



KOROSAN

On-site Household Sanitation Guidelines for Fiji

#8 GUIDELINES FOR VILLAGE PARTICIPATION IN WATER AND SANITATION ACTIONS

1 PURPOSE

The purpose of this guideline is to support community-led water supply, sanitation and hygiene (WASH) improvements in Fijian villages and settlements. Participatory approaches, methods and tools are outlined that can be used by villagers and community members, non-government organisations and government agencies to mobilise and support community action on WASH.

The participatory activities described can be used to:

- Engage villages and other communities to identify and address their WASH needs.
- Raise awareness of the linkages between water, sanitation, hygiene and the health and wellbeing of communities and the environment on which they depend.
- Improve the knowledge base for decisions about water supply and sanitation services.
- Complement the technical information provided in the KoroSan On-site Household Sanitation, enabling communities to:
 - identify water and wastewater management options appropriate to their situation, needs and available financial resources
 - build their capacity to construct, operate and maintain water and sanitation systems, and
- Collect information and identify hazards and potential health risks to support the submission of village water and sanitation plans to provincial and central government to meet regulatory requirements (e.g., Fiji Department of Water and Sewerage, 2012)

2 SCOPE

The participatory approaches provided in this guide are not a recipe or blueprint that needs to be followed in a linear way in successive steps. Rather they are a collection of tools that have evolved in practice during the *Wai Votua* and *WASH Koro* projects¹. We have found them to be effective ways for engaging with communities to explore and address their water supply and sanitation needs. There are, however, a wide range of different participation guides available. The methods outlined in this guideline can be adapted and used alongside these as required.

The guideline is organised into 5 Sections:

- Sections 1 and 2 set out the purpose and scope.
- Section 3 focuses on beginning a WASH project.
- Section 4 provides methods for initial engagement and village participation.
- Section 5 provides methods for building capacity.

Each description of the participatory methods is illustrated through one or more relevant case studies.

3 GETTING STARTED

Water and sanitation projects may be initiated in a variety of ways, such as requests from a village or settlement, or observations or suggestions from Government or other agencies concerned about health or the impacts of weather events related to climate change. From experience, a local project coordinator should be engaged where possible to assist with introducing the village and project team to each other. This is an important on-going role and the person needs to be credible and have some standing in their field of expertise and/or community. In some instances they may also need to be able to carry out a translation role, and provide guidance regarding appropriate cultural protocols and practices.

3.1 PREPARATION

For all participatory approaches and interventions it is important to make sure the village is informed of what is intended. The Turaga ni Koro (TK) usually has the responsibility to inform people in the village and make sure that the 'right' people attend, for example, village elders, members of appropriate committees such as the water and health committees, village health workers, representatives of the different clans within the village, including women and youth. The purpose of the workshop or other activity should be clear, including how long it is likely to take, and the sorts of people required. When working in a village, care should also be taken to schedule workshops at times of the day and places suitable for those attending; e.g., ideally not when meals need to be prepared or children put to bed.

The first village meeting should include the Chief, TK, Elders, committee members and clan representatives as well as women and youth, and all key members of the project team. It may also be appropriate to have Provincial Council Representatives involved. This initial meeting provides an appropriate setting for a formal, traditional welcome and key introductions, followed by an initial exchange of information and discussion about village needs, protocols and visitor expertise.

¹ See Appendix One for overview of *Wai Votua* and *WASH Koro* projects



The following section outlines participatory approaches, methods and tools used to engage partner villages and to build relationships and uses experiences and photos from the *Wai Votua* and *WASH Koro* projects to illustrate these. They are presented in a logically ordered sequence, but, depending on the purpose of using these participatory activities, the order in which they might be used can be adapted as necessary. While the case study examples focus on just one village, the approaches, methods and tools have been employed in all three villages involved in the *WASH Koro* project and adapted to suit individual village contexts, situations and social interactions.

4 METHODS FOR INITIAL ENGAGEMENT

4.1 HISTORICAL TIME-LINES

Historical time-lines can provide information such as when water was first provided, the installation of sanitary systems, how many houses and people are now in the village, village population growth, and what other help has been provided and by whom. This process stimulates discussion amongst people in the village and is inclusive of the elders and women. It can also help put the new project into context of what has gone before.

4.1.2 PROCESS

This activity can be carried out in a village hall or other dwelling big enough for a workshop for as many participants as possible, including elders, youth, men and women. Choose start and finish dates such as from 10-20 years ago to 5 years into the future. Make sure participants understand the aim and focus of the activity. Large sheets of paper and felt pens are needed along with one or two volunteers to record the information.



Merging the historical time-line with the transect walk (see next section).

4.1.3 STRENGTHS & WEAKNESSES

Information collected provides a useful point of reference throughout the project lifetime and it can be added to as people recall other important events. The time-line can provide insights into where the village is right now and what they may want or need in the future. It can help explain why decisions were made, what led to their current water and sanitation systems, what has worked or has not worked, current issues and what progress has been made.

There is not always agreement on the timing of events, or descriptive accuracy about what has been done, as well as discrepancies about the location and/or numbers of people who have different kinds of water/sanitation services. The reliability of the time-line can be checked by following this up with a village transect walk.

4.2 VILLAGE TRANSECT WALKS

This method involves carrying out a transect or cross-section walk of the village. The route (or routes) taken, are first discussed with key people in the village, and adapted depending on the focus of the intended water and/or sanitation project or intervention.

4.2.1 PROCESS

Transect walks involve key people and project team members walking through the village, checking dates of installation and/or improvements to water and sanitation systems, noting issues or problems that need addressing and recording essential information through note-taking and/or taking photos (preferably on a digital camera enabling incorporation into future power point presentations as the project progresses). For a large village it may be necessary to break up into smaller groups.

4.2.2 STRENGTHS AND WEAKNESSES

This activity enables the exchange of questions, verification of historical time-line and highlights village awareness and understanding of issues/problems that need addressing. It may also be used to identify potential monitoring sites.

Key people with vital information may be missing and/or certain areas may be missed.



Groups with project team members taking a transect walk through their village and noting potential risks to health



CASE STUDY EXAMPLE: Environmental Assessment

Context: There was evidence of pollution of a river flowing through a village and into a coastal lagoon. The river was used for bathing and the lagoon was important for fish harvest and provided recreational activities for tourists. The aim of the village transect walk was to observe and document potential causes of contamination such as failing septic systems within the village and septic discharges from a housing settlement upstream.

Process: Project team members teamed up with village participants with two groups taking a section each of the village to walk through. Both groups had digital cameras to record problems. Examples of issues identified:



Wastewater ponding in a drain flowing into river.



Children playing downstream of contaminated drain inflow.



Piggery waste draining to river.



Septic discharge leaking onto beach and into lagoon.

Outcomes: Agreement between project team and villagers that pollution was predominantly being generated in the village and greater understanding about problems that needed addressing.

"We've learned that we are destroying our ocean draining grey and black water out to the ocean" (Villager).

"Finding the best technical solutions for water and waste-water infrastructure depends on village knowledge and needs, as well as imported expertise. It's not our place, therefore we have to ask" (Project team member).

4.3 VILLAGE WATER & SANITATION MAPS OR PARTICIPATORY MAPPING:

Creating a village water and sanitation map draws on more than one person's knowledge of the village, and generates discussion between participants promoting shared understanding. They also provide background information for choosing an appropriate sanitation system (see KoroSan #1).

4.3.1 PROCESS

This activity requires a hall or other dwelling big enough for a workshop. Depending on how many participants there are, it may be necessary to break into groups. Participants should include a cross section of people from different areas in the village, and both men and women. A large sheet of paper and felt pens are provided. Depending on the purpose of the project you may want to concentrate on sanitation infrastructure – what is their water source, what kinds of toilets do households have, what septic systems do they have, and where does the waste-water go – is it treated? Each individual house and their location in the village are represented diagrammatically and an indication of the space between houses is useful for thinking about an appropriate sanitation system. The task of drawing a village water map generates a lot of discussion and checking with each other about the accuracy of what they were drawing, therefore it is wise to allow plenty of time for this exercise (approximately two hours).

4.3.2 STRENGTHS & WEAKNESSES

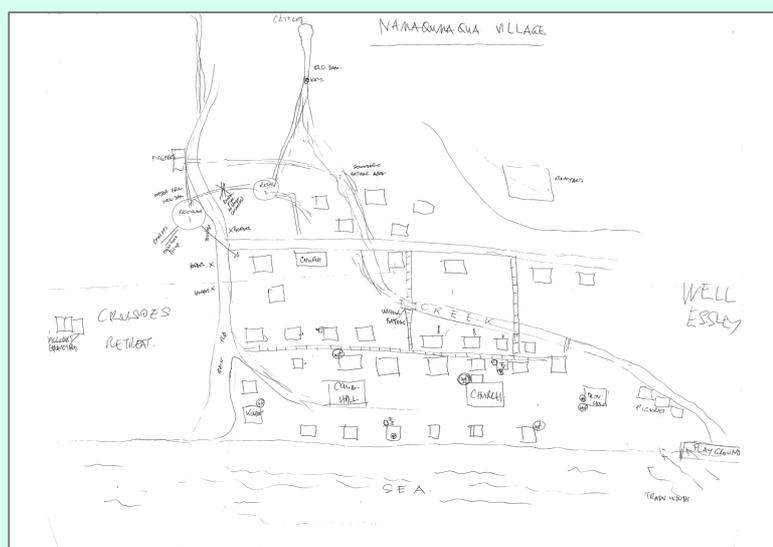
These maps provide a useful reference point (e.g., number and location of household taps, water stands and rainwater tanks; form and location of sanitation systems, and where there are places where water may be contaminated – 'hot spots' where there may be a health risk. This activity promotes village thinking about connections between water supply and sanitation systems and what happens to the waste water. The supplementary process of taking photos and getting information for each individual house is a good way to engage with people in the village and raise awareness about the project or intervention.

Keeping track of the map and making sure it is available for future workshops can sometimes be a problem. From experience, it is a good idea to take photos of village water maps. The supplementary process of getting information for each individual house is very time-consuming, especially as you need to follow cultural protocols and it is wise to take someone with you who can translate when needed.

CASE STUDY EXAMPLE: Participatory Mapping

Context: To understand lay-out of the village, terrain, housing density, wastewater risks, site constraints and opportunities.

Process: A small group of men and women worked in the village hall to construct the map. They were asked to include access roads, river & dam, houses, rain-water tanks, piggeries, beach and to indicate neighbouring resorts, and to point out potential 'hot spots' where they thought water could be contaminated or where waste-water could pose risks.



Members of the women's committee learned how to assess rainwater tank contamination risks.



Water quality testing of water in the old water supply dam showed significant contamination.



Black water treatment constructed above ground because of low permeability clay soils at the back of the village (*See KoroSan #1 & #6*).



Outcomes: The village was advised to use other sources of water or to boil the water first. Villagers learned about the need to consider different land application systems for wastewater because of different soils – clay and sand.

5 INTERACTIVE METHODS TO BUILD CAPACITY

Community understanding of linkages between water, sanitation and health promotes effective actions to address interrelated problems such as hygiene behaviours and infrastructure improvements. Identifying risks to health within the water catchment raises awareness of where and what hazards might pose risks. Hazards can be related to contamination of water sources including wastewater inflows from flush toilet septic systems (black water) or household grey water. The focus is on health problems resulting from ingesting/swallowing contaminated water (e.g., diarrhoea), contact with contaminated water (e.g., infected scabies and/or secondary infections of wounds) and associated hygiene behaviours. This section includes activities that require moving beyond what is often taken-for-granted to create explicit visual images. These reflect shared experiences, consequently promoting community-wide acknowledgement and action to address the identified problems.

5.1 CATCHMENT "RICH PICTURES": HEALTH RISK ASSESSMENT

This activity uses a "*rich picture*" concept to include drawing pictures, text and/or symbols to define a *catchment* water cycle, from mountains to the sea (water into the village and water out). There is no right or wrong way to create a "rich picture". The "richness" arises from the diversity of participants and multiple meanings associated with the captured images. The aim is to identify and examine the linkages between environmental and human health, and to discuss human and other activities that may influence the quality of water used for domestic use (e.g., drinking, cooking, washing); and impact of waste-water on bathing, food gathering and recreational areas.²

5.1.2 PROCESS

A large space is required for working in small groups with large sheets of paper and felt markers to 'construct' their catchment, using illustrations and/or text to produce a 'rich picture'. The need to link their physical environment with potential health risks – the purpose – is explained and participants are encouraged to draw on both individual and collective or shared knowledge and experience. Variation between groups is inevitable and when groups are feeding back to the whole group this variation sparks questions and discussion. Each group needs a facilitator who understands what a 'catchment' and health risks are as well as the skills to build confidence in participants. The "rich pictures" can be presented to larger village meetings to stimulate discussion, and to contribute to action planning to identify and prioritise what is needed to address problems.

5.1.3 STRENGTHS & WEAKNESSES

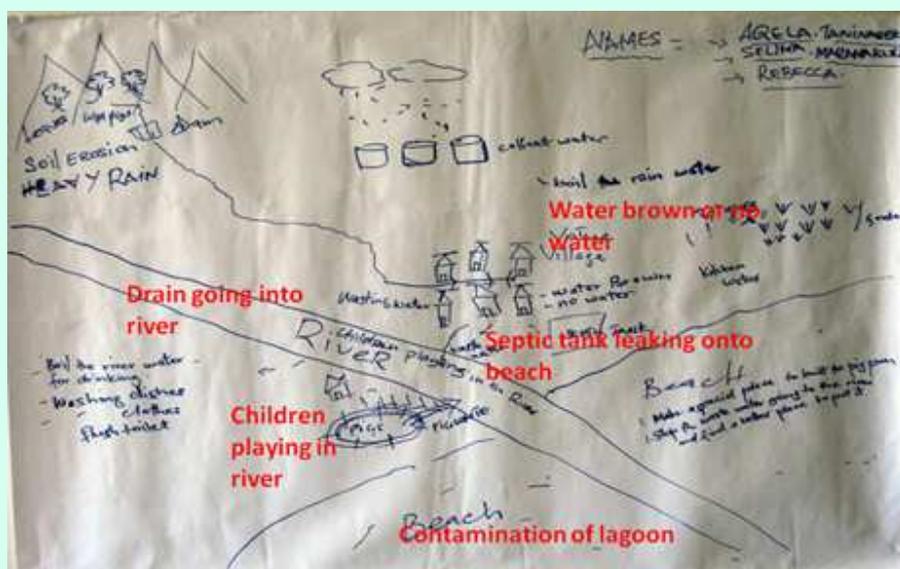
This empowering method, linking environmental and human health makes 'silent' knowledge visible in new ways. The 'rich pictures' are a valuable resource for the village when prioritising and discussing improvements to water and sanitation infrastructure, and can inform water quality testing to substantiate existing perceptions and what has been identified as a possible health risk.

² This fits with the Fiji Department of Water and Sewerage Policy and Guidelines 2012, in which risk assessment aims to ensure a good fit between technology and maintaining environmental and human health.

CASE STUDY EXAMPLE: Rich Pictures

Context: Constructing a Health Impact Assessment (HIA) for the Wai Votua project to assess improvements to water and sanitation systems and hygiene behaviours, as well as the impacts of actively involving women. An important part of an HIA is to identify health risks, based on linking environmental and human health. The concept of producing a 'rich picture' is based on Critical Systems thinking and we adapted this in a workshop carried out with 4 groups of women.

Process: The concept and purpose of a 'rich picture' was explained to participants along with making linkages between environmental and human health through focusing on their village catchment. Initially the women said they could not draw their catchment and did not have the knowledge about the catchment and risks to health, but it soon became clear that they could do both the drawing and identify risks to health, especially for young children. Project team members facilitated the four groups.



Outcomes: This participatory method was empowering for the women whose knowledge was clearly valued by those who attended the village meeting demonstrated by spontaneous applause from an initially sceptical water committee. The pictures provided a rationale for subsequent water quality testing sites, the results of which were integrated with village health data to provide a 'big picture'. People in the village stopped blaming the housing estate up the valley for contamination of Votua River, and articulated the need for them to take responsibility.

We can't ask other settlements such as Votua Housing to clean up if we don't clean up our own 'back yard' first.

5.2 PHOTO-VOICE

Photo-voice as a participatory method has its origins in social geography and the social sciences especially those relating to socio-spatial inequalities. It has been described as an empowering tool effective in representing participants' lived reality, providing new insights as well as indications of shared issues and/or problems. It has rarely been used in the WASH intervention context in Pacific Islands or elsewhere in the developing world.³

5.2.1 PROCESS

It is important to focus on an issue or problem relevant to the village so participants are clear about what they are photographing and why. They are provided with a commentary sheet to say why they took particular photos. Participants need to decide who will take the photos and approximately how many photos will be taken. This can be done in groups, or by having at least two people working together – one to take the photo and the other to write the commentary. Disposable or digital cameras can be used. It is preferable to have the photographer input into collating the photos and commentaries. This requires ranking based on how many photos of the same thing were taken and/or agreement on what seems to be the most urgent or pressing issue that needs addressing. Below is an example of a commentary sheet.

Focus of photovoice activity:	Name of village: Participants:
We took this photo because ...	
We took this photo because ..	

5.2.2. STRENGTHS & WEAKNESSES

This can be both a fun and empowering participatory method where participants see their village with "*new eyes*" and what they see is *shared by others*. The photos provide *evidence* that there are village-wide issues which promotes discussion, debate and action planning contributing to *mobilizing change*. It also reinforces linkages made between water, sanitation and health.

Availability of digital cameras and costs related to using disposable cameras and developing photos may be barriers, as well as access to laptops to download digital photos and enter commentaries. Another significant barrier is the time needed to take photos, collate the photos and commentaries and prepare feedback for village, and follow-up with action planning workshops.

³ See Bisung et al. 2015.

CASE STUDY EXAMPLE: Photo Voice

Context: The village had issues with insufficient water supply, which meant that water was supplied to different parts of the village on a 1 day on and 2 days off schedule. Rainwater tanks at various sites in the drought-prone village were also unreliable water sources. Associated issues included: (i) the ongoing installation of flush toilets and septic tanks being undertaken by an NGO based on outdated 1964 health department guideline; (ii) risks of contamination of stored water both outside and inside dwellings. Photo-voice was used to get a more in-depth understanding of the issues relating to water, sanitation & hygiene from the villagers' perspective.

Process: Four groups with cameras and commentary sheets covered four areas of the village with instructions to include photos of the water supply, rainwater tanks, collection and storage of water, the toilet, septic tank and any issues with the toilet wastewater. Commentaries were to focus on the health risks associated with outside and inside environments, as well as the actions of collecting, storing and using water and associated hygiene issues. Photos and commentaries were collated according to commonly identified issues and presented in a village album (see examples below).



"The toilets are located on higher ground whilst the borehole is situated below. There is the risk of faecal contamination from the toilet into the borehole and water which is being pumped and supplied to the village."



"Gutterings are often used as pathways by rats and when it rains this dirty water is often collected and used by the household."



"Water that is stored in buckets is used for drinking but there is no filter to clean the water before drinking it."

Outcomes: The album formed the basis of an action planning workshop resulting in replacement of broken guttering and rainwater tank lids and fixing leaks, and the installation of bucket filters in every household by 'Give Clean Water', Nadi (www.givecleanwater.org).

Improved understanding of the linkages between environmental and human health and between water and sanitation systems led to participation in two subsequent workshops (see following section for Reality check workshop) and a later water and sanitation action planning workshop, the outcomes of which included agreement to install ecoVIP2 toilets in the short to medium term while options are investigated for improving water supply reliability.

5.3 REALITY CHECK WORKSHOP

This method is based on critical systems theory.⁴ Participants develop a systemic rich picture based on an imaginative and idealistic vision which is then compared to what is currently real. The purpose of the method is to use participants' imagination to think more creatively about possible or potential ways to achieve a shared and desired reality or to shift their desires to something that is more practical for the community within the constraints of their environment or situation.

5.3.1 PROCESS

The workshop is held in a hall or other suitable venue. It is important to ensure that relevant participants attend the workshop. Participants are divided into groups of 6-10 people and the topic, issue or problem is introduced. They are asked to think about the ideal situation they envisage if the problem was 'fixed' – and represent this in diagrammatic form – pictures, text and symbols. The 'ideal' is then compared to the existing reality that paves the way for considering how they might either achieve their ideal/vision or find a practical and realistic alternative. These reality check workshops usually require some preparation of information that needs to be taken into account in the comparison between the ideal and the real before any future decisions and/or actions can proceed. This information may necessitate the involvement of expertise outside the village.

5.3.2 STRENGTHS AND WEAKNESSES

This approach enables articulation and documentation of village aspirations, examining the existing reality and getting to grips with the factors that constrain or enable their realisation - whether they are achievable and in what time frame.

While this approach can lead to future action, it is more likely to indicate the need for further information that may not be readily available in the village. Finding people with the right expertise and/or skills may be difficult and expensive.

⁴ Within the systems science paradigm (used in social science), the need for a critical systems approach was identified by Jackson (2001) for situations where there may not be common interests shared by stakeholders; where there is potential for fundamental conflict, and where consensus is often derived from the exercise of power by particular individuals and/or groups rather than through shared understanding and inclusive processes.

5.4 HANDS ON- BUILDING CAPACITY BY WORKING TOGETHER

Working together provides capacity-building through opportunities to *learn by doing* and integrating outside expertise with local knowledge, skills and labour. Water and sanitation service projects or interventions may often begin with village involvement but this may be neglected as the physical/technical construction work proceeds. In the *WASH Koro* project, the participatory activities took place alongside the design, construction and monitoring of sanitation services (septic tanks, waste-water treatment, ecoVIP2 toilets). In the *Wai Votua* project, concurrent participatory activities were crucial for the village-scale improvements in water and sanitation systems. In both projects, the participatory approaches and methods used complemented and were integrated, where possible, with the actual physical and technical design and construction work.

5.4.1 PROCESS

Working together can include the whole village – all ages can play a role: e.g., Elder support, especially for young men carrying out physical work, women providing food, and children can help too. Developing a memorandum of understanding (MOU) can provide leadership, commitment, a common sense of purpose, and promote discussion about what is to be undertaken. It can also help define roles and responsibilities of both the project team and the village. There is not a one-size-fits-all process for working together as each village is different in many ways, including:

- The physical environment (e.g., hilly, flat, soil types).
- The social environment (e.g., size of village, density of housing, population changes).
- The availability and reliability of water supplies and whether these are from rivers (surface water) or underground (groundwater).
- The nature of project or intervention – on what scale is it? (e.g., whole village or individual households).
- Access to outside resources and materials needed for construction.
- Availability and willingness of workers within the village.
- Support from the chief and elders, and enabling governance structures and practices.

Progress is also affected by weather conditions, social and cultural responsibilities such as a death or a wedding in the village, and other events such as village fund-raising activities. The processes for working together are best presented here through a series of case study examples using photos from the *Wai Votua* and *WASH Koro* projects that illustrate the ways in which project team members and villagers worked together.

CASE STUDY EXAMPLE 1: Learning by Doing

Context: The village was receiving help from Rustic Pathways (NGO) to install new flush toilets and septic systems. The septic tank standards (1964) being used were outdated and needed upgrading to reflect current best practice, as well as land application systems for treatment of septic tank effluent to reduce health risks.

Process: The project team provided upgraded design plans for septic tanks and developed land application systems suitable for the local soils. Workshops were held to provide initial information about what would be involved and Rustic Pathways, the project team and people in the village embarked on building the septic tanks and land application systems for black water. Given the village problems with water supply and reliability, water and women committee members were invited to another village project where a prototype ecoVIP2 pit toilet had already been built to see if this was a viable alternative to the ongoing installation of flush toilets. **(See KoroSan #2, #3, #4, #5)**



Soil testing to determine soil capability for drainage



Checking ground levels and gradients



Digging land application trenches



Family collecting material to line bottom of trench.



Waste water trench with half drums covering pipe.



Building a waterless ecoVIP2 toilet.

Outcomes: The combination of educative and practical activities built local knowledge, skills and capacities. Subsequently Jeke (local project manager) wrote references for a number of young men in the village to support future employment opportunities. The village has constructed two new septic tanks and land application systems for waste-water treatment, and two ecoVIP2 toilets, with commitment from the participating NGO to help the village construct 8 more.

CASE STUDY EXAMPLE 2: Learning by Doing

Context: The aged and inadequate village water and sanitation infrastructure needed upgrading. This included upgrading the existing dam, increased storage capacity, installation of a new pipeline and reticulation system for village drinking water. New wastewater management systems were also needed to markedly reduce pollution of the river and coastal zone, important for bathing and recreation. Because of the high density of houses in the village and limited nearby areas available for land application of wastewaters, a hybrid system of household septic systems linked to the centralised collection of black water was chosen. The septic wastewater was then pumped to a wetland constructed on the hill behind the village for treatment and land application. Improved systems for grey water infiltration or treatment were also implemented at each household.

Process: **Water**



Digging trench for new water reticulation system around village



Installing drinking water tanks to remove sediment and provide storage

Process: **Sanitation**



Designing a system



Preparing drums for household grey water infiltration (see KoroSan #7).



Constructing small wetland treatment area for grey water in drain to river



Excavating for black water collection and pump chamber



Constructing wetland for black water treatment behind village

Outcomes: Improved water and sanitation infrastructure for the village, creating a healthier environment, and reducing the health risks to people in the village

"Having this project will surely bring a good future for all the people in Votua"



CASE STUDY EXAMPLE 3: Learning by Doing

Context: The village had recently improved their drinking water supply but recognised they had a problem with septic tanks and lack of black water treatment. Very different soil types, ranging from sandy soils to clay, occurred in the village and a creek ran through the centre of the village. The *WASH Koro project* was interested in working with the village to demonstrate and test new household-scale wastewater treatment approaches at 3 houses.

Process: The village map (see section 4.3) was used to identify areas of the village where different land application approaches would be needed due to differences in soil permeability. With this information, the village chose representative houses where the new septic tanks and land application black-water systems would be installed. The project team was responsible for the design and the village carried out the construction overseen by an experienced Fijian project manager from a nearby village.



Construction and completed above-ground waste-water treatment systems for low permeability, high water table clay soils.

(See KoroSan #2,#4, #5)



Construction of septic tank.
(See KoroSan #2-5)



LAS system on sandy soil.
(See KoroSan #2-5)



Completed ecoVIP2
(See KoroSan #6)

Outcomes: Because people in the village now understand the importance of appropriate and functioning sanitation systems, a village task force will assess the remaining 40 septic tanks and the soakage performance of black water. A report will be presented at the Village Council meeting, followed by a request for financial and technical support from the Provincial Administrator and relevant NGOs. Positive experience of the ecoVIP2 toilet has changed people's perceptions of what a waterless pit toilet can be, and more households now want an ecoVIP2 system. The TK has asked the *WASH Koro* team to facilitate a workshop with the village to develop a village-wide sanitation plan.

5.5 INFORMATION GATHERING (HEALTH AND WATER QUALITY DATA COLLECTION)

Providing evidence about health problems that could be related to water contamination can support projects or interventions to improve water and/or sanitation systems. While this information can be used for monitoring and evaluation of projects, it may not be sensitive enough to detect change in community health due to water and sanitation interventions. This is because there are multiple sources of environmental contamination and opportunities for disease transmission from other sources within the villages (e.g., food-related).

5.5.1 PROCESS

When making decisions about improvements to water and sanitation systems it can be helpful to have a clear picture over time of how many people – or children – in the village experience health problems such as diarrhoea, secondary infections of scabies lesions or cuts/wounds, and eye infections which *may* result from drinking or contact with contaminated water/wastewater. Working alongside village health workers and interviewing local health centres can provide a general overview of the health problems in the village and local community. The Doctor may request water quality testing if there are significant numbers of children getting sick. Water quality testing, can provide valuable information about the degree of contamination. Simple methods to detect *Escherichia coli* (*E. coli*) (bacteria resulting from faecal contamination by humans and/or animals, including birds) can be used to make the otherwise unseen visible. This can help the community determine if the water is safe and/or identify high risk areas and activities.⁵

Health information can be collected from the whole village or a sample of households. It needs to be collected weekly over a meaningful period of time (at least three months), preferably at times of the year when the risks of contamination and/or associated health effects are evident. Once collated and made available to village meetings, health authorities, provincial councils and government departments, this evidence can help the village to assess the risks and develop plans to address them. This information can also support requests for resources to address related health problems. While it is often not possible or feasible to collect quantitative health and water quality data in the village context, in an ideal world, collection of this data before and after water, sanitation or hygiene projects or interventions would provide (a) evidence of problem or need and (b) evidence that the project/intervention made a difference.⁶

5.5.2 STRENGTHS & WEAKNESSES

When patterns of health problems are identified this provides insights into the possible causes and can guide activities or interventions to address the problem or problems – e.g., drinking water contamination,

⁵ *E. coli* is an indicator of the potential presence of faecal pathogens in the water. Participation of adults and children in the transect walk, catchment rich pictures, and photo-voice can help in identifying priority sites for water quality testing. Microbiological testing can identify health risk “hot spots” and sources of contamination.

⁶ In the *WASH Koro* project, the performance of the different land application systems installed will be monitored to determine the effectiveness of these systems in treating septic tank wastewaters and protecting village health. See *KoroSan #4 & #5*

failing septic systems and lack of black water treatment or inadequate hygiene behaviours (e.g., hand-washing). When health data is integrated with water quality testing this provides even stronger indications of where problems lie. Other simple low-cost scientific methods include the H₂S water test⁷ to provide a broad picture of contamination, but other moderate-cost scientific methods can provide more detail about the amount of faecal contamination in the water and how safe (or risky) the water is for human health.⁸

Health data collection is time-consuming, and requires skilled survey design and interpretation of findings (what does this information mean?). Water quality testing is often unavailable and/or relatively expensive. Undertaking a 'before and after' village scale study to get scientifically valid results would be costly so there are questions about how much money and effort would be needed in order to prove a significant reduction in disease prevalence. However, it is possible to carry out a 'before and after' general village health, water and sanitation survey/questionnaire using appropriate health indicators to show trends. When carrying out more than one intervention over the same time period it is not possible to attribute health improvements to a single intervention.



Youth testing water conductivity.



Woman collecting water sample from tap stand.

⁷ See Mosley & Sharp, 2005; Live & Learn Environmental Education, 2012; Wright et al. 2012.

⁸ See Stott, 2015.

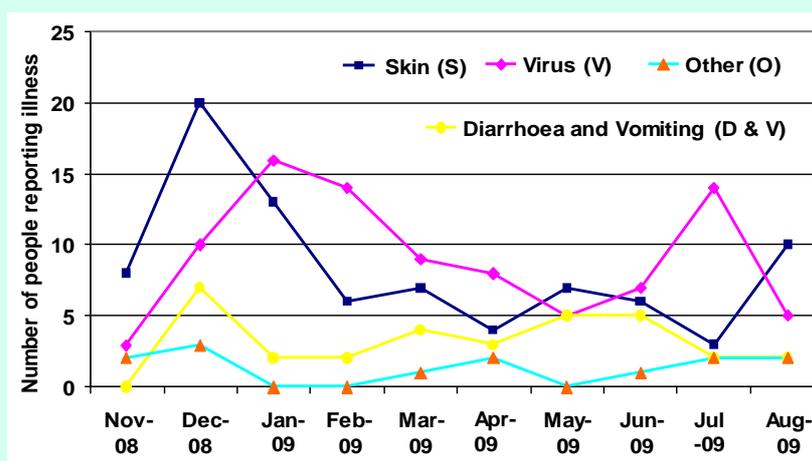
CASE STUDY EXAMPLE: Health Monitoring

Context: Informing the Health Impact Assessment (HIA) for Votua was data collected on children’s health given that, communicable diarrhoeal diseases was identified as a leading cause of death in children under five in Fiji, with inadequate sanitation, poor water supply, and poor living and environmental conditions identified as causal factors (MDG, Fiji National Reporting 2004).

Process: We first examined the health data at the local health clinic over a year and, building on health problems already identified by women in the village, we developed indicator illnesses that could – or were likely to – result from water contamination. A simple questionnaire was prepared & translated into Fijian. Twelve households with Primary school-age children were selected, with data collected weekly for 5 months.

Household Name:		Date:			
Who	Age	Diarrhoea and/or Vomiting	Secondary infection of cut or wound	Skin infection with scabies	Eye infection

The weekly data was collected by a village representative and with help this was collated and presented in graph form for the village notice-board and monthly village meetings. There were 36 cases of diarrhoea in children between May to October 2007. Collation of data was followed up by hand-washing workshops and activities and the engagement of the village, including children, in water testing



Gastro-intestinal diarrhoeal illnesses and secondary infection of cuts, grazes and skin lesions (e.g. from scabies⁹) are common health problems in Fijian villages.

Outcomes: Transfer and extension of knowledge gained from village participation back to the community has strengthened the engagement of the village in the project and supported voluntary work by the village. Involvement of women, who tend to take primary responsibility for the health of their families, was especially important for provoking action across the whole WASH spectrum.

"I am happy about this project ... we can be sure about our future generation’s healthy living" (village elder).

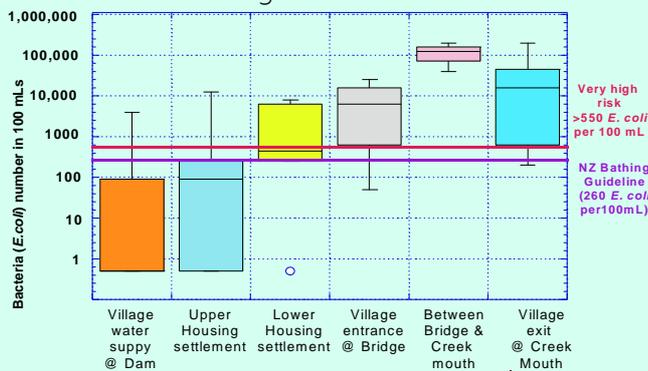
⁹ See Romani, L., et al, 2015.



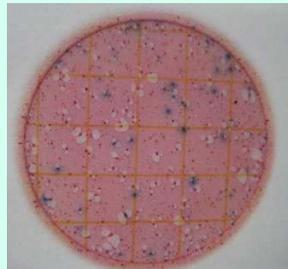
CASE STUDY EXAMPLE: Water Quality Monitoring

Context: Fijian villagers, especially the children, swim and bath frequently in streams and lagoons around villages. Communal bathing and clothes washing are often also important social events in daily village life, and water from these sources may also be used for drinking and cooking during periods when piped or roof water supplies are unavailable. Water quality testing was used alongside a variety of other participatory activities to help assess and raise awareness of water-borne health risks in and around villages.

Process: Focussing on involvement of women and members of water and health committees, surface and drinking water sampling sites were identified using rich pictures, sampled, and the microbial quality assessed using low-cost simplified faecal indicator testing methods. Feedback of results to the village the next day (after 24 hrs incubation) showed significant faecal contamination of bathing areas and surface waters around the villages.



Sampling bathing and laundry washing areas



Water testing with 3M *Petrifilm*TM plates



Testing water with H₂S paper strips

Outcomes. Making visible the otherwise unseen, microbiological state of waters within and around the villages increased understanding of wastewater sources and transmission pathways, and the potential health risks of different drinking water sources and bathing areas. Direct visual assessment of *E. coli* bacterial colonies on the plates rather than numbers or graphs appeared to be influential in facilitating village accountability of their own contamination of waterways rather than blaming “upstream” users. Integrating the two forms of data collection (health data and water quality) promoted a keener interest in village responsibility for environmental management and helped to mobilize village actions resulting in (i) moving the piggeries; (ii) discouraging the children from bathing and playing in the river, and (iii) increasing awareness of the importance of hand-washing after being in the river and after cleaning out the piggeries

“Where the women bathe – we didn’t know it was contaminated before WASH Koro came in. We’d always got itchy skin”

“We have to stop blaming the housing estate upstream and start doing things we’re responsible for”

5.6 ACTION PLANNING

Action Planning can be carried out at the beginning of a project or intervention, or it can build on other participatory processes that have built knowledge, skills and capacity. It could also be used as part of a Water and/or Sanitation Safety Plan process to rank hazardous events, prioritise risks and to identify where improvements can be implemented. The ability to identify and prioritise issues are key to successful action planning - whether at the beginning or later in a project. Also important is 'getting the right participation and getting the participation right'. Including village leaders, ensuring clan and committee representation, encouraging men and women, youth and children to participate will increase the likelihood of action and outcomes.

Participatory Action Planning Cycle (courtesy of Patrina Dumaru)



The purpose of action planning is a process for moving from what people think should or needs to be done, to actual action to make it happen. The action planning cycle is an iterative, not linear process. Follow-up assessment of whether the outcomes are appropriate and satisfactory needs to be done. It may be necessary go back to the beginning, or look more closely at the implementation and/or monitoring, and whether others were well informed.

5.6.1 PROCESS

Action planning is done in a workshop setting, usually in a village hall, depending on how many people participate. If there are a lot of people it is useful to break into groups of about 10 people in each group. When all groups have completed their action plans they present them back to the whole group. The plan that includes most of the actions is selected and if it is missing anything identified on other plans this can be added to the final action plan. There are clearly defined processes within the action planning cycle. It is useful to begin with a particular vision or outcome that relates to an already defined problem or issue that needs a solution within a given time-frame, rather than a large over-arching vision that can be overwhelming, too complex, and take too long to achieve.

For each step in the action planning cycle there are a number of questions that can help. Not all of these questions need to be answered but you can select which questions are most relevant or necessary in order to reach your goal (See Appendix 3).

Immediate follow-up to action planning is the presentation of the action plan at a village meeting where it can be discussed to reach agreement for its implementation. Once it is implemented further follow-up is needed – this is explicitly part of the action planning cycle in the monitoring and accountability/review processes. These forms of follow-up are often neglected which may hinder ongoing progress and the sustainability of the outcomes. There are also changes occurring in villages that may need a change of direction or a new vision, such as increase/decrease in population, new technology, more or less resources available, new village commitments, and or the effects of adverse weather events.

5.6.2 STRENGTHS & WEAKNESSES

This can be an effective process for encouraging action in the village, especially if it has been informed by other participatory methods to raise awareness, and build knowledge and skills. For example, in two villages, photos and commentaries provided the evidence of a shared problem resulting in buy-in from the whole village for actions needed. Participants that represent committees, clans and include village leaders feel valued in their roles and also have the authority to help implementation of the plan, once it has been presented and agreed to in village meetings.

Fiji culture is predominantly an oral culture not a written culture, so there are issues relating to what happens to the written plan – who holds it, how can it be updated or adapted, and how does it inform ongoing action.¹⁰ Another difficulty is the implementation of behaviour change – often part of any action plan. This may not be a problem if there is one committee or group that is responsible for implementation and follow-up, but when the action involves the whole village (such as improving hygiene practices and handwashing) implementation and follow-up becomes considerably harder.

¹⁰ This problem is also relevant to other participatory methods in this guide where material produced by participants remains – or is given back to them as resources to benefit the village.

CASE STUDY EXAMPLE 1: Action Planning

Context: A photo-voice activity in a village to show what makes the village healthy or unhealthy resulted in many photos of water and sanitation problems, but the next most common problem identified by nearly all of the 12 participating households was rubbish (see photos and commentaries below):

PROBLEMS IDENTIFIED			
Rubbish attracting flies	Bad smell	Not a good look for passing motorists, tourists	People not proud of their village
Encourages dogs	Cannot influence behaviour elsewhere unless we deal with the problem in our own village	The regular Monday clean-up day is not happening	The men are not looking after solid waste regularly (hazards for children playing)



Process: An action planning workshop was held with men and women representing all village committees and clans. Participants selected effective rubbish disposal as necessary to achieve their vision of a healthy and attractive village. This action planning workshop was facilitated in Fijian with participants divided into two groups to discuss what actions needed to happen, in what time-frame, and by whom.



Outcomes: The action plans were presented at the village meeting for further discussion and to get agreement on village-wide action. The final plan included:

- * *Recycling tins, glass and plastic.*
- * *Arranging regular rubbish collection and having it taken to dump.*
- * *Monday to be village cleaning day with all adults and children taking part.*
- * *Building household composts.*

The action plan was accepted at the village meeting and implemented, resulting in a cleaner and safer environment for everyone in the village and for visitors, including home-stay students who contribute to the village economy. The outcomes of this action planning have been sustained over time which can be attributed to:

- Shared visual evidence of rubbish as a health-related problem.
- Getting the right participation and the participation right.
- Developing a regular and affordable household levy to pay for rubbish collection and disposal.
- Renewed pride in their village.

CASE STUDY EXAMPLE 2: Action Planning

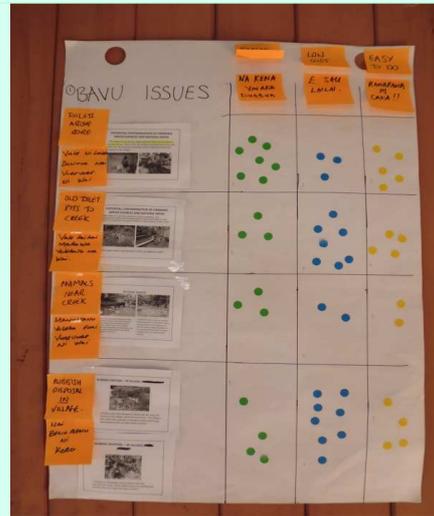
Context: Those participating in the photo-voice activity to identify health risks relating to water and sanitation in the village, as well as others in the village who had seen the presentation of photos and issues, were eager to take part in an action planning workshop based on the above.

Process: The photos and issues were placed on a large sheet of paper and participants selected the issues they wanted to address based on (i) what would provide the biggest benefit (green dots), (ii) low cost (blue dots), and (ii) easy to do (yellow dots). Based on these criteria each participant was given three dots of each colour and asked to place these on the issues they wanted to address. The numbers of dots for each issue were counted resulting in three top issues participants wanted to address.

- Assessment of septic disposal from toilets above the water supply bore.
- Protection of emergency sources of water.
- Fixing spouting and replacing covers on rainwater tanks.



The toilets are located on higher ground whilst the borehole is situated below. There is the risk of faecal contamination from the toilet.



This is an emergency water source (a spring) for the village but it is not properly protected or covered.



The lid for the water tank has fallen into the water tank.

Outcomes: The covers on the rainwater tanks have been replaced, leaks have been fixed, and guttering has been fixed or replaced. Nothing has been done to the spring awaiting further investigations for a new well and bore to improve the village water supply. Further installation of flush toilets is on hold.

6 CONCLUSION

The methods included in this Participatory Guide are primarily based on fieldwork, practical experience and experimentation in Fijian villages. Some methods are informed by theory and applied research in other contexts, but we have always adapted our methods to suit the villages in which we have been working, just as the sanitation systems outlined in the KoroSan guidelines are adapted to different physical environments as well as village needs. Feedback on earlier drafts of this Guideline suggested that some of the methods here were focused more on research, rather than practicalities. However, we would counter this with our belief (and observations) that when those affected can incorporate new – or different – knowledge and skills into their understanding of their own village environments and infrastructure development, village involvement, success and sustainability are more likely to follow.

As stated in the introduction there are many ways to 'do' participation and there are many other guides available to agencies and organisations working in the WASH area. We hope that this guide is both unique and innovative as well as complementary to other guides and participatory processes employed for WASH initiatives. We have emphasised linkages between environmental and human health based on our early experience in the *Wai Votua* project that the health of families and children was a prime motivator of improvements in water and sanitation services. We hope that the methods outlined in this guide are useful and relevant to the readers.

7 REFERENCES

- Bijoux, D., Myers, J. (2006) Interviews, solicited diaries and photography: 'New' ways of accessing everyday experiences of place. In *Graduate Journal of Asia-Pacific Studies*, 4:1, 44-64.
- Bisung, E., Elliot, S., Abudho, B., Karanga, D., Schuster-Wallace, C. (2015) Using photovoice as a community-based participatory research tool for changing water, sanitation and hygiene behaviours in Usoma, Kenya. *Biomed Research International*, Vol 2015, Article ID 903025. <http://dx.doi.org/10.1155/2015/903025>
- Eisenberg, J., Scott, J., Porco, T. (2007) Integrating Disease Control Strategies: Balancing Water Sanitation and Hygiene Interventions to Reduce Diarrhoeal Disease Burden. *American Journal of Public Health*, 97(5): 846-852.
- Jackson, M.C. (2001) Critical systems thinking and practice, *European Journal of Operational Research*. 128(2): 233-244. www.sciencedirect.com/science/article/pii/S0377221700000679
- Laverack, G. (2003) Building capable communities: experiences in a rural Fijian context. *Health Promotion International*, 18(2): 99-106.
- Live & Learn Environmental Education (2012) *A community based water monitoring toolkit using the H₂S paper strip test*. http://www.livelearn.org/sites/default/files/docs/Toolkit_Water.pdf
- Mosley, L.M., Sharp, D.S. (2005) *The hydrogen sulphide (H₂S) paper-strip test: a simple test for monitoring drinking water quality in the Pacific Islands*. SOPAC, Suva, Fiji. <http://www.pacificwater.org/userfiles/file/TR0373.pdf>
- Prüss-Üstün, A., Bos, R., Gore, F., Bartram, J. (2008) *Safer Water, Better Health, Costs, benefits and sustainability of interventions to protect and promote health*. World Health Organisation.
- Romani, L., Koroivueta, J., Steer, A. C., Kama, M., Kaldor, J. M., Wand, H., Whitfeld, M. J. (2015). Scabies and Impetigo Prevalence and Risk Factors in Fiji: A National Survey. *PLoS Neglected Tropical Diseases*, 9(3), e0003452. <http://doi.org/10.1371/journal.pntd.0003452>
- Stott, R., Tanner, C.C. (2011) Development of sustainable waste treatment systems for coastal Fijian villages that enhance human health and safeguard environmental resources. NZAID Project Completion Report, *NIWA Project MRS10202*. Prepared for NZAID (NZ State Sector Development Partnerships Fund SSDPF) and Ministry of Research, Science and Technology. February, 2011:19.
- Stott, R., Davies-Colley, R., Jeke, V., Storey, R., Wright-Stow, A., Winstanley, A., Tanner, C. (2015) Making the unseen visible: using microbial water testing to engage and mobilise communities to address water quality and sanitation issues; experience from New Zealand and Fiji. Poster presentation 18th IWA Symposium on Health Related Water Microbiology International Symposium, Lisbon, Portugal 13-19 September.
- Tanner, C.C., Lange, M., Dakers, A., Winstanley, A., Stott, R., Bonito, V., Jeke, V., Headley, T., Aalbersberg, W. (2010) Development of sustainable waste treatment systems for coastal Fijian villages that enhance human health and safeguard environmental resources: the story in words and pictures,

112 pages. Laminated booklet and CD prepared for Votua Village, Coral Coast, Fiji, project partners and NZ AID. December, 2010, revised and extended May 2011.

Willets, J., Carrard, N., Halcrow, G., Rowland, C., Crawford, J. (2009) How do we better address gender in Pacific water and sanitation initiatives? Fiji *Case Study*. Australia: Institute for Sustainable Futures.

Winstanley, A., Lange, M., Stott, R. (2010) 'Wai Votua' Health Impact Assessment. ESR Client Report No CSC 0908, prepared as part of a NIWA contract for scientific services.

World Health Organisation (2000) *Participatory Hygiene and Sanitation Transformation: An Approach to Working with Communities*, WHO: Geneva.

Wright, J.A., Yang, H., Walker, K., Pedley, S., Elliott, J., Gundry, S.W. (2012) The H₂S test versus standard indicator bacteria tests for faecal contamination of water: systematic review and meta-analysis. *Tropical Medicine & International Health*, 17: 94–105.

8 RESOURCES

CWAST WASH Education and training. Includes technical and training resources for WASH and visual aids and participatory activities for delivering WASH: <https://resources.cawst.org/>

USAID Hygiene Improvement Project (HIP) : <http://www.hip.fhi360.org/page/3396.html>

Hands up for hygiene can be found at:

<http://www.livelearn.org/sites/default/files/docs/PacWASHTeachersGuide.pdf>

Live and Learn : WASH education in Pacific communities. E.g Participatory Hygiene and Sanitation Transformation (PHAST) in Pacific communities <http://www.livelearn.org/resources/discovering-healthy-living-flipchart>,

WHO (2015). Sanitation Safety Planning: Manual for safe use and disposal of wastewater, grey-water and excreta. 138 pages. http://www.who.int/water_sanitation_health/publications/ssp-manual/en/

WHO and SOPAC 2010 Drinking water safety planning: A practical guide for Pacific island countries, 57 pages : <http://www.wsportal.org/wp-content/uploads/2016/04/WSP-Guideline-for-Pacific.pdf-22-mar-2010.pdf> or download from <http://www.wsportal.org/resource/drinking-water-safety-planning-a-practical-guide-for-the-pacific-island-countries/>

World Health Organisation (2016). Protecting Surface Water for Health: Identifying, assessing and managing drinking-water quality risks in surface water catchments. WHO: Geneva http://www.who.int/water_sanitation_health/publications/pswh/en/

USAID The Hygiene Improvement Project (HIP). WASH training package for the prevention of diarrhoeal disease <http://www.hip.fhi360.org/page/3396.html>

Water Aid: Sanitation and hygiene approaches: Technical Brief. 6 pages <http://www.wateraid.org/what-we-do/our-approach/technologies> (accessed 3 October 2016)

WAI VOTUA PROJECT, DEVELOPMENT OF SUSTAINABLE DRINKING WATER AND WASTE TREATMENT SYSTEMS FOR COASTAL FIJIAN VILLAGES THAT ENHANCE HUMAN HEALTH AND SAFEGUARD ENVIRONMENTAL RESOURCES (2006-2010).

AIM: To improve water and wastewater systems to safeguard the health of the villagers, the river and the reefs.

The 'Wai-Votua Project' funded by NZ Aid focused on the development of sustainable water supply and waste treatment systems for a coastal Fijian village. Votua Village, Korolevu, on the South (coral) coast of Viti Levu in Fiji, is home to about 270 people in over 50 houses situated on a strip of land between the main highway (Nadi-Suva) and the coast, and bordered on one side by a river. Increasing contamination of this river and the lagoon were identified as a major environmental threat to the ecology of the reef and lagoon, with implications for marine food sources and tourism. Improved water supplies inevitably lead to increased generation of wastewaters that can readily contaminate local water resources, increasing spread of illness and disease. It is therefore critical that both water supply and sanitation are addressed together. ¹¹

KEY GOALS:

- To assess risks to human and environmental health
- To improve the existing drinking water supply
- To develop, test and demonstrate village-scale sustainable wastewater treatment solutions
- To build local knowledge and capacity

¹¹ Stott, R and Tanner, C.C. (2011). Development of sustainable waste treatment systems for coastal Fijian villages that enhance human health and safeguard environmental resources. NZAID Project Completion Report, NIWA Project MRS10202. Prepared for NZAID (NZ State Sector Development Partnerships Fund SSDPF) and Ministry of Research, Science and Technology. February 2011, 19 pages.

Tanner, C.C., Lange, M., Dakers, A., Winstanley, A., Stott, R., Bonito, V., Jeke, V., Headley, T., Aalbersberg, W. (2010). Development of sustainable waste treatment systems for coastal Fijian villages that enhance human health and safeguard environmental resources: the story in words and pictures, 112 pages. Laminated booklet and CD prepared for Votua Village, Coral Coast, Fiji, project partners and NZ AID. December, 2010, revised and extended May 2011

WASH KORO PROJECT, MOBILISING COMMUNITY-LED WATER SUPPLY, SANITATION AND HYGIENE IMPROVEMENTS IN FIJIAN VILLAGES (2013-2017).

AIM: to provide self-help tools to mobilise Fijian villages to recognise and address their own water supply, sanitation and health/hygiene needs

The *WASH Koro* project addresses provision of water supply, sanitation and hygiene (WASH) infrastructure to the rural villages of Fiji. It builds on the learning and capacity developed in the *Wai Votua* Project (2006-2010). WASH is pivotal to the health and wellbeing of village communities, and addressing these needs can be a critical entry point to empower community self-determination and economic development. A major risk in trying to address WASH needs in developing communities such as Fiji is that uptake of the tools developed will remain dependent on continuing outside funding and expertise, and so: (1) not lead to change beyond the villages where they have been implemented; (2) not be affordable or practical under local conditions; and/or (3) not be maintained properly and so fall into disrepair and be unsustainable.

To create village desire and action for improved water and sanitation facilities, facilitate ownership and self-responsibility, and ensure the tools are responsive to local needs and realities, a participatory approach is being undertaken with two collaborating communities. A focus of the project is to raise and strengthen awareness of the links between water, sanitation, hygiene and health across the whole community, engaging women and men, young and old. Because women in Pacific Island communities play a critical role in the water, sanitation and health needs of their families, the project works closely with women and village nurses, as well as men, to build their awareness, skills and confidence, and promote their involvement in village decision-making and governance. Work also focuses on associated cultural behaviour changes needed to ensure sustainable self-funding and –management of their water and sanitation infrastructure.

KEY GOALS

- To assess risks to human and environmental health.
- To develop, test and demonstrate household-scale sustainable wastewater treatment solutions.
- Build capacity for on-going self-management and funding of water and sanitation services to ensure the practical sustainability of the WASH outcomes.
- Build in-country capability and expertise for implementing appropriate on-site and community-scale water and wastewater infrastructure.
- Develop practical guidelines and training to promote effective engagement across the local community and sustainable village wastewater management approaches.

QUESTIONS RELATED TO ACTION PLANNING CYCLE

Outcome/vision

1. How will you choose which issue is the most important to address? (e.g., How many people will benefit? Will it improve health? Will it help the environment? Is it affordable?)
2. Who will be involved in deciding? (Village leaders and committees, men, women, youth, children)?
3. Are clans and committees in the village equally involved? Do they need to be?

Action planning

4. How do you know you have enough or the right people involved?
5. Who will take responsibility to be a leader, or leaders?
6. How will you work together to come up with ideas to help solve the issue/problem?
7. How do you decide which ideas you will use?
8. What other information do you need?
9. What resources do you need?
10. What servicing and maintenance will be required?
11. Is there anything else that needs to be first before you can proceed?

Implementation

12. How will you use resources in the village?
13. What outside specialised help is needed?
14. How will you get outside help if you need it?
15. What actions will be taken and by who? Who will do the work?
16. Who will take responsibility for providing ongoing operational and maintenance requirements, funding?
17. Who will take responsibility for raising and managing operational finances?
18. What is the time frame in which the work will be carried out?
19. How are others in the village involved?

Monitoring

20. How will operational and annual funds be monitored?
21. How will you know that the work is supported by the village?
22. How will you make sure that work actions are carried out and will be continued?
23. What is the time frame in which the work will be carried out?
24. How will you know if you have got the outcome you wanted?

Accountability & following up

25. How can you make sure that the outcomes are sustainable over time?
26. How can you use this experience to tackle other issues/problems?

This guideline was produced in consultation with the Fiji Department of Water and Sewage and the Ministry of Health as part of the WASH Koro Project led by the National Institute of Water and Atmospheric Research (NIWA). The project was supported by the New Zealand Aid Programme through the Partnerships for International Development Fund of the Ministry of Foreign Affairs and Trade. Care has been taken to make sure the information provided is correct and fit-for-purpose, but we accept no liability for any errors or omissions, or the consequences of their use or misuse. The views expressed in these guidelines do not necessarily reflect those of the New Zealand or Fiji Governments.

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For more information contact:

The Department of Water and Sewage.

The Ministry of Health, or your local

Provincial Council

KoroSan Guidelines

The WASH w project has produced the following series of technical and participatory guidelines to help mobilise villages and settlements to improve their water supply, sanitation and hygiene. These guidelines may be freely disseminated provided the source is acknowledged.

KoroSan #	Title
1	Choosing a village wastewater management service
2	Site, soil and wastewater flow assessment
3	Septic tank construction using concrete blocks.
4	Land application systems
5	Maintaining your septic tank and land application system
6	Water-less ecoVIP2 toilet
7	Greywater management
8	Village participation in water and sanitation actions

KoroSan – for healthy villages

