

Ability – personal factors influencing new water conservation and sanitation behaviours

Ability determinants reflect people's capabilities to perform the behaviour, including perceived and actual capabilities. The main determinants of ability are knowledge of the behaviour, perceived social support, and self-efficacy (how confident an individual is of performing such behaviour).

Ability		Summary of Findings
Knowledge	• Level of knowledge of their water usage, water conservation actions • Level of knowledge of sanitation and types of toilets	*Water knowledge* • About 70-90% of participants provided accurate responses of how much water their households use • Respondents were able to explain the main causes of high-water use, which demonstrated high level of awareness and knowledge • IS1 residents demonstrated high level of knowledge of actions being taken in the village by NGOs and government). They also demonstrated awareness that it is a water scarcity area, and for that reason, people know how to save water *Sanitation knowledge* • Knowledge of the importance of sanitation and hygiene was noticed. Although not much detail in how to apply was mentioned, residents understand the importance of having clean toilets, and threats on the spread of diseases. • Villages M1 and M2 were not aware of VIP and composting toilets as alternative waterless toilets, while IS1 and IS2 had heard, seen or used composting toilets.
Social support	• Perception of social support to save water within the community	• There was a high level of perceived social support within the communities • Participants mentioned that the responsibility of saving water was of everyone in the community • Respondents demonstrated belief that all community members did something to support water conservation practices • A sense of belonginess and community was evident. Some people stated they would support others if they ran out of water • Perceived social support in relation to using waterless toilets were mixed, with some perceiving the community would support, while others not.
Self-efficacy	• Belief in ability to take actions to save water • Confidence of managing waste of composting toilet	• A high level of self-efficacy to save water was found • Most people reported knowing how to take actions to save water • People that experienced composting toilets mentioned it needs to be managed well, and that it is more difficult when compared to other types of toilets (for example pit)

Motivation – interest to adopt water conservation and water-saving sanitation behaviours

Motivations is an individual's interest to engage in a certain behaviour, once they're given the opportunity and ability. Determinants of motivation include personal beliefs and attitudes, perceived outcomes or consequences from engaging in the behaviour, perceived risks and threats, and one's intention to carry out the behaviour.

Motivation		Summary of Findings
Beliefs/ Attitudes	Attitudes (affective and instrumental) toward saving water and using waterless toilets	*Instrumental Attitudes (Cognitive) toward water conservation* • Most people think water is very important, and that they need to save water • Some respondents expressed concern about water use being abused *Affective Attitudes (Emotional) toward water conservation* • Respondents indicated they value water demonstrating very positive affective attitudes toward water and water conservation • Some respondents expressed feeling of hurt, sadness, and anger when others do not care about saving water or water is wasted • Water is considered life and health, as it is used for drinking, cooking and washing *Instrumental Attitudes toward toilets* Respondents think waterless toilets (such as pit or composting) are important due to being better for saving water • Perceptions to waterless toilets are related to the water access in the village. Villages with more access to water in the villages have a more negative perceptions of waterless toilets • People also considered pit latrines to be a cheaper toilet option for those who could not afford water-based toilets. • Water-based toilets are also considered important due to being perceived as cleaner and more hygienic, which can prevent diseases

		• Whilst most people agreed that composting toilets were good for dry seasons, when asked if people in the village would support its use, there were mixed responses, and people said it would be good for other villages, and not their own. This indicates a negative attitude towards this type of toilet. They did not like the fact that this toilet requires waste management. *Affective Attitudes toward toilets* • Waterless toilets (such as pit or composting) are considered by some to be shameful, as they are dirty and have a bad smell, and some people stated they feel embarrassed they have to use them • Negative attitudes toward pit toilets and compost toilets were also captured due to being difficult to use and not convenient

Conclusions and Recommendations

Drawing from the findings of this research, a series of key recommendations have been outlined for Habitat for Humanity for future implementation. These recommendations answer Research Question 3:

RESEARCH QUESTION 3: BASED ON THE INSIGHTS GAINED, WHAT STRATEGIES COULD BE IMPLEMENTED BY HABITAT FOR HUMANITY TO IMPROVE OVERALL WATER SECURITY, INCLUDING INFLUENCING SANITATION AND CONSERVATION BEHAVIOURS?

The recommendations have been developed considering analyses of findings and have been outlined with specific actions suggested for Habitat for Humanity to implement.

Importantly, we recommend that both new behaviours – of water-saving sanitation, and water conservation – be addressed at the same time, as this will make it more likely that each behaviour is improved. Promoting water-saving sanitation will be more likely to be successful if there is broader promotion of the need to conserve water.

In order to design and implement a behaviour change program, it is crucial to understand that a **"one size fits all" approach is not effective**. Findings from this research clearly show that there are a series of different specific behaviours to be targeted, as seen above. For each one it is recommended that a specific strategy is designed and used.

In addition, **considering the different target audience, or segments**, is extremely important. For example, households that already have access to water and a flush toilet in their house are very unlikely to adopt waterless toilets, while in villages that have very little access to water, and households with a pit toilet, adopting a VIP toilet can be seen as very positive, given the right behaviour change tools to influence them.

For behaviour change to occur, understanding of the needs and wants of the target audience is essential. A **"what's in it for them**" mentality is helpful to achieve change. It is also important not to assume that people will adopt behaviours because it is good for them. Very often people are aware that certain behaviour is not good for them, and they will still continue engaging in the harmful behaviour (e.g. smoking, alcohol drinking, sedentary behaviours, etc). Therefore, strategies that go beyond providing information and knowledge and telling people what to do, are needed.

A **normative approach**, which seeks to establish new social norms for desired behaviours, is frequently considered one of the most effective, since people are influenced by what others around them do and think they should do. Approaches that **appeal to the emotional**, rather than cognitive are also very successful. Strategies that aim at giving a sense of self-identify, role model, or associating the new behaviour with a positive feeling are examples of this approach.

Key Recommendations for Promoting Sanitation and Water Conservation			
Sanitation **- promotion of waterless or / low water-using sanitation alternatives** Target Outcomes: - Increase awareness and knowledge of alternative sanitation options and their link to water use - Increase self-efficacy to build and maintain appropriate alternative toilets - Create positive attitudes toward VIP toilets - Adoption of behaviour (increase use of water-saving or waterless alternative toilets)			
Target behaviours to be promoted and to which segments/audiences	**Mechanism of Change**	**Target Audience actions**	**HfH Actions**
A. *Target audience:* **Households that currently have a pit toilet (and all villages with water scarcity)** *Target behaviour promoted:* **VIP (Ventilated Improved Pit) toilet**: - building - using - maintaining *B.* *Target audience:* ***Households that currently have a water-based toilet and higher water availability*** *Target behaviours:* **Low-water using toilet** - fill existing cisterns with blocks to reduce the volume water used for flushing - SaTo pan – a low-water using toilet seat for pour-flush	**Promotion - motivate positively and create social norms** *Aim:* To promote benefits of having a VIP toilet. Some important characteristics to be promoted are: low-cost, convenient, hygienic alternative to pit. Promotion is an important aspect in most behaviour change programs. However, it is usually more effective when combined with other strategies. When using promotional strategies, it is essential to communicate the **positive outcome expectancies**, or benefits of adopting certain behaviour. Benefits of the behaviour need to be relevant to the target audience (for example, improved cleanliness and smell). For promoting VIP latrines, it is recommended to focus on the positive benefits of: no smell, convenience (can be closer to house because no smell), cleanliness, comfort, lower cost than flush toilets and using less water. Using direct quotes from community members about the benefits would help to influence positive attitudes (for example using some quotes collected during the research).	**Community level** Village leader to enable placement of posters, and distribution of the leaflets to all households. Village leader to help promote during festivities and community gatherings. **Household members** Any/all household members able to participate in information sessions about modifying their toilets to use less water Other potential channels should be explored with village leader and community members.	**Develop promotional and educational materials** Develop simple materials that combine providing education with promotion: - Provide information about VIPs and advertise the main benefits of using VIPs - Provide information about how to modify cisterns to use less water and advertise the benefits - Provide information about sato-pans as an alternative for pour-flush toilets (if these are to be made available by HfH). Develop these so they use the most common communication channels appropriate to the villages: posters in the community hall, leaflets for households, announcements and posters to be used during community gatherings, social events. An easy 1-page "how-to" guide with tips on how to maintain toilets to be pleasant places can also be created. This can

toilets	In addition to communicating the benefits of VIP toilets, the communication materials should include visual images of the ideal VIP toilet (but also realistic), so that entices people in the community to want to build one. Strengthening the norm for VIP toilets, and other strategies for water-saving toilets, can be achieved by holding public/community information sessions, and placing posters in public places (community or church halls – making the information very public helps to create the idea that "everyone is doing this, and so should I" Once some alternative toilets have been implemented in the same village or in other villages, this can be can be communicated publicly, such as through public notices and announcements. This can also increase perception of social norms, as above - "if everyone else is doing it, I should do it as well". This is suggested both within a village, and between villages.		include tips for decoration, putting fragrant flowers, etc. Some women in the communities are already doing this and they can help create the communication material with their best tips - this would ensure the information is more authentic (from the community to the community). **In villages** 1. Consult with village representatives about them making announcements (and showing posters) 2. Put posters up in community halls, and other communal areas in the village. 3. Develop and distribute leaflets to households 4. Hold information sessions about modifying cisterns and pour-flush toilets 5. Hold information sessions about keeping VIP toilets well-maintained 6. Build one VIP toilet as the demonstration model in the village common area (for example, near the school or community hall) and decorate with flowers and other local objects, to make it visually appealing. This could be done during the training. This can be used as the model where village members can visit the toilet to see how it would be if they decided to build one in their household.
	Education / Knowledge – increase awareness of alternative options As well as motivating people to want to build a VIP, it is important they receive information about what a VIP is, how it works and why they are important. The cognitive benefits (why VIPs are important) are improved hygiene and cleanliness, which decreases risks of diseases. For some villages and households, they will also be interested in VIPs as a a water-saving action.		
	Improve Identity / Self-efficacy – through community having some members that have completed **training on constructing VIP toilets and how-to-train others in the community**	**Community level** Village leader and/or community members will be trained (one-on-	**Train-a-trainer approach** HfH to deliver one-to-one training to a minimum of 2-8 builders (depending on the size of the village). It is

	This training will ensure that the builders know how to build an optimum VIP toilet, but also, they know how to teach other builders to build an optimum toilet. These builders could be named Champion VIP Builders A train a trainer approach is a good way of community members self-identifying as the role model of a certain behaviour. There is a sense of responsibility when they are the ones training other members of the community, and it provides a self-sustained model of behaviour change. Confidence levels would also increase once hands-on training occurs.	one) to build an improved toilet, and as Champion VIP Builders would train the rest of the builders in the community.	recommended that HfH staff selects the builders together with the village leader. Ideally, the selected champions would have a strong level of influence on the rest of the community. A visual booklet with pictures/figures and a step-by-step instructions is recommended (readability test is needed to make sure they understand the booklet). To ensure the training is continuously occurring and ensure they are motivated, each Champion VIP Builders would keep track of how many community members they have trained, and a goal can be set within a timeframe. Once the goal is achieved, a reward can be awarded (either financial or not).
C. Target audience: government Target behaviours: promote water-saving sanitation (VIPs, cistern-modifications, Sato-pans)	**Education and knowledge** Aims - increase awareness of: the need to improve water security in some villages - increase awareness of the benefits of water conservation including water-saving sanitation - increase awareness of water-saving sanitation options, including their hygiene and health benefits - encourage government to promote water-saving sanitation options, and modify existing promotion of water-based sanitation	**Ministry of Health, Department of Water and Sewerage** Information currently used to promote water-based sanitation is modified to include information about water-saving sanitation options	**Advocate for water-saving sanitation options** Through direct meetings with government representatives, share promotional/education resources developed for communities demonstrating the importance and benefits of water conservation, and water-saving sanitation options. A brief of this research report could also be developed to be shared with the government; the full report can also be shared.
Water Conservation Target Outcomes: - Increase knowledge of how to conserve water			

- Increase positive social norm for water conservation actions at the household level and village level - Adoption of water conservation behaviours			
Target behaviours to be promoted and to which segments/audiences	**Mechanism of Change**	**Target audience actions**	**HfH Actions**
D. <u>*Target audience:*</u> **Householders in all villages** <u>Target behaviours***:***</u> **Conserve drinking water** - Use of alternative water sources (e.g. rivers) for non-drinking and cooking purposes - Increase storage of rainwater for drinking in water tanks - Storage of rainwater for non-drinking uses, such as washing and bathing, in other containers (e.g. buckets, barrels) - Closing of taps after using and whilst bathing - Fix leakages and breakages in household water storage, pipes and taps - Report broken pipes and leakages in shared systems *E.* <u>*Target audience*</u>: **Community-leaders / water managers**	**<u>Promotion - motivate positively</u>** *Aim:* To promote tips and tricks to water conservation through posters and leaflets to the community. When using promotional strategies, it is essential to communicate the positive outcome expectancies, or benefits of adopting certain behaviour. The personal, social or emotional benefits of the behaviour need to be relevant to the target audience (for example, saving water during the wet season in larger storage will provide convenient and safe water during the dry season). It is essential to demonstrate in the communication materials how much water these actions can save and what does that mean in terms of water for the community (here it would be useful to mention benefits to families and children, as people are generally concerned for the health and wellbeing of their children). Including quotes from community members from the research could also be powerful influencers and help to establish	**<u>Community level</u>** Village leader to enable placement of posters and distribution of the leaflets to all households. Village leader to help promote water saving actions during festivities and community gatherings. Other potential channels should be explored with village leader and community members. **<u>Household members</u>** Any/all Household members to participate in information sessions/workshops on water saving practices – encourage more than one from a household, and including children as they can be effective change agents.	**<u>Develop promotional and educational materials</u>** Develop simple materials that combine providing education with promotion: - Provide information about actions water users can take to use less water (this can include mentioning VIP and Sato-pan toilets) - Information should include the importance of fixing or reporting breaks/leakages - advertise the main benefits of using less water for households as well as for the whole community Develop these so they use the most common communication channels appropriate to the villages: posters in the community hall, leaflets for households, announcements and posters to be used during community gatherings, social events. Some people, especially women, in the communities are already doing actions to save water and they can help create the communication material with their best tips - this would ensure the information is more authentic (from the community to the community). It is also important to reinforce the actions that are already taking place, so that creates a stronger perception that all around them are doing something to save water. **<u>In villages</u>** 1. Consult with village representatives about them making announcements (and showing posters)

- Limit community water supply during dry season (e.g. to a few hours in the morning and afternoon) - Repair of broken pipes and leakages	social norms for water conservation. **<u>Education / Knowledge</u>** *Aim:* To raise awareness and increase knowledge about water conservation actions. These will be focussed on sharing tips to improve water conservation within the community, such as use of alternative water sources (e.g. rivers) for non-drinking and cooking purposes and the importance of repairing broken pipes as soon as there is a leakage to avoid waste. Public announcements, and information sessions or workshops on how to save water will help to create a social norm of water saving, by making the information public – this helps to create the belief that "everyone else is saving water so I should too".		2. Put posters up in community halls, and other communal areas in the village. 3. Develop and distribute leaflets to households 4. Hold information sessions about how to use less water – for householders, and the importance of fixing or reporting breaks/leakages
	<u>Strengthen Identity and Social norms - Water saving group/activities of the water committee</u> Many villages have an active water committee, or a group of people interested in water savings that could form a water saving group. By supporting these already-interested people to adopt and promote water saving behaviours, community members are self-	**<u>Community level</u>** A group of volunteers will be selected to be part of the water saving committee. The group will have the help of the village leader to make sure the community knows who they are and that they have a voice in the community.	**<u>Water saving group</u>** *Aim:* To create a sense of shared responsibility and increase social norms of water saving actions within the community. Assist the existing water committee, or a newly created water saving group, to raise awareness and promote water saving actions. Women should be encouraged to be lead or be actively involved as some are already driven to help save water in the community. They will be responsible for promoting water saving behaviours in the village, and motivating all households to do their part. They will work with the village leader to ensure

	identifying as the role model of water saving behaviour. There is a sense of responsibility when they are the ones talking to other members of the community, which creates a norm (people think they should save water because everyone else is saving water). This sense of norm is already existing in the communities, and this would strengthen this important aspect.		reinforcements of water saving activities are complied.
	Reminders/cues/social norms Putting posters up in every single tap in the community is one way of: 1) reminding everyone to close taps, and not waste water, 2) show the urgency of the issue, and transform this behaviour into a norm (e.g. it is unacceptable that a water tap is left open, or that someone takes a bath using the tap rather than buckets).	**Community level** This can be distributed by the water committee.	**Visual reminders** Aim: To remind everyone of simple but important water saving practices (e.g. closing the tap). Use adhesives or waterproof signs (for outside taps) with a reminder to close the taps. This needs to be visually appealing, yet very simple.

References

Andreasen, A. R. (2002). Marketing social marketing in the social change marketplace. *Journal of public policy & marketing, 21*(1), 3-13.

Coombes, Y., & Devine, J. (2010). Introducing FOAM: A Framework to Analyze Handwashing Behaviors to Design Handwashing Programs. of commercial marketing principles for social good.

Grier, S., & Bryant, C. A. (2005). Social Marketing in Public Health. *Annual Review of Public Health, 26*(1), 319-339. doi:doi:10.1146/annurev.publhealth.26.021304.144610

Jønch-Clausen, T., & Fugl, J. (2001). Firming up the conceptual basis of integrated water resources management. *International Journal of Water Resources Development*, *17*(4), 501-510.

Lee, N. R., & Kotler, P. (2016). *Social marketing: changing behaviors for good* (Vol. 5.). Thousand Oaks, California: SAGE Publications.

Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., ... & Wood, C. E. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behavior change interventions. *Annals of behavioral medicine*, *46*(1), 81-95.

Schouten, M. A. C., & Mathenge, R. W. (2010). Communal sanitation alternatives for slums: A case study of Kibera, Kenya. *Physics and Chemistry of the Earth, Parts A/B/C*, *35*(13-14), 815-822.Massoud et al., 2009

Truong, V., & Dang, N. (2017). Reviewing Research Evidence for Social Marketing: Systematic Literature Reviews. In K. Kubacki & S. Rundle-Thiele (Eds.), *Formative Research in Social Marketing: Innovative Methods to Gain Consumer Insights* (Vol. 1st ed., pp. 189-190). Singapore: Springer.

WHO, & UNICEF. (2017). Progress on Drinking Water, Sanitation and Hygiene: 2017 Update and SDG Baselines. Retrieved from https://www.who.int/water_sanitation_health/publications/jmp-2017/en/

Yadav, K. D., Tare, V., & Ahammed, M. M. (2010). Vermicomposting of source-separated human faeces for nutrient recycling. *Waste Management*, *30*(1), 50-56.Wichuk & McCartney, 2007

Appendix A

Household Survey

General Information: (I tukutuku matata)

Vakaitarogi: Turaga / Marama Yabaki: _____

1. How many people were living in this house last week?
2. What is the usual number of people living in this house (not during holidays)?
3. What is the usual number during festivities or holidays?
4. How much water do you think this household uses daily? (choose one answer

A lot of water Some water Not much water

1	2	3	4	5
○	○	○	○	○

5. If Q4 is 'a lot of water', then "Why do you use a lot of water?" (choose all options they mention)

a.Kava driniking b.Garden use c.Lots of cleaning/washing d.Animals e.Toilet use f.Other

6. How many containers/pots of water do you use in one day?
7. Can you please show me the container you use to collect/store water? If yes, estimate the size:

a.~ 1.5 – 2.5 L b.~5L c.~12L d.~20L e.200L (44Gallon drum) f.Others:

[AFTER SURVEY: estimate total daily volume use for this household:

8. In this household, do you think you use more water than your neighbour/houses/families?

a.More than neighbours b.Less than neighbours c.The same as neighbours d.I don't know.

10. If answer for 8 is I don't know, How many people are in your neighbors household?

Attitudes :

11. What do you think about saving water (or using less water)?

Really not important /Not important /No opinion /A little important /Very important

1	2	3	4	5
○	○	○	○	○

Really not useful/ Not useful /No opinion/ A little useful/ Very Useful

1	2	3	4	5
○	○	○	○	○

Really not convenient /Not convenient/ No opinion/ A little convenient/ Very convenient

1	2	3	4	5
○	○	○	○	○

Really not pleasant/ Not pleasant/ No opinion/ A little pleasant/ Very Pleasant

1	2	3	4	5
○	○	○	○	○

Really not enjoyable/ Not enjoyable/ No opinion /A little enjoyable/ Very Enjoyable

1	2	3	4	5
○	○	○	○	○

12. How concerned are you that water might run out in your household?

Really not concerned /Not concerned/ No opinion /Concerned /Very concerned

1 2 3 4 5

○ ○ ○ ○ ○

13. How concerned are you that water might run out in this community?

Really not concerned/ Not concerned/ No opinion/ Concerned/ Very concerned

1 2 3 4 5

○ ○ ○ ○ ○

14. How much do you agree that your household should use less water?

Strongly disagree/ Somewhat disagree /No opinion/ Somewhat agree/ Strongly agree

1 2 3 4 5

○ ○ ○ ○ ○

15. How much do you agree that other households in this community should use less water?

Strongly disagree/ Somewhat disagree /No opinion/ Somewhat agree/ Strongly agree

1 2 3 4 5

○ ○ ○ ○ ○

Social Norms :

16. How much do you think people who are important to you would disapprove/approve of you using less water in your household?

Disapprove /a great deal/ Disapprove/ No opinion/ Approve/ Approve a great deal

1 2 3 4 5

○ ○ ○ ○ ○

17. How much do you agree that people who are important to you want you to use less water in your household?

Strongly disagree/ Somewhat disagree /No opinion/ Somewhat agree/ Strongly agree

1 2 3 4 5

○ ○ ○ ○ ○

18. How much do you agree that your family try to use less water in your household?

Strongly disagree/ Somewhat disagree /No opinion/ Somewhat agree/ Strongly agree

1 2 3 4 5

○ ○ ○ ○ ○

19. How much do you agree that other people in the village try to use less water in their household?

Strongly disagree/ Somewhat disagree /No opinion/ Somewhat agree/ Strongly agree

1 2 3 4 5

○ ○ ○ ○ ○

20. How much do you agree that your village leaders try to use less water in their household?

Strongly disagree/ Somewhat disagree /No opinion/ Somewhat agree/ Strongly agree

1 2 3 4 5

○ ○ ○ ○ ○

Perceived Behavioural Control

21. How much do you agree that whether or not your household uses less water is entirely up to you?

Strongly disagree/ Somewhat disagree /No opinion/ Somewhat agree/ Strongly agree

1 2 3 4 5

◯ ◯ ◯ ◯ ◯

22. How much do you agree that, if you wanted to, it would be easy for your household to use less water?

Strongly disagree/ Somewhat disagree /No opinion/ Somewhat agree/ Strongly agree

1 2 3 4 5

◯ ◯ ◯ ◯ ◯

23. How much personal control do you feel you have over your household using less water?

Very little control/ Little control/ No opinion/ A fair amount of control/ A lot of control

1 2 3 4 5

◯ ◯ ◯ ◯ ◯

Water saving Practices:

24. How much do you agree that people in this community do enough to save water or use less water?

Strongly disagree/ Somewhat disagree /No opinion/ Somewhat agree/ Strongly agree

1 2 3 4 5

◯ ◯ ◯ ◯ ◯

Knowledge

25. How much information do you think people in this community have about how to use less water in their household?

Very little information/ Little information/ No opinion/ A fair amount of information/ A good amount of information

1 2 3 4 5

◯ ◯ ◯ ◯ ◯

Sanitation:

26. What type of toilet do you currently have?
27. What do you like about your current toilet?
28. What don't you like about your current toilet?
29. What is your preferred type of toilet?
30. Why, what do you like about it?
31. Have you ever heard / seen any of these types of toilets:

Composting toilet ( ) Yes / ( ) No / ( ) Not sure

Pit toilet( ) Yes / ( ) No / ( ) Not sure

32. [If yes to 30] Have you ever tried a composting toilet?

a. Yes b.No c. Not sure

33. [If yes to 30 or 31] What is your opinion of composting toilets?
34. [If yes to 30] Have you ever tried a Pit toilet?

a. Yes b.No c. Not sure

35. [If yes to 30 or 33] What is your opinion of VIP toilets?

Attitudes

36. For me, using dry toilets (Pit and compost) is :

Really not important /Not important /No opinion /A little important /Very important

1 2 3 4 5

○ ○ ○ ○ ○

Really not useful/ Not useful /No opinion/ A little useful/ Very Useful

1 2 3 4 5

○ ○ ○ ○ ○

Really not pleasant/ Not pleasant/ No opinion/ A little pleasant/ Very Pleasant

1 2 3 4 5

○ ○ ○ ○ ○

Really not enjoyable /Not enjoyable /No opinion/A little enjoyable /Very Enjoyable

1 2 3 4 5

○ ○ ○ ○ ○

If I have further questions, would you be willing to participate in a longer interview about water?
( )Yes / ( ) No
Any additional comments:
End of survey: Thank the participant
NOTES:
Water use: high or low (based on reported use, estimated volume used; Q 4, 6, 7, 8)
Attitude to water saving: positive or not positive ends of scale (Q 9, 10, 11, 12, 13)
Type of toilet: sort out between water-based, VIP, and composting for interview (Q 24)
Permission for interview: Yes / No

Appendix B

Interview Questions for Households with POSITIVE attitudes to water use:

Interview Questions for Households with POSITIVE attitudes to water use:

1. Do you think your household uses more, or less or the same water as other households?
2. What makes you think your house is using more (or less)? How do you know?
3. What are some reasons your house uses more (or less) water?
4. Are there things you do to use less water? Or save or reuse water?
5. Do you think using less water is important? Why/why not?
6. What about the other members of your household – how important do they think it is to save water (and who? – no names, just position in family)
7. What about other people in this village – how important do you think they think it is to use less water?

A. What makes you think this? (what evidence?)

8. Why do you think some people don't care about using less water?
9. Why do you think some people care more about using less water?
10. How does it make you feel that your household uses more water?
11. And what about the other members of your household? What do they think about your house using less water? (prompt – husband/wife; children; older people; youth)
12. What do you think about those households that use less water?
13. Are there some rules in this village about using less water? Can you please explain them? (prompt: Do the rules apply at all times? When do they apply?)
14. What are some reasons why people use a lot of water in their households?
15. Are there some things that make it difficult for some households to use less water?
16. Are there any actions the village does to save water?
17. Earlier I asked you about whether your household does anything to use less water. Do you know of any other things your household could do to use less water?

17.A - Is anything stopping your household from doing these other actions? What?

18. Do you have any ideas about things the village could do to use less water? (What are the main uses or loses of water? Can anything be done about these to save water?)
19. What about other households that use a lot of water – what do you think can be done to help those people to use less water?
20. What do you think would encourage or influence those households to care more about using less water?
21. Do many people use water in their toilets (not for handwashing, but for flush or pour-flush toilets)?

A. Do you think this is a good use of water? Why?

22. Is there anything else you would like to tell me about water use and saving water?

Interview Questions for Households with NON-POSITIVE attitudes to water use:

1. Do you think your household uses more, or less or the same water as other households?
2. What makes you think your house is using more (or less)? How do you know?
3. What are some reasons your house uses more (or less) water?
4. Are there things you do to use less water? Or save or reuse water?
5. Do you think using less water is important? Why/why not?
6. What about the other members of your household – how important do they think it is to save water (and who? – no names, just position in family)
7. What about other people in this village – how important do you think they think it is to use less water?

A. What makes you think this? (what evidence?)

8. Why do you think some people don't care about using less water?
9. Why do you think some people care more about using less water?
10. How does it make you feel that your household uses more (or less) water?
11. And what about the other members of your household? What do they think about your house using less water? (prompt – husband/wife; children; older people; youth)
12. What do you think about those households that use less water?
13. Are there some rules in this village about using less water? Can you please explain them? (prompt: Do the rules apply at all times? When do they apply?)
14. What are some reasons why people use a lot of water in their households?
15. Are there some things that make it difficult for some households to use less water?
16. Are there any actions the village does to save water?
17. Earlier I asked you about whether your household does anything to use less water. Do you know of any other things your household could do to use less water?

A. Is anything stopping your household from doing these other actions? What?

18. Do you have any ideas about things the village could do to use less water? (What are the main uses or loses of water? Can anything be done about these to save water?)
19. What about other households that use a lot of water – what do you think can be done to help those people to use less water?
20. What do you think would encourage or influence those households to care more about using less water?
21. Do many people use water in their toilets (not for handwashing, but for flush or pour-flush toilets)?

A. Do you think this is a good use of water? Why?

22. Is there anything else you would like to tell me about water use and saving water?

Interview Questions for Households with Pit toilets:

1. Please describe how the toilet works at your household.

2. What do you think about using this type of toilet in your household?
3. How do you feel about using a pit toilet?
4. And what about the other members of your household? What do they think/feel about your house using a pit toilet? (prompt – husband/wife; children; older people; youth)
5. Do you think using a pit toilet is important? Why?
6. What about the other members of your household – how important do they think it is to use a pit toilet (and who? – *no names, just position in family)*
7. What about other people in this village - how important do you believe they think it is to use a pit toilet?
   a. What makes you think this?
8. Why do you think some people don't care about using pit toilet?
9. Why do you think some people care more about using a pit toilet?
10. In your opinion, do you think other people in the village should have pit toilets? Why?
11. Do you think people in the community (friends, community leaders) support that you have a pit toilet in your household?
12. What are some of the benefits of having a pit toilet in your household?

13. What do you think are some of the problems associated with having a pit toilet?
14. In your opinion, how easy or difficult is it to use a pit toilet? Why?
15. How would you feel about using a toilet that doesn't use much water (such as a composting toilet)?
16. Do you know anyone that have a toilet that don't use much water (such as a composting toilet) in their household?
17. Do you think people in the community (friends, community leaders) would support if you decided to use toilets that don't use much water (such as a composting toilet)?
18. In your opinion, how important is water conservation is the village?
19. Who should be responsible for water conservation in the village?

Interview Questions for Households with Water-based toilets:

1. Please describe how the toilet works at your household.

2. What do you think about using this type of toilet in your household?
3. How do you feel about using a water-based toilet?
4. And what about the other members of your household? What do they think/feel about your house using a water-based toilet? (prompt – husband/wife; children; older people; youth)
5. Do you think using a water-based toilet is important? Why?
6. What about the other members of your household – how important do they think it is to use a water-based toilet (and who? – *no names, just position in family)*
7. What about other people in this village - how important do you believe they think it is to use a water-based toilet?

a. What makes you think this?

8. Why do you think some people don't care about using water-based toilet?
9. Why do you think some people care more about using a water-based toilet?
10. In your opinion, do you think other people in the village should have water-based toilets? Why?
11. Do you think people in the community (friends, community leaders) support that you have a water-based toilet in your household?
12. What are some of the benefits of having a water-based toilet in your household?

13. What do you think are some of the problems associated with having a water-based toilet?
14. In your opinion, how easy or difficult is it to use a water-based toilet? Why?
15. How would you feel about using a toilet that doesn't use much water (such as a composting toilet)?
16. Do you know anyone that have a toilet that don't use much water (such as a composting toilet) in their household?
17. Do you think people in the community (friends, community leaders) would support if you decided to use toilets that don't use much water (such as a composting toilet)?
18. In your opinion, how important is water conservation is the village?
19. Who should be responsible for water conservation in the village?

Interview Questions for Households with Composting toilets:

1. Please describe how the toilet works at your household.

2. What do you think about using this type of toilet in your household?
3. How do you feel about using a composting toilet?
4. And what about the other members of your household? What do **they think/feel** about your house using a composting toilet? (prompt – husband/wife; children; older people; youth)
5. Do you think using a composting toilet is important? Why?
6. What about the other members of your household – **how important** do they think it is to use a composting toilet (and who? – *no names, just position in family)*
7. What about other people in this village - how important do you believe they think it is to use composting toilet?

a. What makes you think this?

8. Why do you think some people don't care about using composting toilet?
9. Why do you think some people care more about using a composting toilet?
10. In your opinion, do you think other people in the village should have composting toilets? Why?
11. Do you think people in the community (friends, community leaders) support that you have a composting toilet in your household?
12. What are some of the benefits of having a composting toilet in your household?

13. What do you think are some of the difficulties/barriers of using a composting toilet?
14. In your opinion, how easy or difficult is it to use a toilet that doesn't use much water? Why?
15. In your opinion, how important is water conservation is the village?
16. Who should be responsible for water conservation in the village?

Focus group discussion guide

1. What are some behaviours people and the community can do to use less water?
2. What are some ways the community can be supported to use less water and how?
3. What are some ways the community can be influenced to use less water and how?
4. Can you tell me about the types of toilets in this village? What are the types and why do people choose to use those types? (prompt likes, dislikes)
5. What about other types of toilets that don't use any water? Or don't use much water?

[use prompts below]

a. Can you tell me how do they work?
b. What do the people who use like about them?
c. What do the people who use them DO NOT like?
d. Would they be suitable for this village?
e. Is there anyone that would have difficulty using and looking after these types?

6. [SHOW IMAGES OF Pit] Have you heard or seen any of these?

a. Can you tell me how do they work?
b. What do the people who use like about them?
c. What do the people who use them DO NOT like?
d. Would they be suitable for this village?
e. Is there anyone that would have difficulty using and looking after these types?

[SHOW IMAGES OF COMPOSTING TOILET] Have you heard or seen any of these?

f. Can you tell me how do they work?
g. What do the people who use like about them?
h. What do the people who use them DO NOT like?
i. Would they be suitable for this village?
j. Is there anyone that would have difficulty using and looking after these types?

8. Comparing these water-saving toilets to the toilets already in the village, which do you think most people would like better? Why?
9. If not water-saving: are there some changes that could be made to these water-saving toilets that would mean people like them better than the existing toilets?
11. In your opinion, how would you influence other people in the village to use water-saving toilets?