

Gud wata plan blong iumi

A process to support Community-Based Water Security
Improvement Planning in rural Solomon Islands

**Water sources,
pathways and
hazards**

VOLUME

3

Guidebook for Facilitators

This document was produced through the *The New Times, New Targets Project*, which aims to improve sustainable and inclusive access to water, sanitation and hygiene (WASH) services and facilities with schools, clinics and communities in rural Solomon Islands. The project is an Australian aid initiative implemented by Plan International Australia in partnership with Live & Learn Environmental Education on behalf of the Australian Government.

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Table of Contents

Water sources, pathways and hazards	4
Glossary of key terms	6
Water Source Picture Resources	8
Rainwater tank (shared or household-owned)	9
Bore (hand or mechanical pump) - groundwater	10
Protected well	11
Unprotected well	12
Protected spring	13
Unprotected spring	14
Surface water (stream, river, dam)	15
Bottled water (but not refilled old water bottles)	16
Shoreline spring (non-drinking)	17
Water Hazard Picture Cards	18
Why we need to care for our water quality	19
Hazard 1 - Germs	20
Hazard 2 - Salt	22
Hazard 3 - Chemicals	23
Hazard 4 - Sediment	24
Hazard 5 - Water Availability - Source Supply	25
Hazard 6 - Water Supply System	26
Hazard 7 - Water Accessibility	27
Water Pathways Discussion Cards	28
Shallow Well	30
Bore	32
Dam	34
Spring Box	36
Reservoir Tank	38
Tap Stand	40
Barrels	42
Rainwater Tank	44
Surface Water	46

Water sources, pathways and hazards

**VOLUME
3**

We define water security as:

the ability of a village to safeguard availability of, access to, and use of a safe, reliable, and resilient quantity and quality of water for the health and wellbeing of everyone in the village¹.

Rather than including irrigation and other larger scale uses of water in water security, our focus is on improving domestic water security for villages in Solomon Islands. This covers water for all domestic needs, including drinking, washing, bathing and cleaning.

*The goal of village-scale water security improvement planning is to get water users and managers in villages thinking about key risks to their local water security. This type of risk-based approach involves assessing hazards, which are events, currently happening or that might happen, that could reduce water security. **A risk assessment considers how likely a hazard is to occur**, and how serious its consequences. By conducting a risk assessment, water managers can focus on reducing hazards that can cause the most harm. By removing or managing high-risk hazards, communities can prevent water problems from occurring, or reduce their impact, which means it is more likely they will have enough safe water for drinking and other household needs.*

*This Community-based Water Security Improvement Planning (CWSIP) process is designed to make rural water supplies in Solomon Islands more sustainable, inclusive and resilient. As well as supporting communities to identify and manage existing and future risks to their water supplies, including the effects of climate change and changing populations, it **considers social inclusion** and the need for **'safe access for all'**.*

A Community-based Water Security Improvement Plan will identify these risks, together with actions that will prevent or reduce these risks – it is a **plan of action** for the community. These actions should include improving operation and maintenance of water facilities, awareness raising, behaviour change of water users, and good community water management.

1 Adapted from Sustainable Water Partnership, 2017

This is Volume 3 of the CWSIP process.

Volume 3 has resources that are used during facilitation of the CWSIP process to demonstrate water sources, water pathways, and identifying water safety hazards.

Glossary of key terms

Controls	Activities and processes that can be used to prevent, remove or reduce the risk of a hazard.
Equity	Each person or group of people are treated according to need. For CWSIP, this means that all people and groups should have the opportunity for meaningful participation in, and equitable benefit from, water security improvement planning.
Gender and Social Inclusion (GSI)	<p>Transformed social norms that create a supportive and equitable environment where all people have agency over their own lives and input into the decisions that affect them.</p> <p>Water for all: Not excluding any person or group of society based on gender or other factors such as age, cognitive or physical disability, economic status, political orientation, marriage status (e.g. single mothers), migrants/people from another place, or people who follow a different faith.</p>
Germ	Microorganisms and pathogens that carry illness and can make you sick (e.g. bacteria, viruses)
Hazard	Hazards are events or situations that are currently happening or might happen, and which could reduce the availability or security of water. They may be physical, biological or a chemical agent that can cause harm to people or result in no water for people.
Hazardous event	An event that introduces hazards to, or fails to remove them from, the water supply or an event that causes interruption to the supply of water to consumers.
Resilience	The ability to recover quickly from setbacks.

Risk	The risk of a hazard is based on the likelihood of identified hazards causing harm in exposed populations, the number of people that would be affected, and the severity of the consequences of that harm.
Risk Assessment	A risk assessment considers how likely a hazard is to occur, how many people would be affected, and the severity of the consequence of that hazard. By conducting a risk assessment, water managers can prioritise action for those hazards that are likely to have the greatest negative consequences.
Water quality	The health/safety of water.
Water security	The ability for a village to be able to safeguard the sustainable availability of, access to, and use of a safe, reliable, and resilient quantity and quality of water for the health and wellbeing of everyone in the village. For this CWSIP process the focus is on domestic water security for residents of villages in Solomon Islands - this includes water for all domestic needs, e.g. drinking, washing, bathing, cleaning, sanitation, hygiene.
Water Zone/Area	A number of households in close proximity to one another, within a village, that share access to a water point either as a component of a larger water system (e.g. a tapstand) or as a standalone source (e.g. handpump, well, spring, rainwater tank).

The background is a vibrant, abstract watercolor illustration in shades of blue and teal. It depicts an underwater scene with several small, dark blue fish swimming in various directions. There are also larger, lighter blue circular shapes that resemble bubbles or water droplets. The overall texture is soft and painterly. A large, solid teal circle is centered on the page, containing the title text. A dotted blue line forms a larger circle around the teal circle. The top and bottom edges of the page have a decorative wavy blue border.

Water Source Picture Resources

Rainwater tank (shared or household-owned)



Bore (hand or mechanical pump) - groundwater



Photo Credit: ywamsolomons.org

Protected well



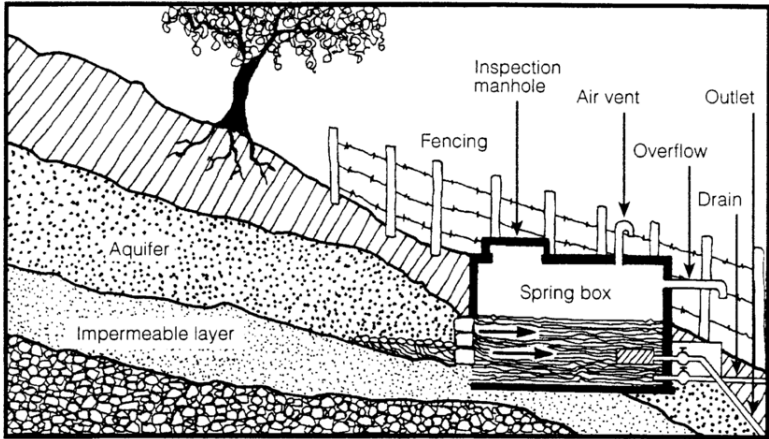
Unprotected well



Protected spring



Photo Credit: wasraq.wordpress.com

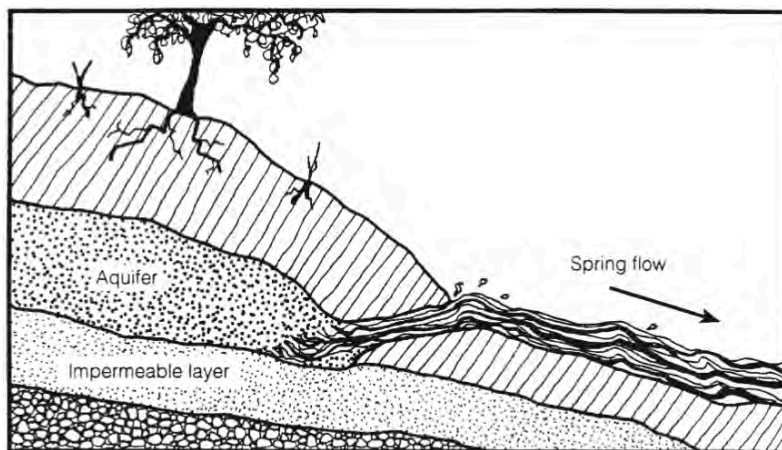


WHO 96555

Unprotected spring



Photo Credit: WWF South Pacific



WHO 96556

Surface water (stream, river, dam)



Bottled water (but not refilled old water bottles)



Photo credit: Steve Johnson

Shoreline spring (non-drinking)



Water Hazard Picture Cards

The following pages are picture cards for the 7 Hazards that are discussed with the village during Step 4.

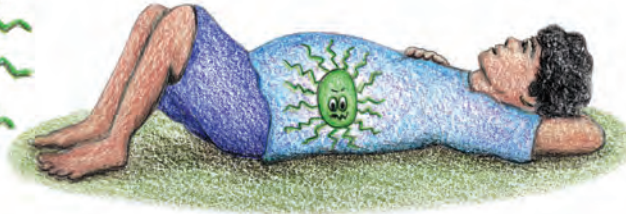
You can print these cards in colour from the PDF file of the CWSIP guide or get colour photocopies.

Or you can remove them from the printed version of the CWSIP guide.

Why we need to care for our water quality



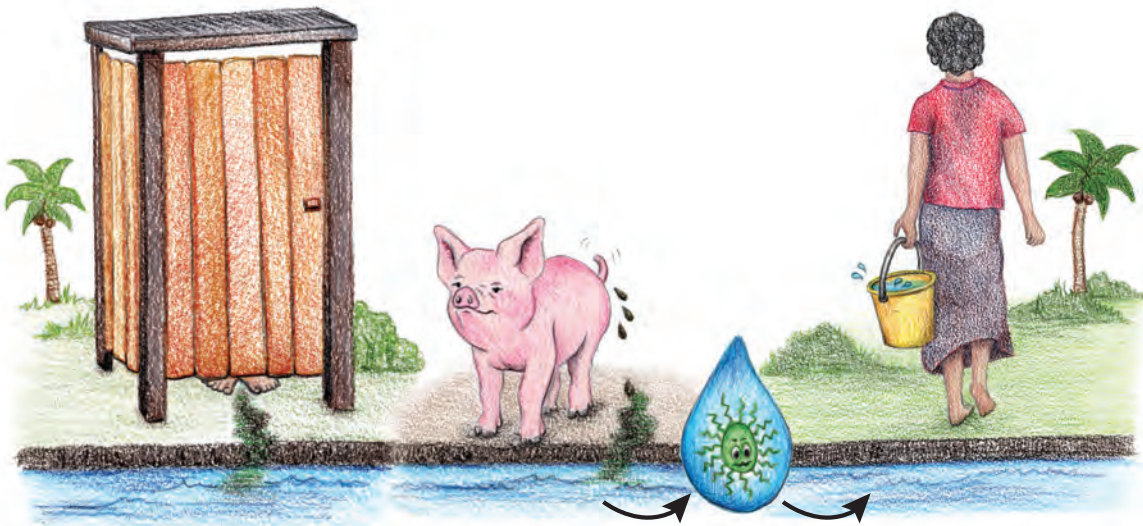
Coliform bacteria...



lives in the intestines of both humans....



and animals.



The bacteria is discharged through faeces into streams...



and if the water is drunk...



that person becomes infected too and may contract serious health problems.

HAZARD

1

GERMS



Discussion prompts:

- WE CANNOT SEE GERMS, even if water looks clean it may still have germs in it
- HUMAN GERMS ARE MORE HARMFUL TO PEOPLE THAN ANIMAL GERMS, but animals also carry human germs in open defecations areas

WHERE GERMS COME FROM

Human siti

- open defecation
- toilets that leak into the ground
- nappies in rubbish piles
- dirty hands after siti

Animal siti

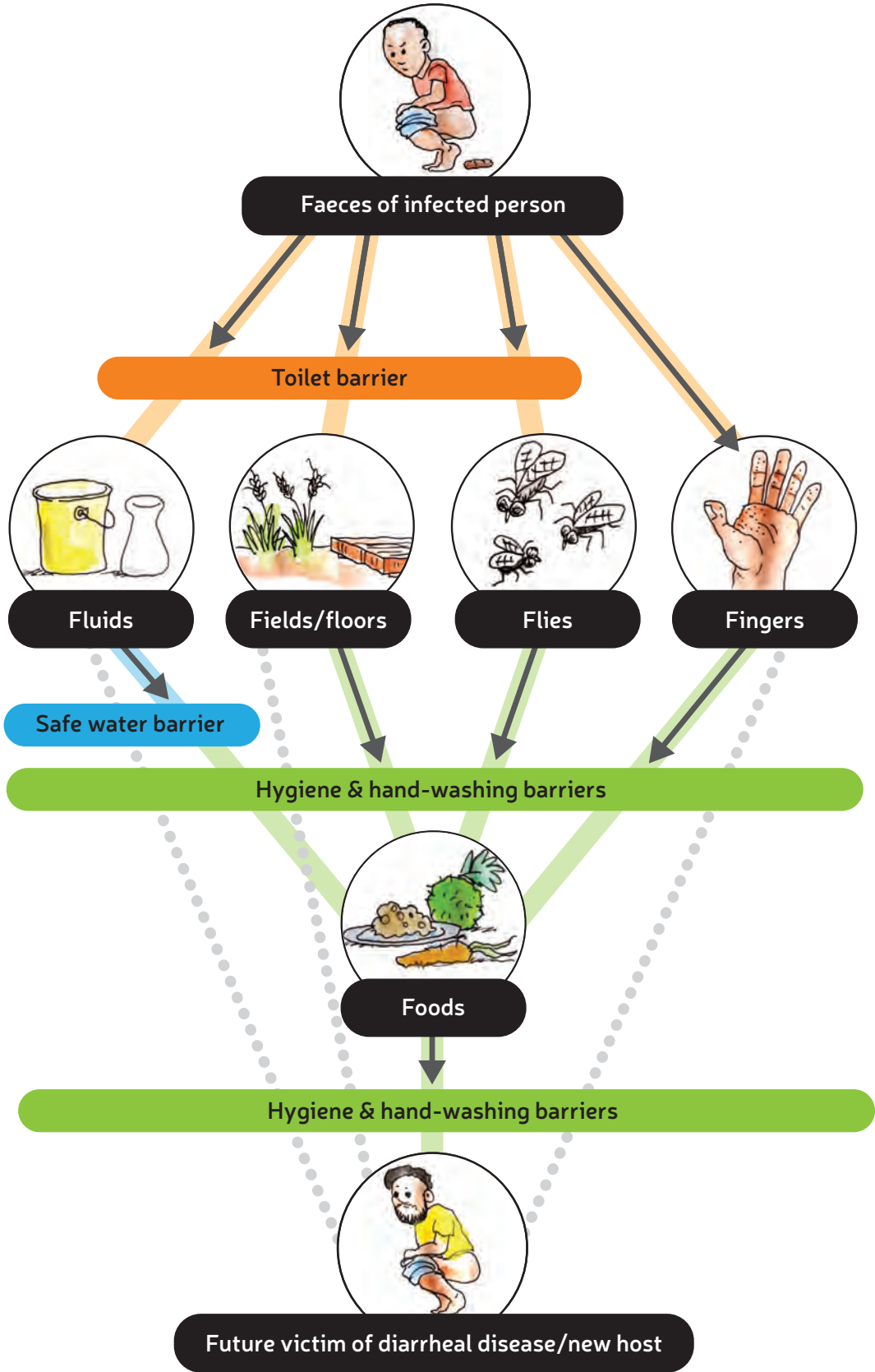
- on ground
- on house roofs

How GERMS get into drinking water:

- **Germs leak into ground** from open defecation or toilets, then **into groundwater** and **into wells, bores** (especially when raining)
- **Rain washes germs over ground** from **open defecation or nappies** in rubbish and into streams, dams, wells
- **Water pipes are broken** and germs from open defecation or toilets enters water systems through cracks in pipes
- **Animals eating/touching siti** – pick up germs on feet and mouths and then enter water sources or lick taps or containers
- **Dirty hands** after defecation touching water containers
- **Bathing / washing clothes** in or next to **watersource**

- **Animal germs leak into ground** from open defecation, then into groundwater and into wells, bores
- **Rain washes animal germs over ground** from open defecation and into streams, dams, wells
- **Rain washes animal germs on roof** into rainwater tank

F Diagram



HAZARD 2

SALT



SOLWATA

Photo Credit: LoggaWiggler, Pixabay



Discussion prompts:

- Salt in water makes the water taste bad – you will not be able to drink water with levels of salt that can cause harm to your health
- Salt (like germs) cannot be seen in drinking water

SOURCES and CAUSES (Where from):

Common sources and causes of SALT:

- Sea

PATHWAYS INTO DRINKING WATER:

How SALT gets into drinking water:

- **Storms cause coastal flooding** – sea water comes over land into wells, shallow bores, streams, rivers
- **Sea level rising pushes sea water into groundwater**
- **Extracting too much groundwater from bores and wells causes sea water to get sucked into the fresh groundwater**

HAZARD 3

CHEMICALS



HERBICIDES
PESTICIDES
FERTILISERS
used for
MANUFACTURING
(making products
e.g. glue)

CHEMICALS

Photo credit: MARKUS SPISKE



Discussion prompts:

- Can harm human health – significantly less common than germs
- May only present at health issues after a long time
- THESE ARE NOT COMMON IN VILLAGES IN SOLOMON ISLANDS – AND LESS IMPORTANT THAN GERMS, SEDIMENT OR SALT.
- WE WILL NOT BE PLANNING FOR IMPROVEMENTS ABOUT CHEMICALS YET – unless there is a clear evidence of a chemical problem in water sources. (This can be done if future plans if there is a concern about chemicals.)

HAZARD 4

SEDIMENT



SEDIMENT (DIRT)



Discussion prompts:

- Makes water look bad – looks like milo
- Makes water unpleasant (not as nice) to drink but sediment by itself does not harm health

SOURCES and CAUSES (Where from):

Common sources and causes of SEDIMENT:

- Plants removed for logging, gardening, farming, mining
- Ground dug for construction

PATHWAYS INTO DRINKING WATER:

How SEDIMENT gets into drinking water:

- Rain washes the sediment into rivers, streams, dams, wells

HAZARD 5

WATER SOURCE AVAILABILITY



WATER AVAILABILITY - SOURCE SUPPLY



Discussion prompts:

- Why might water not be available at the source?

HAZARDS

- Not enough water – not enough supplies
- Not enough water – source / pipe is blocked

CAUSES: (when / why does this happen)

- Drought – less rain than usual – dam or tanks are empty
- Tanks or dam not big enough for the number of people (now, or in the future)
- Spring is drying up
- Storm / flood – more rain than usual – high amounts of sediment enter source (dam) or flood source (spring) and block inlet pipe

HAZARD 6

WATER SUPPLY SYSTEM



WATER SUPPLY SYSTEM (SOURCE TO ACCESS)



Discussion prompts:

- Why might water stop coming to an access point (tap)?

HAZARDS

- Not enough water at access points – **low water pressure at taps**
- No water or not enough water at access points – **system is broken or not working properly** (broken pipes or taps; guttering for rainwater tanks is broken)

CAUSES: (when / why does this happen)

- Low water pressure – not enough water in tank or spring to reach all taps with strong water
- Pipes are blocked
- Too much water being used – people leaving taps running
- Pipes blocked (leaves and dirt – when rains)
- Floods (rain) damage water system
- Floods (sea) damage water system
- Storms damage water system
- Sea level rise (slow increase in height of sea water)
- Earthquake damages water system
- People broke taps, pipes, pumps or other parts of water system
- Pipes or taps broken by animals
- Pumps not maintained
- Crack in dam / reservoir / tank

HAZARD 7

WATER ACCESSIBILITY



WATER ACCESSIBILITY



Discussion prompts:

- Why might people not be able to access water?

HAZARD

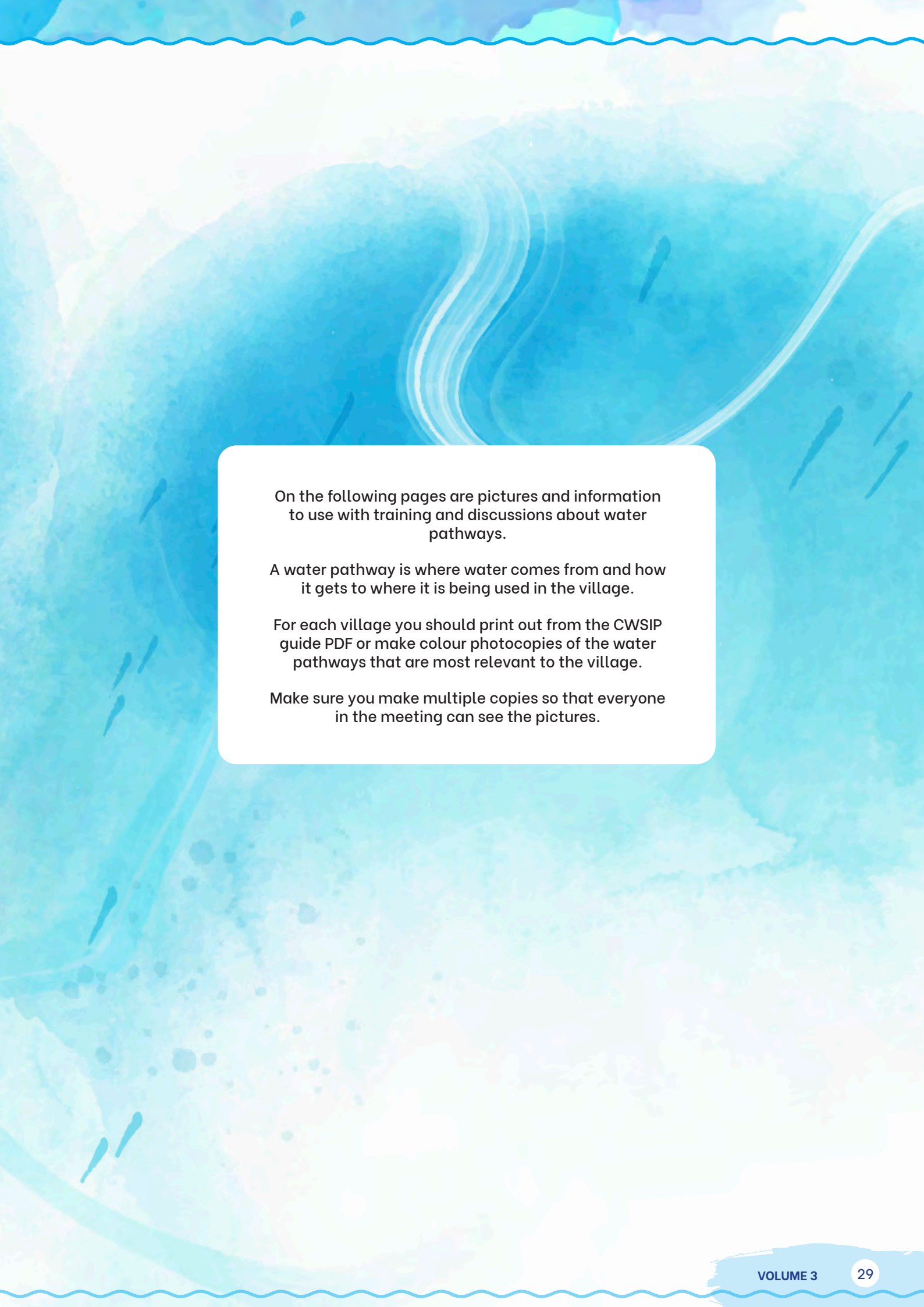
- Difficult to get **enough water** to the house to meet all household needs

CAUSES: (when / why does this happen)

- Water access location is too far from houses to carry/ take enough water home
- The water access location is shared by too many people (it is too busy)
- The path from the water access location is difficult to walk with water for some or all people
- Containers are too heavy
- Not enough containers

The background of the cover is a vibrant, abstract watercolor illustration in shades of blue and teal. It depicts a network of winding waterways, with several small, dark blue fish swimming in various directions. A large, solid teal circle is centered on the page, containing the title text. A dotted blue line forms a larger circle around the teal circle. The top and bottom edges of the page are decorated with a wavy, scalloped blue border.

Water Pathways Discussion Cards



On the following pages are pictures and information to use with training and discussions about water pathways.

A water pathway is where water comes from and how it gets to where it is being used in the village.

For each village you should print out from the CWSIP guide PDF or make colour photocopies of the water pathways that are most relevant to the village.

Make sure you make multiple copies so that everyone in the meeting can see the pictures.

SHALLOW WELL

WATER PATHWAYS DISCUSSIONS

- **Drinking water system** (how to get water to point of drinking: pumps, containers, storage)
- **Water cycle elements:**
 - **Groundwater movement:** carries very small things like germs and chemicals (usually not sediment)
 - **Rainfall:** Surface water seeping through ground (near well, away from well)
 - **Rainfall:** Surface water running down side of well

HAZARD DISCUSSIONS

Water quality prompts

Contaminant sources and pathways into drinking water:

- **Animal waste:**
 - germs on animals' feet (animals walking into water), germs in animals mouth (licking taps & containers)
- **Human waste:**
 - Open defecation or toilets nearby (all types of toilets – especially water-based)
 - Dirty hands (sanitation & hygiene): containers and cups;
 - Animals eating/carrying human waste germs in mouths or on feet
- **Sediment:**
 - Shallow wells – sediment from surface flows into wells (not usually from groundwater)
- **Salty water:**
 - Sea level rising – during tides, or long term rises
 - Coastal storms/flooding

Water availability prompts

- Water access point functioning (pump / well equipment not working) – causes:
 - Equipment not strong/lasting
 - Equipment not maintained
 - Equipment damaged (by people, animals, storms)
- Reduced water levels in well (low rainfall, too much water use)
- Enough containers for carrying and storing water at households?



BORE

WATER PATHWAYS DISCUSSIONS

- **Drinking water system** (how to get water to point of drinking: pumps, containers, storage)
- **Water cycle elements:**
 - *Groundwater movement:* carries very small things like germs and chemicals (usually not sediment)
 - *Rainfall:* Surface water seeping through ground (near well, away from well)
 - *Rainfall:* Surface water running down side of well

HAZARD DISCUSSIONS

Water quality prompts

Contaminant sources and pathways into drinking water:

- **Animal waste:**
 - germs on animals' feet (animals walking into water), germs in animals mouth (licking taps & containers)
- **Human waste:**
 - Open defecation or toilets nearby (all types of toilets – especially water-based)
 - Dirty hands (sanitation & hygiene): containers and cups;
 - Animals eating/carrying human waste germs in mouths or on feet
- **Sediment:**
 - Shallow wells – sediment from surface flows into wells (not usually from groundwater)
- **Salty water:**
 - Sea level rising – during tides, or long term rises
 - Coastal storms/flooding

Water availability prompts

- Water access point functioning (pump / well equipment not working) – causes:
 - Equipment not strong/lasting
 - Equipment not maintained
 - Equipment damaged (by people, animals, storms)
- Reduced water levels in well (low rainfall, too much water use)
- Enough containers for carrying and storing water at households?



Photo: <https://ywamsolomons.org/wp/manual-well-drilling-with-pvc-hand-pump/>

DAM

WATER PATHWAYS DISCUSSIONS

- **Drinking water system** (how to get water to point of drinking: pumps, containers, storage)
- **Water cycle elements:**
 - *Groundwater movement:* carries very small things like germs and chemicals (usually not sediment)
 - *Rainfall:* Surface water following over ground to creek/ stream/river

HAZARD DISCUSSIONS

Water quality prompts

Contaminant sources and pathways into drinking water:

- **Animal waste:**
 - Animal poo in catchment
 - Animals drinking from, walking in water or dam with germs on animals' feet
- **Human waste:**
 - Open defecation in or above dam
 - Animals eating/carrying human waste germs in mouths or on feet
- **Sediment:**
 - Shallow wells – sediment from surface flows into wells (not usually from groundwater)
- **Salty water:**
 - High rainfall – increased erosion – more sediment in water
 - Clearing land (eg. logging) – increased erosion – more sediment in water
 - Breakage in pipeline

Water availability prompts

- **Water access point not functioning** (dam, pipeline, tap) – causes:
 - Dam blocked with sediment
 - Breakage in pipeline
 - Equipment damaged (by people, animals, storms)
- **Reducing pressure** – causes
 - Break in pipeline



SPRING BOX

WATER PATHWAYS DISCUSSIONS

- **Drinking water system** (how to get water to point of drinking)
- **Water cycle elements:**
 - *Groundwater recharge* – unknown location
 - *Groundwater movement* – carries very small things like germs and chemicals (usually not sediment)
 - *Rainfall:* Surface water flooding spring box

HAZARD DISCUSSIONS

Water quality prompts

Contaminant sources and pathways into drinking water:

- **Animal waste:**
 - Animals drinking from, walking or defecating in spring
 - Spring open to access by animals
- **Human waste:**
 - Open defecation in or near spring
 - Animals eating/carrying human waste germs in mouths or on feet with access to spring or tap
- **Sediment:**
 - If spring box gets flooded which can be caused by high rainfall or clearing land (e.g. logging)
 - Breakage in pipeline

Water availability prompts

- **Water access point not functioning** (spring) – causes:
 - Spring blocked with sediment / tree / structure
 - Breakage in pipeline
 - Equipment damaged (by people, animals, storms)
- **Reducing pressure** – causes:
 - Spring is drying up
 - Break in pipeline



RESERVOIR TANK

WATER PATHWAYS DISCUSSIONS

- **Drinking water system** (how to get water to point of drinking): dam / spring to reservoir by pipeline
- **Water cycle elements**
 - *Surface water movement* – carries whatever is on the ground surface. Sediment and germs
 - *Rainfall*: Surface water following over ground to creek / stream/river

HAZARD DISCUSSIONS

Water quality prompts

Contaminant sources and pathways into drinking water:

- **Animal waste:**
 - Reservoir open to access by animals
- **Human waste:**
 - Animals eating/carrying human waste germs in mouths or on feet
- **Sediment:**
 - Breakage in pipeline

Water availability prompts

- **Water access point not functioning** – causes:
 - Breakage in pipeline
 - Crack in tank
 - Equipment damaged (by people, animals, storms)
- **Reducing pressure** – causes:
 - Break in pipeline



TAP STAND

WATER PATHWAYS DISCUSSIONS

- **Drinking water system** (how to get water to point of drinking):
 - dam / spring - reservoir - pipeline - taps - containers - storage
- **Water cycle elements**
 - See dam / spring

HAZARD DISCUSSIONS

Water quality prompts

Contaminant sources and pathways into drinking water:

- **Animal waste:**
 - Animals drinking from, walking in water with germs on animals feet
 - germs in animals' mouth (licking taps & containers)
- **Human waste:**
 - Dirty hands (sanitation & hygiene) : containers and cups;
 - Animals eating/carrying human waste germs in mouths or on feet
- **Sediment:**
 - Breakage in pipeline

Water availability prompts

- **Water access point not functioning** (pipeline, tap) – causes:
 - Breakage in pipeline
 - Equipment damaged (by people, animals, storms)
- **Reducing pressure** – causes:
 - Leaking taps or taps not turned off
 - Too many taps or illegal connections
 - Break in pipeline
- **Enough containers**
 - for carrying and storing water at households?

TAP STAND



BARRELS (small storage)

WATER PATHWAYS DISCUSSIONS

- **Drinking water system** (how to get water to point of drinking):
 - dam / spring, reservoir, pipeline, taps, containers, storage
- **Water cycle elements**
 - *Surface water movement* – carries whatever is on the ground surface. Sediment and germs
 - *Rainfall*: Surface water following over ground to creek/ stream/river

HAZARD DISCUSSIONS

Water quality prompts

Contaminant sources and pathways into drinking water:

- **Animal waste:**
 - Animals drinking from, walking in water with germs on animals feet
 - germs in animals' mouth (licking taps & containers)
- **Human was**
 - Dirty hands (sanitation & hygiene) : containers and cups;
 - Animals eating/carrying human waste germs in mouths or on feet
 - Animals eating/carrying human waste getting in barrel
- **Sediment:**
 - Breakage in pipeline

Water availability prompts

- **Water access point not functioning** (pipeline, tap) – causes:
 - Breakage in pipeline
 - Equipment damaged (by people, animals, storms)
- **Reducing pressure** – causes:
 - Leaking taps or taps not turned off
 - Too many taps or illegal connections
 - Break in pipeline
 - Hole in barrel
- **Enough containers**
 - for carrying and storing water at households?



RAINWATER TANK

WATER PATHWAYS DISCUSSIONS

- **Drinking water system** (how to get water to point of drinking):
 - roof, gutter, pipe, tank, containers, storage
- **Water cycle elements**
 - *Rainfall*: – carries whatever is on roof / gutter usually dirt, bird poo, leaves

HAZARD DISCUSSIONS

Water quality prompts

Contaminant sources and pathways into drinking water

- **Animal waste:**
 - Bird / animal poo on roof
 - Germs in animals' mouths (licking taps & containers)
 - Tank open to access by animals
- **Human waste:**
 - Dirty hands (sanitation & hygiene) : containers and cups;
 - Animals eating/carrying human waste germs in mouths or on feet
- **Sediment:**
 - dirt on roof

Water availability prompts

- **Water access point not functioning** (gutter / tank / tap) – causes:
 - Leaking tap
 - Break in gutter or pipe
 - Crack in tank
 - Equipment damaged (by people, animals, storms)
- **Reducing water levels in tank** (low rainfall, too much water use)
- **Enough containers** for carrying and storing water at households?



SURFACE WATER (RIVER / STREAM / CREEK)

WATER PATHWAYS DISCUSSIONS

- **Drinking water system** (how to get water to point of drinking): river, containers, storage
- **Water cycle elements**
 - *Surface water movement* – carries whatever is on the ground surface. Sediment and germs
 - *Rainfall*: Surface water following over ground to creek/stream/river

HAZARD DISCUSSIONS

Water quality prompts

Contaminant sources and pathways into drinking water:

- **Animal waste:**
 - Animal poo in catchment
 - Animals in water
- **Human waste:**
 - Open defecation above collection point
 - Bathing or washing clothes in water
 - Dirty hands (sanitation & hygiene) : containers and cups;
- **Sediment:**
 - High rainfall : increased erosion : more sediment in water
 - Clearing land (e.g. logging) : increased erosion : more sediment in water

Water availability prompts

- **Water access point not functioning**
 - Long distance to walk
 - Difficult to access waterway – steep / slippery
- **Reducing water levels** (low rainfall)
 - Low rainfall / drought
- **Increasing water levels** (high rainfall)
 - Flood
 - Debris (e.g. logs) in river
 - Fast water : dangerous to collect water
- **Enough containers** for carrying and storing water at households?







Live & Learn and **Plan International Australia** in collaboration with **International WaterCentre** has developed a contextualised Community-based Water Security Improvement Planning guide for Solomon Islands.

The tool aims to support community-led water management through knowledge sharing, provision of a practical and inclusive process and a risk-based approach to community-led water management.

The three-volume tool is a facilitation guide to:

- Support community-led water management through knowledge sharing and provision of a practical process
- Promote “access for all” by amplifying the voices of marginalised community members and prompting decision makers to consider WASH inequalities in water management
- Provides a risk-based approach to community-led water management, including specific risks related to climate change