

# GOVERNING WATER

## COMMUNITY WATER GOVERNANCE GUIDE



## Acknowledgements

Governing Water (2004 – 2007) is a project funded by the European Commission. The aim is to raise awareness and promote dialogue on good governance, using water as a discussion issue, within and between communities in Fiji.

More than 40 rural and urban communities on Viti Levu and Vanua Levu have participated in the Governing Water project. Through Governing Water, over 300 community facilitators and school teachers have been trained. More than 45 community-based management plans and water action plans to improve community and water governance have also been developed and implemented.

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- ❖ “Conservation Choices” and “Case Studies and Prediction Problems” as published in Conserve Water Educators Guide, pp. 115-122 and pp 243-277. Copyright 2000 by the Project WET International Foundation. Used with permission.

## The Governing Water Guide

The Governing Water Guide was developed with assistance and support from communities, partners and friends in government, non-government and regional organizations, and shares Governing Water actions, tools and lessons learnt.

The Governing Water Guide can be used to mobilise community actions to improve water use and access in communities. Through Learning Circles, participants provide the content for learning and action based on their views, experiences, ideas, and skills. This forms the basis for making decisions and developing plans to address water issues.

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Linking Knowledge To Change

# The Governing Water Guide

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## Water Covers Most of the World

If you were an astronaut gazing down from outer space, you would notice that most of the earth's surface is blue. About three quarters of the earth (70%) is covered by water.

Almost all of the world's water (97%) is found in oceans and seas and is salty. We cannot easily use salt water for our daily needs. All animals and plants that live on land, including humans, need fresh water to drink.

A very small amount (about 2.8%) of the world's water is fresh water and most of it is not available for us to use. It is either frozen or trapped under the ground as ground water or found in the atmosphere or soil as water vapour.

A very, very small amount, about 0.3%, is found in rivers and lakes – this is freshwater we can use! Just a drop in the bucket!

### *Earth! The Blue Planet !*



WATER-PRECIOUS RESOURCE OR RUBBISH BIN?



Our limited water supplies are being threatened by human activities such as deforestation, pollution and the misuse of water resources.

Much water that is piped to towns and cities is lost before it reaches our taps through leakage.

*In Fiji about 50% of water is lost through leakage before it reaches the taps.*

Also in many cases water is taken from other areas through pipes to towns and cities, leaving people who live in those areas with little or nothing.

*Did you know? We treat water as the world's rubbish bin - a dumping ground for all kinds of waste, from human body waste to radioactive materials.*

## Freshwater in Fiji

Freshwater supplies are a critical issue for many Pacific Island countries. Not all islands within the Pacific region have the same sources of freshwater or equal access to freshwater. The soil and rock structure of each island or island group directly affects where freshwater will be found.

Natural sources of freshwater on high volcanic islands in Fiji such as Viti Levu and Vanua Levu include:

- **Surface water:** These are water sources above-ground such as rivers, streams and ponds and lakes.
- **Ground water:** This is water stored underground in cracks, gaps or fissures in rocks.

Islands with no surface water rely on rainwater tanks or groundwater. On the low-lying islands coral atolls or limestone islands freshwater is available mainly from an underground freshwater lens.



Freshwater collects under-ground and floats above the heavier, salty seawater surrounding the islands. This is called a freshwater lens.

The freshwater lens can be refilled by rainfall.

*If there is excessive use of the water, or a drought, the freshwater lens will shrink or deteriorate!*



### Water Sources on Our Islands

Most communities in Fiji collect water from one of several sources: rainwater tanks, wells, boreholes, rivers and springs or piped from reservoirs.

*Where does your community get its water?*

Courtesy of SOPAC



Courtesy of SOPAC



***Water is ours to drink, ours to play in, ours to grow with, ours to build on, ours to take care of...***



## Will We Always Have Enough Freshwater?

It is easy to think that we have plenty of water in the Pacific – it rains often, sometimes for many days – so why do we need to worry about the quality and quantity of freshwater?

Not all islands or communities have access to the same amount or quality of freshwater. Not everyone has access to safe drinking water, or piped water. Some people can turn on a tap in their house and get drinking water immediately, some get water from community taps or wells, some carry water from rivers or lakes. Many islands have water supply shortages during the dry season and the springs and wells closest to the village dry up.

Protecting and preserving freshwater sources is the best way to ensure there is enough clean, drinkable water for now and in the future. Water quality is affected by how people ‘treat’ and use water and the decisions that are made to govern or manage water.



***Many activities in urban and rural areas negatively affect water quality. Some of these are shown here. Can you think of any more?***



### Climate Change

The freshwater supplies of Pacific Islands are vulnerable to climate change.

Rising sea levels will probably affect the quality and quantity of water available for drinking and agriculture.

Low-lying atoll islands that rely almost completely on rainwater or freshwater lenses, for their water supply will be most affected.

Rainfall is likely to increase in some areas, leading to more storms. This may lead to more flooding and less water soaking into the soil. However, some areas will get less rain and experience more droughts.

# Good Water Governance

Over the past years there has been increasing competition for available water resources, and increasing water pollution.

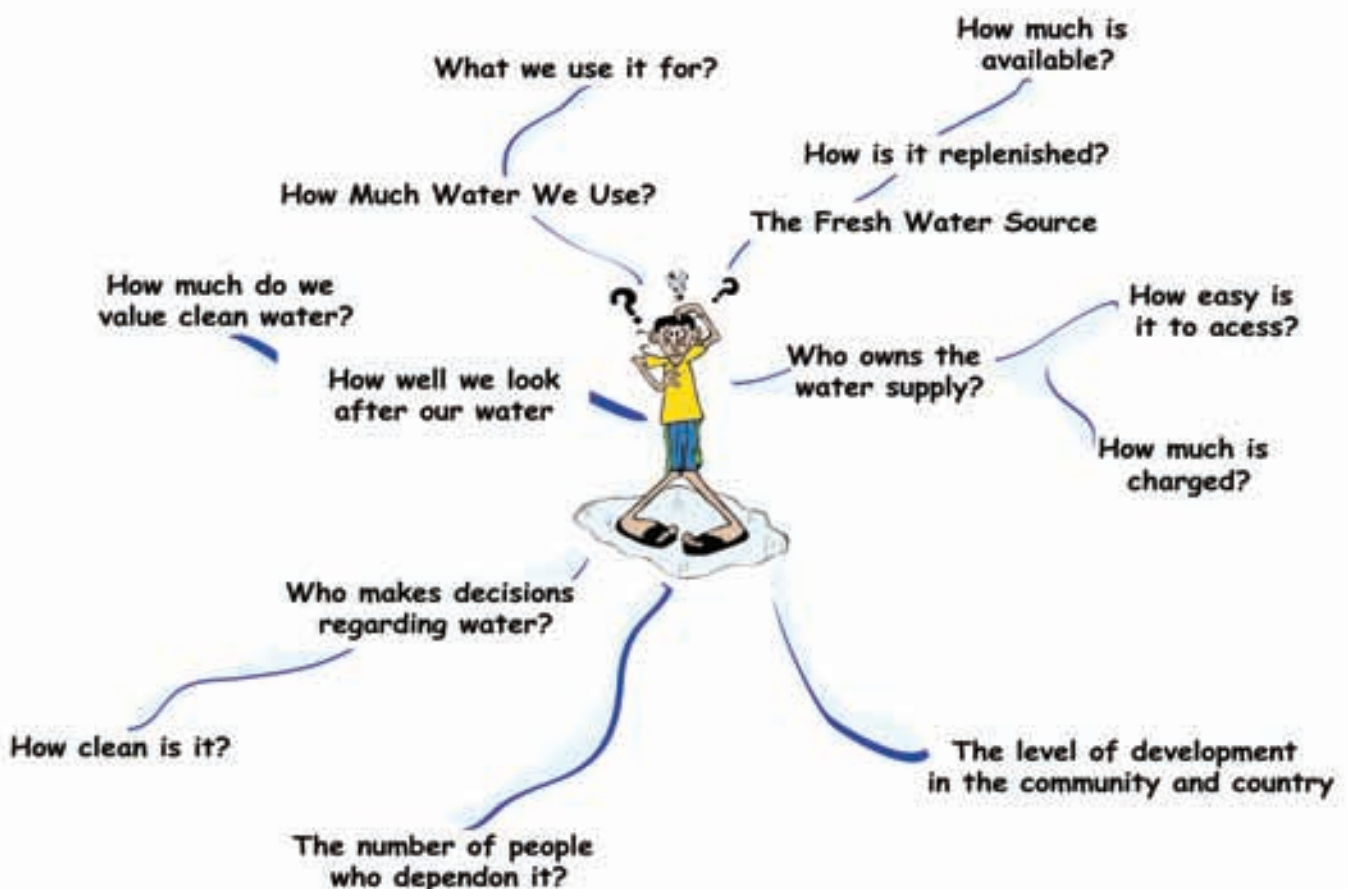
Water shortages, water quality degradation and destruction of the aquatic ecosystem are problems facing many communities in Fiji. In order to meet basic human needs and services, communities must address several serious water challenges.

The question **‘What can we do to address our water challenges?’** is largely a question of good governance. Good governance is needed to balance social and economic development, maintain the quality of the environment, promote sustainable development and reduce poverty.

“...the multiple political, social and administrative systems that must be in place, which influence the development and management of water resources and the delivery of water services at different levels of society.”

*European Union  
definition of water  
governance*

Many factors influence how we use and manage our water resources.



*These factors also shape our attitudes to water. Do you think you would value water more if you had to collect it from the river, or if you could just turn on a tap? Do you think water would seem more valuable, and you would use it more wisely, if you had to pay for it?*

## Governing Water

Communities face a number of social, economic, and political challenges on how to govern water resources more effectively. Good water governance involves setting up systems and processes to manage water in a sustainable way, using the people, money and resources the community has. Through good water governance, communities can ensure they have safe and adequate water access for current and future generations.



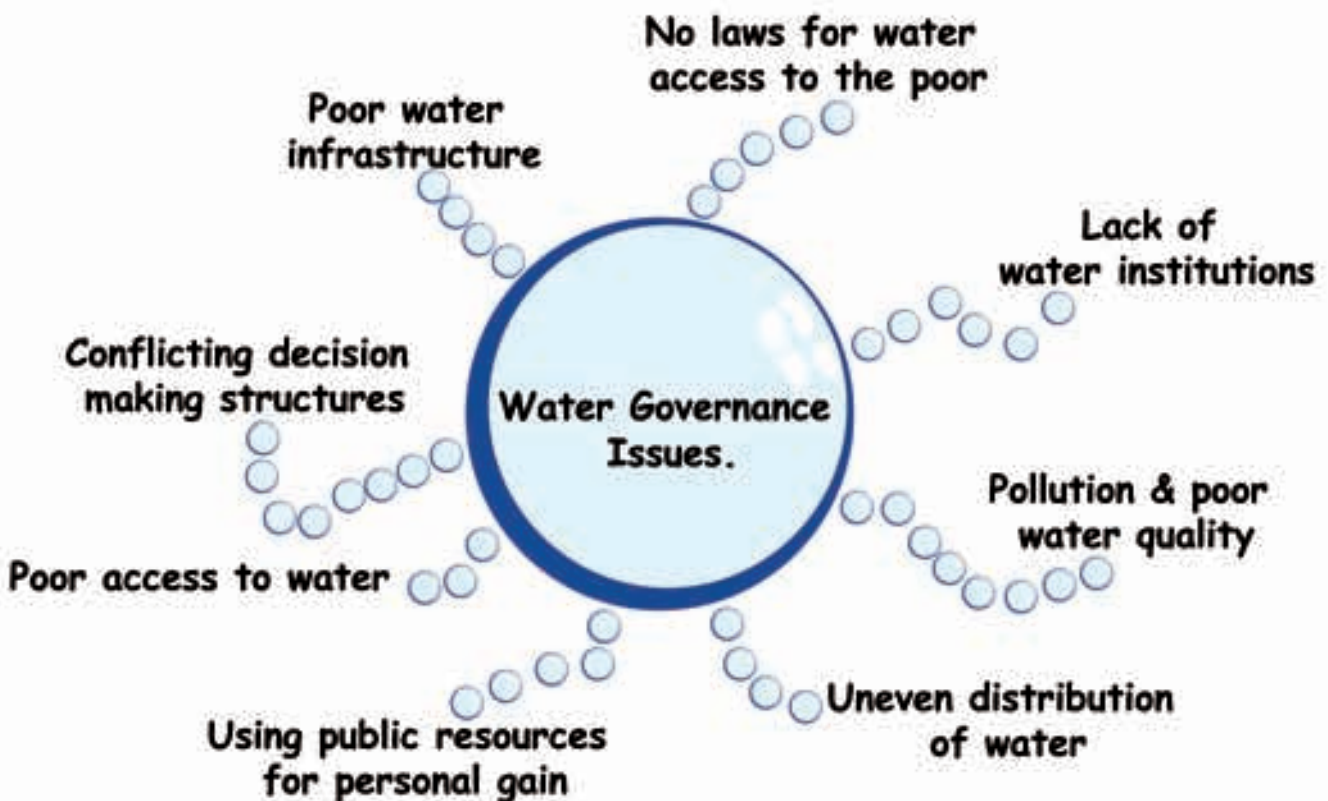
*Governing Water inspires community participation and action for better water use and management*



Water is essential for life. A few organisms can survive without air, but none can live without water. The quality of water can affect the life of people, plants and animals because all depend on water for survival. Clean, fresh, safe water is essential for our health and in our day-to-day living.

Equally important is having access to adequate sanitation and hygiene. The World Health Organization estimates that 80 percent of all sickness and disease is a result of inadequate water and sanitation and 2.2 million people, mostly children, die from diarrhoea every year in developing countries.

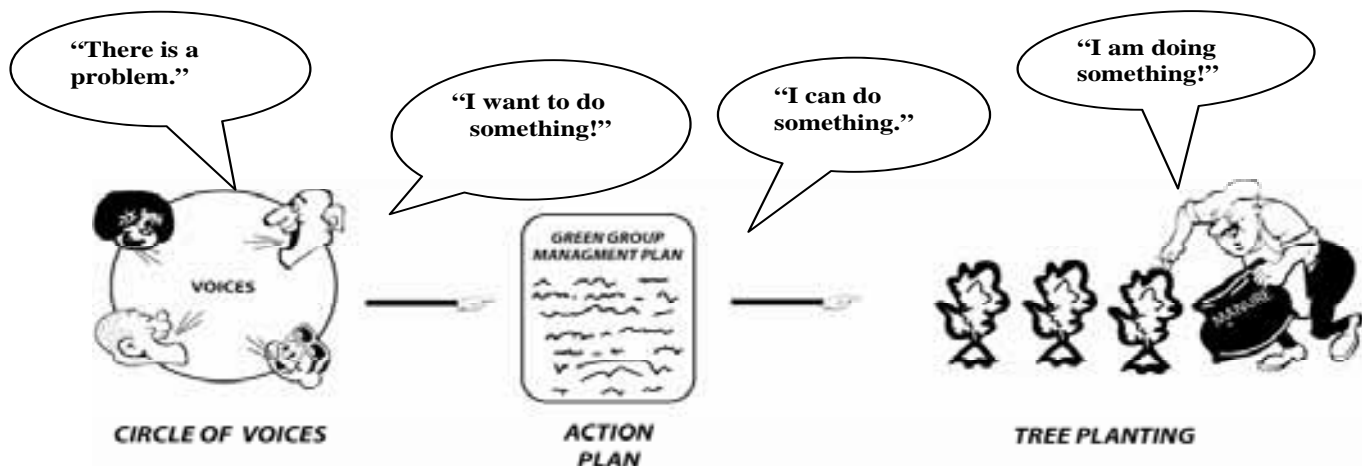
### Some water governance issues include...






# Linking Knowledge to Change

Governing Water looks at how community water resources are managed, how decisions affecting water are made and possible actions for improvement. Governing Water recognises that awareness and action towards clean water sources at community level is needed to improve health and quality of living.

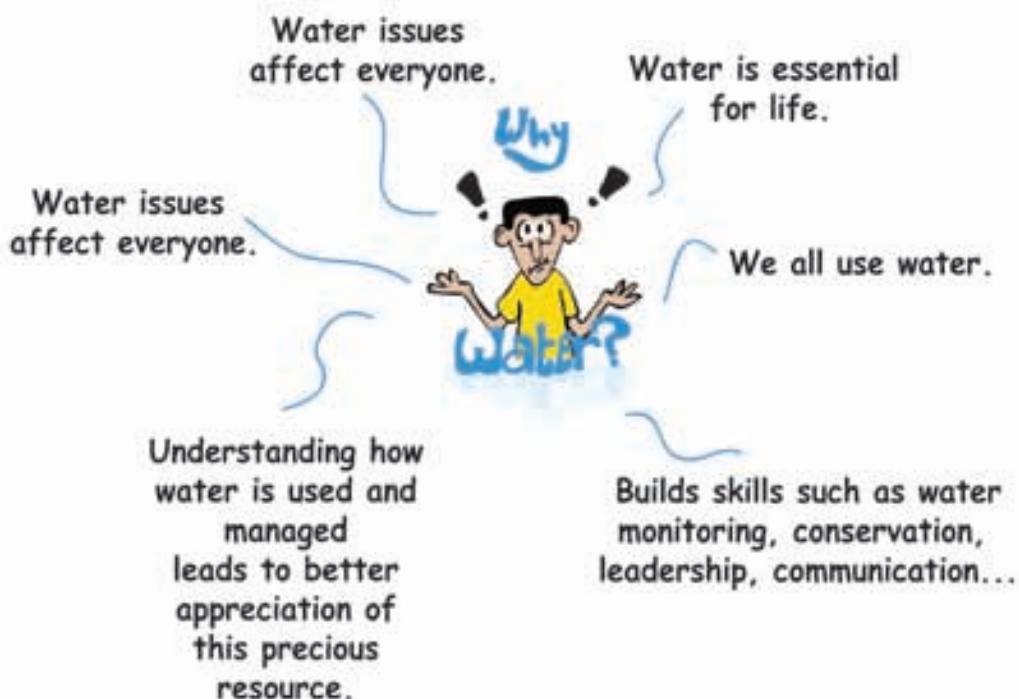


The process towards good water governance starts with water awareness and education, investigating water quality, making decisions and mobilising community actions to improve water resources and access. By being better informed, community members can participate more actively in decisions concerning the use, governance and management of their water resources.



**Why learn about water?**

*It is important to learn about the situation in the community, where the water supply is coming from, how safe it is, how water is being used, how it is being polluted or wasted, and what can be done to prevent water pollution and conserve water.*





# Community Snapshots



## Safe Water For All

In 2005, a *Drinking Water Quality Workshop* was held in Nailega village Tailevu. The focus groups were men, women and youth representatives from Nailega and Veinuqa, two neighbouring villages that depend on rainwater collected in tanks, well water and untreated water from the river.

The objectives of the workshop were for participants to:

- *Identify water problems in their community;*
- *Develop skills in community-based water quality monitoring;*
- *Plan for improving the quality of drinking water in their community.*

Water issues faced in communities and techniques for monitoring water quality were explored. Using the H<sub>2</sub>S test and Sanitary Survey sheets, participants were able to link results obtained from the water tests to reasons for contamination of the water sources.

According to the women's group, *"This exercise really opened our eyes to the importance of keeping our water sources clear from waste. We must encourage our community to make changes and to relocate their toilets so that waste is not directly deposited into the waterways."*

A surprise follow-up visit by Live & Learn staff the following day saw the men and youth in Nailega village busy draining the water tank and cleaning rubbish and grass around their wells. Trees growing near the water tank were cut down and roof and guttering cleaned. The well was cleaned out and a cover made.



Creating awareness in the community after testing the water in Nailega. After presenting water test results at the Village Council meeting, the community were motivated to take action in cleaning up their water sources the very next day!



The H<sub>2</sub>S tests that were carried out afterwards showed an improvement in the quality of water from the rainwater tank and well. These results made them proud of their hard work and the news was related to people in their district.

Villagers in Veinuqa also took action straight after the workshop. They produced a cover for their well and emptied the well of debris that had settled in it. According to the village headman, they had never done that in the last 20 years.

The Chief of Veinuqa Village said, *“We never realised that the clear water we drink had bacteria that can be harmful to us. We thought that we don’t need to boil the water if it was clear and our children drink straight out of the well. The workshop and water testing activity has helped us to understand the importance of drinking clean water. It has also given us skills to monitor and to plan how to keep our water safe for our people.”*

The Village Headman then approached the staff from the Ministry of Health to present the results of their water test to the Ministry and seek their assistance in providing the village people with safe and treated water.

*“This simple and practical half day workshop which includes the water testing activity has empowered and motivated the people and the Chief that we must, and we can, do things ourselves to improve our own water source.”*

Women in the village made a point of boiling their drinking water and students who attended Waidalice School were informed to bring boiled water to school.



Checking out the water source in Veinuqa.



Water samples show that there are bacteria in the water- the water is contaminated! This is a simple, practical test that can easily be used in communities.

Results are easily understood, and motivate community ‘safe water’ actions!

## Women And Water

In 2006, over 45 women participated in a “Women and Sustainable Water Governance” workshop facilitated by the Governing Water team.

The training workshop was aimed at strengthening the participation of women in decision-making and promoting good governance and sustainable water use and management.

The women represented 25 communities – from Fijian villages, Indo-Fijian settlements, and religious groups – in the provinces of Naitasiri, Tailevu and Rewa.



Participation at the ‘Women and Sustainable Water Governance’ workshop, organised with the Women’s Interest Group in Nausori.

*We learned safe water practices from the SOPAC team and really appreciated them taking the time to give the presentation.*

Comment:  
Women and Sustainable Governance Workshop



Women play an important role in ‘governing water’



Guest speakers can provide technical information and answer questions



A participant at the workshop Taraivina Tamani, from Naganivatu Village took what she learnt about water quality and community water monitoring back to her community. A water sample from the Naganivatu water source was tested and results showed that the water was contaminated.

Naganivatu Village of Naitasiri, relies on water for cooking and drinking from a dam built on a waterway up in the forest. This water is piped to a reservoir in the village then to households. According to village members, over the years, many people have been sick with water-borne diseases. The poor quality of water was also linked to the recent dysentery deaths of two infants in the community.

Taraivina presented the result of the water test during a Village Council meeting and a 'Clean Water' day was organised, with the men and youth groups taking the lead role.

Taraivina has taken on the role of Naganivatu's Water Auditor, and regularly checks to ensure that the village's water source is properly maintained and that people are kept aware of any water issues that need to be addressed.



### **Time to clean up at the dam providing water to Naganivatu Village**

*Naganivatu is an example of a community that decided to take action to improve their water quality and 'link knowledge to change'.*

*Even though Naganivatu village was not a Governing Water target community, the women's representative decided to attend the workshop to find out more about women and sustainable water governance.*

*Lessons learnt during the workshop were used for the benefit of the community.*



## Community Empowerment

Through the Governing Water project, the villagers of Namama in Macuata, developed a five-year, 2005-2010, Governing Water Management Plan to address community water concerns.

One of the issues identified by Namama Villagers was the problem of outdoor bathing places being without good shade and water supply. This was addressed by local builders in the community and other community members constructing closed-in bathrooms and flush toilets for households in the village.

Another issue identified was the poor drainage system in the village. As a result, there was rubbish and water collected in the drains, especially during heavy rain. This was unhealthy and the smell from the rotting rubbish was also very unpleasant.

Members of the community got together to dig bigger drains and approached the Public Works Department (PWD) for cement water pipes to be installed to improve the drainage.

The community also organised for a survey for new water tanks to address the poor water supply system in the community. Members of the community are currently fundraising to help with the cost of purchasing another tank, replacing the 30-year-old piping of their current water source and to build a community hall.



Namama Village benefited from local skills, experience and networks in the village to improve water access, sanitation and drainage.

Working to address water issues in Namama has helped to create more unity in the community. Due to the improvements made, Namama village won 1st prize in the Naduri Medical Team 'Tidy Towns Competition'.

## Water Committees

Nukulaca is an Indo-Fijian Settlement in Ra near Naivuvuni village. At the Learning Circle training at Narewa in Ra, participants from Nukulaca learnt about the use of the H<sub>2</sub>S to test for the presence of bacteria in water. After testing they found that the water in their reservoir was contaminated.

Participants conducted Learning Circles with families in the settlement and one of the first decisions was to clean out the community reservoir which supports 14 families. Members from each family got together to clean out mud and dirt from the reservoir.

The Assistant Advisory Councillor and representatives from Savusavu settlement in Ba also attended the Governing Water training. Community facilitators who checked the water in Savusavu Settlement also used the H<sub>2</sub>S test.

The result was positive for contamination and this was presented at the Settlement meeting. A water committee was formed with the first task of cleaning all settlement water reservoirs. The Community Water Committee has the role of regularly monitoring and maintaining the water quality in the community reservoirs.



Testing the water in Ba, and getting ready to clean the water source in Ra



The Advisory Councillors play a major role in working with communities to address water issues



## Linking Water And Waste

Water for Navatuvula village comes from a dam some distance away from the village. Water is piped from the dam to the main reservoir.

A major problem faced by Navatuvula village was dirty water from taps following heavy rain and also lack of water during dry weather. The effects of poor water quality on health were a major concern, particularly as many young children had skin diseases.

At a Village Council meeting, a plan was developed to address water issues. A team was formed to clean out the dam. The village reservoir is being cleaned every month with plans to build a larger reservoir in the future, which will contain more water.

Meetings and discussions also resulted in Navatuvula establishing a community waste management project. Aims of this included improving the look of the village, keeping waste out of the nearby river where they fish for prawns and *kai*, and better community health with rubbish disposed of correctly.

After a Learning Circle meeting, the youth group took the responsibility of designing the signboard for the community waste management project. The Learning Circle examined youth roles, talents and skills, working together, consideration, and good communication.

Youth skills and talents, such as painting, art, carpentry, general office skills, were identified and used in successfully implementing the community waste management project.



Waste awareness signboards, a Navatuvula youth project, to promote good waste management practices, stop littering in the village, and stop rubbish from ending up in the river.







# Activity Guide



# Watery Thoughts



10-15 Minutes

**Purpose:** Share feelings and thoughts about water.

**Materials needed:** Paper and pens, container to represent the 'Salad bowl'

## What to do:

1. Hand out a piece of paper to each participant (a small piece is fine!).
2. Read the following question to participants:  
***How do you feel, or what do you think about water?***
3. Ask participants to write down their feelings or thoughts in one sentence. They don't need to put their name on it.
4. Show the container to the participants. Inform them that this is the salad bowl and their pieces of paper with their different ideas represent the ingredients.
5. When they have finished writing, ask each person to fold their paper and put it into the 'salad bowl'.
6. Ask a participant to mix the papers around (toss the salad). Pass the bowl around and ask each person to choose one piece of paper.
7. Each participant should then read the sentence aloud to the group.
8. After all participants have read out a sentence, facilitate a discussion with participants regarding their feelings or thoughts about water. Suggested questions to ask:
  - \* Were the feelings about water good or bad, positive or negative?
  - \* What were some interesting thoughts about water?
  - \* Do we all feel or think that water is an important resource and should be protected? Why or why not?

*Note to facilitator: Make a note of thoughts and feelings about water. Keep this list and review it at the Learning Circles. Have thoughts or feelings changed?*





**Purpose:** Explore the importance of water.

**Materials needed:** Newsprint or butcher's paper, **picture cards** and markers

**What to do:**

### **Part I: Linking Water Issues**

1. Form small groups with 5-6 participants per group and ask them to identify a leader, a recorder and a note taker for their group.
2. Distribute newsprint, markers and a set of picture cards to each group.
3. Ask groups to discuss the links between the picture cards, and arrange these in any order depending on their discussions. *They may decide to arrange picture cards in a cycle, a series of flow charts or so forth.*
4. Give each group 10-15 minutes to discuss and present their water links to the rest of the groups. *For this presentation, get all participants to move from group to group, so that the group members can make their presentation where they are sitting or standing.*
5. Once all groups have completed their presentations, facilitate a group discussion.

Suggested questions to ask:

- \* What were some of the new things you learnt?
- \* Does your community face these problems? Why?
- \* Are members of the community aware of the links between water and their health and livelihoods?



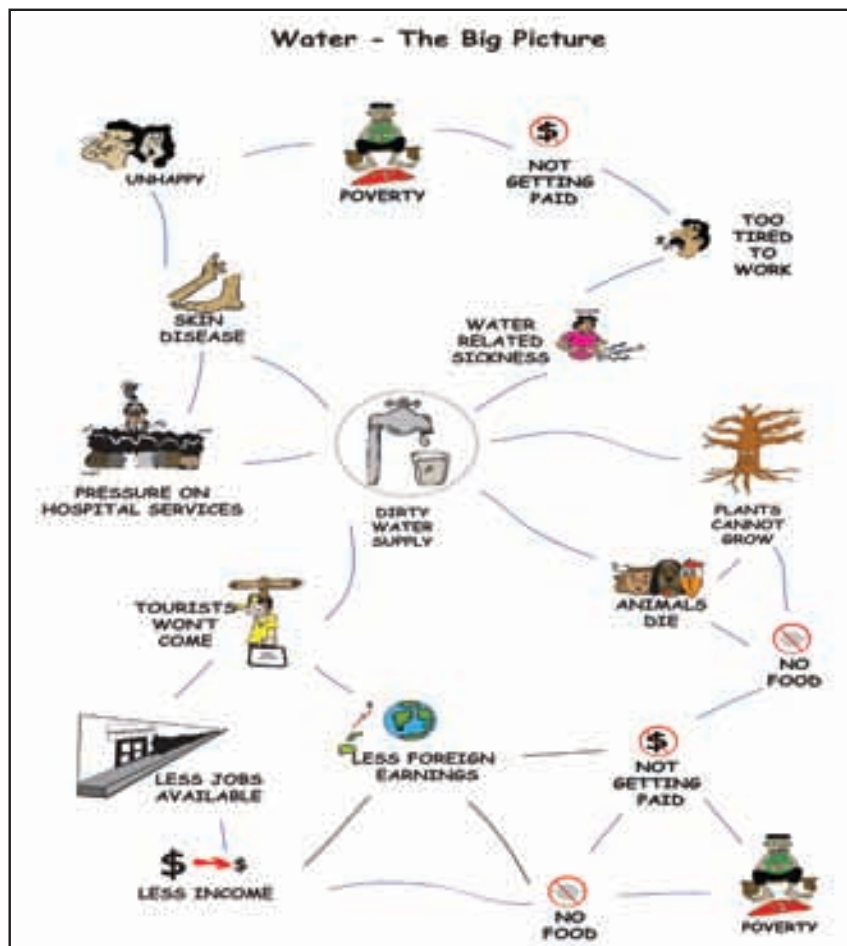
Many people in developing countries know that the best way to avoid diarrhoea is by boiling water before use, yet in many areas of the developing world a lack of firewood and time means water is rarely boiled.

### **Part II: Developing a Bigger Picture**

6. Ask groups to choose one of the picture cards. Try to get each group to have a different picture card.
7. Each group should write down their 'problem' (from the picture card they have chosen) in the centre of the newsprint and circle the problem.
8. Ask participants: What are all the things that can happen because of this problem? What does your problem lead to?



9. Write these impacts on the newsprint connecting them with lines going out from the centre (problem).
10. Continue building the bigger picture of the problem showing the further impacts, consequences or effects of the problem on water sources, human health, society, the environment, the economy and so forth.



11. Give groups 20 minutes to complete the activity and then ask each group to present their water connections to the rest of the groups.
12. Facilitate a discussion with participants. Suggested questions to ask:
  - \* Were you surprised by the all the consequences or effects of the problems?
  - \* Are there any positive effects that can occur as a result of the problems identified? Discuss this further.
  - \* Identify areas where the chain of events or links can be broken. That is, where action can be taken to prevent the problem from 'expanding'.
  - \* What actions have been taken or can be taken in the community to solve these problems?
  - \* Are water problems only related to the environment?

# Picture cards to copy



Unable to pay for safe water supply



No money



Poor Water Supply



Unable to work for long periods



People are prone to diseases



Dirty water supply



Demand on water supply



Poor harvest



No surplus crops to sell



Overcrowding



Overpopulation

# Watery Connections



40 Minutes

**Purpose:** Understand that water pollution is an environmental, social and economic issue.

**Materials:** 3 Sets of Role Cards (*feel free to make up the roles or add more roles if you have many participants*)

## What to do:

1. Divide participants into three groups or more.
2. Copy the three sets of role cards onto cardboard or paper and provide each group with one set.
3. Explain that the role cards can be arranged to tell a story that shows relationships between the environment and peoples' lives. There is no right or wrong order to use the objects or people in the role-play.
4. Ask each group to prepare a short role-play that must include each of the six objects or people on their list.
5. Give each group 15 minutes to prepare and 5 minutes for each performance.
6. After each performance, facilitate a discussion with participants. Suggested questions to ask:
  - \* What was the message in the performance?
  - \* Do you agree with the links that were made between people and the environment?
  - \* Can these watery connections be applied to local communities?
 Discuss.

## Role Cards to copy

Set 1	Set 2	Set 3
A supermarket	A baby	An unhappy tourist
A dead marine turtle	A well	An empty rainwater tank
A happy jelly fish	A person drinking	A beach littered with water bottles
A plastic bag	Several dirty nappies	A poor person
A person shopping	A poor person	A polluted well
A sad old man	A person with diarrhoea	A tour boat sailing away



# Water Responsibility

(Sum of the Parts. Used with permission)



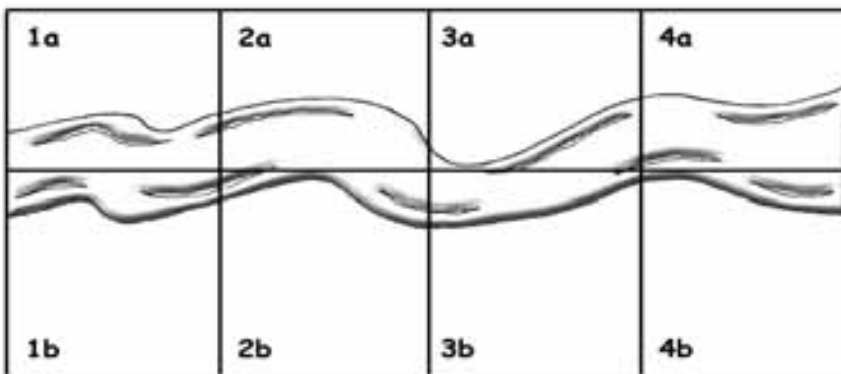
1 hour

**Purpose:** Appreciate the role we all need to play to develop responsible use of our water resources.

**Materials needed:** Newsprint or butcher’s paper, drawing pens and pencils, items that represent waste or pollutants such as stones, soil, leaves, and screwed-up papers.

**What to do:**

1. You will need to prepare for this activity before the training session.
2. Using a blue marker, draw a river on newsprint or poster cardboard as shown below.
3. Each section of the newsprint should include a bit of river and blank space for riverfront property.
4. Put a number on the left hand top corner of each newsprint as shown below. You should be able to place each numbered newsprint next to the other to form one river.



Put the newsprint together and draw the river. Each piece is riverfront property. Mark the corner of each newsprint as shown. Participants should not easily notice the numbers.

5. Next, collect materials to take to the workshop or Learning Circle with you. You will use these materials to represent pollutants in the river.
6. Divide the participants into 4-8 groups depending on the size of the group. There should be at least 4-5 people in one group.
7. Give one newsprint to each group. Inform the participants that they have just inherited a piece of riverfront property. How will they use it? What will they do?
8. Group members need to discuss how they will share and develop their riverfront property and draw this on the newsprint. *The blue is water and the blank space is the land they own.*

9. When the participants have completed their drawings, ask them to look in the upper left hand corner of their property for a number. Explain that these are actually neighbouring properties along the same river. Starting with number 1a, ask participants to join their newsprints together.
10. Each group should stand around their riverfront properties and describe how they have developed their land and how they will use the water. They should identify any of the actions that polluted or added waste to the waterways.

11. Give groups 'pollutants' (small coloured cards, stones, leaves, screwed-up paper etc) to add to the river in front of their properties to represent any pollutants that come from their property. *Groups that add a lot of pollution to the river should be given a lot of items.*



It is best to join the newsprints together on a clear floor space.

12. After all groups have presented, ask group 1 to move their pollutants down stream to group 2. Group 2 then moves all the pollutants down to group 3 (downstream) and so on, until pollutants reach Group 5 (bottom of the stream or water-catchment).
13. After all the items have reached the final group, discuss the activity:
  - \* What happened?
  - \* Discuss the relationship between upstream and downstream water users. What actions upstream affect downstream water users?
  - \* What are some effects of polluting our water resources? What would happen if we continue to pollute or negatively affect our water resources?
  - \* Discuss practical ways of solving water issues.
  - \* What are the best plans or practices that could be taken to prevent waterways from pollution and degradation? What can we do to take care of our water resources?

# Water for the future



40 Minutes

**Purpose:** Promote sustainable water use and management.

**Materials:** Newsprint, markers, paper and pencils for recording, and a large number of readily available items such as seeds, stones, leaves, lollies etc, *(if you have 20 participants, then you should collect about 120-150 items to use)*



**What to do:**

1. Divide the participants into three or more groups. Tell participants these groups represent communities. *Each member of the 'community' can represent a family.*
2. Place 4 items (pebbles/lollies/stones/ buttons etc) per person in the centre of each group. *If your community has 4 members then there are 16 items placed in their pile.*
3. Explain the rules of the activity *(write the rules on newsprint and paste up on the board)*. Tell the participants that the items represent the community water resource and ask them to identify community water resources.
4. Choose one person in each community to observe and record the number of items taken by each community member in each round. *For example,*

**Rules**

- o The items represent the community water resource.
- o Each round of play represents one generation.
- o Each community member may take as many items as they like from the resource pile each round. This shows the water resource is being used by humans!
- o The resource is replenished after each round of play.
- o To be able to survive, each community member must take at least one item in each round. Members who do not take an item during a round will not survive.

**Group 1**

Names	Mary	John	Masi	Va	Remarks
Round 1	2	6	1	2	John grabbed a lot of items. Group did not discuss.
Round 2	1	3	1	3	Although Mary said they should take a few, John and Va grabbed many items.
Round 3	1	1	0	2	Very competitive! Everyone very quickly grabbed items and Va did not want to share hers. Masi was too slow and did not survive.
Round 4	0	0	0	0	No one survived as there were resources from Round 3 to be replenished.



5. Begin the activity by calling out “Round 1”. At the end of Round 1, count how many items each community has remaining in the pile and replace according to number of items left. For example, if 4 stones remain, then add another 4 stones to the pile. *Do the same for each round.*
6. After you have renewed the resource, call out “Round 2”. Check and renew resources for each community.
7. Play three or four rounds pausing after each round to find out if any community members did not survive.
8. Draw up a table on newsprint to record the items left in each ‘community’ after each round. The observers can call out the number of items left after each round.

Names	Group 1	Group 2	Group 3	Group 4	Remarks (can be added by a volunteer during the activity or discussions)
Round 1	5	16	12	5	e.g. group 2 members had a lot of talking before they started taking items
Round 2	2	28	8	0	
Round 3	0	52	14	0	
Round 4	0	100	20	0	

9. Play the final round then have the community members’ share what happened in their communities. Facilitate a discussion.

- \* In which community did everyone survive and had the most items left in the resource pile at the end of the activity? Why?
- \* Which communities are confident they will always have enough items for everyone as long as the pile is renewed? Why?
- \* Which communities did not survive? Why?
- \* How did each ‘community’ operate?
- \* Were there leaders?
- \* What were some things that you were thinking of when taking the ‘resource’?
- \* Discuss how our actions may negatively affect our water resources? What can we do to ensure that our water resources are available in a good state for us, and our children?

*“In order to sustain the environment we need to talk more, discuss things and work together. The role of a leader is very important.”*

Comment from a community learning circle

*Begin the game again if most communities do not survive after the first two rounds, or if groups want to try again to manage resources more sustainably.*

*Record all responses on newsprint so participants are able to read their responses and better understand and appreciate lessons learnt and shared experiences.*

## A Note on Making Choices and Decisions

Making choices for good water governance or conservation can create dilemmas between what one wants to do and what one believes should be done. A dilemma is a problem situation that requires a person to choose from or decide between two or more alternatives, each of which can produce wanted or unwanted effects.

People use various strategies or approaches to decide how to act when faced with a dilemma. These range from flipping a coin, conducting research, attending meetings where decision-makers argue various options etc.

One method of decision-making consists of listing the alternatives, identifying the pros and cons for each, and possible outcomes. Factors to consider include costs (money, environmental etc.), time, energy, people affected, and personal values.

Good water governance and water conservation comes down to making choices. Many decisions or choices that can be made may seem small, but can be added up to make a big impact!

The choices we make reinforce our values and influence our attitudes, habits, behaviour and our daily lives.



In confronting dilemmas, considering options and finally selecting a course of action, individuals within a group may come into conflict.

### Why?

*Finding, proposing and implementing alternatives require an understanding of values. When this understanding is lacking, attempts to resolve the dilemmas often meet with resistance.*

### How do individuals develop different value systems?

*Values often take years to develop and are influenced by culture, family, religion and the social and physical environment. When a group examines options to resolve a dilemma, the process can be less stressful if individuals acknowledge their own values and show respect by thoughtfully listening to, and considering the values of other participants.*



## A Note on Case Studies

Case studies can be used to promote discussions on water issues and conservation, and the role of communities or individuals in water use and management. Difficulties presented by real-life choices on water issues can promote use and development of skills such as brainstorming, discussion, research, reasoning, evaluating evidence and cooperating or working together.

Case studies that involve predicting or trying to work out what happened (*Prediction problems*), can highlight that we are all part of the problem, as well as the solution.

**Prediction problems** involve assessing the problem by putting yourselves in the ‘shoes’ of the person, community or organization involved. This also includes brainstorming and working out options or strategies for action.

After discussing the case studies and predicting what happened, groups can be presented with the ‘real ending’ to the case study – **What really happened?** Suggestions, options or strategies from the group can be compared with the real-life choices. This shows that the action taken, that is, ‘*What really happened?*’ is not the only way to or may not even be the best solution to the problem. In many cases there is no such thing as a single correct response.



People can talk about water issues, research statistics, and discuss the ‘right things to do’, but in real life many factors such as finance, personal habits, or self-interest influence our actions.

*How do you balance water conservation goals with what you can afford to do? What do you do if you’re dying of thirst? How can you save water and keep the lifestyle you’re used to?*



Small group decision-making should be used for case-study problems, because that is the process by which decisions are most often made in life. Small group work can be a problem. Motivated participants can give other participants a free ride and discussions can be dominated by stronger personalities. Assign well-defined roles to group participants such as spokesperson, recorder, brainstorm leader etc.

The group’s final summary, strategy, options should reflect contributions from all members and be the result of a process where everyone participates in sharing knowledge and experiences, making choices and deciding actions.



# Suggested Steps for Making Choices and Decisions

- i. **Summary and Research:** Start by asking participants to summarise the situation given using the information provided. Identify extra information needed to make informed decisions.
- ii. **Brainstorm and Sharing of Ideas:** Brainstorm all possible approaches and solutions to the problem or dilemma. Participants contribute their own ideas and these are recorded. No in-depth discussions are required here and no criticising of ideas. The process continues until all ideas are exhausted.
- iii. **Making Choices:** Discuss strategies (*that is, the options to solving the problem*) with the aim to 'narrowing or reducing' the choices to the best 3 or 4 options. Discuss reasons for each and remain open-minded about conflicting points of view. By the end of the discussion, the group should have two or three possible strategies or options.
- iv. **Evaluation:** Weigh the pros and cons of each strategy. *The group can combine aspects of several options to develop their chosen strategy.*
- v. **Selection:** Choose one strategy or option as recommendation.
- vi. **Summary and Defence:** Develop a clear summary of the strategy chosen, identify strengths and weaknesses and prepare to defend it. Select a spokesperson to present and justify the recommended strategy.

## Example worksheet for making choices or decisions

*Can be used with case studies. Use this form to record the progress of the group decision-making process.*

- i. Write a two to three sentence summary of the problem, the challenge or situation outlined.
- ii. List any important information you may be able to supply from general knowledge or experience or add through research.
- iii. After brainstorming and narrowing options, record the handful of possible solutions or responses that the group have decided on.
- iv. Once options have been evaluated, record the option that has been selected.
- v. List the main points to defend the chosen strategy. Briefly explain reasons and describe why this solution is better than the other proposed solutions.

# Ranking Water Issues



40 Minutes

**Purpose:** Think critically about water issues and engage in dialogue on water.

**Materials:** Sets of water statement cards. *Feel free to make up your own statements.*

## What to do:

1. Divide participants into small groups of about 4 per group.
2. Provide each group with 5 statements concerning serious water issues.
3. Ask groups to rank the issues according to what they believe is the most important to the least important (or most serious to least serious). *The activity presents a moral dilemma because each issue is in fact important – there is no truly right or wrong answer.*
4. When each group has ranked the water statements, they must explain their reasons to the other groups.
5. Each group is then given some time to reassess their ranking after listening to presentations from all the groups.
6. Facilitate a discussion. Suggested questions to ask:
  - \* What factors did each group consider when ranking the issues?
  - \* Did all groups rank the water issues in the same order of importance? Why or why not?
  - \* Are water issues the same for all people everywhere? What are some factors that determine this?
  - \* What were some of the challenges faced by the groups in ranking water issues? How can these challenges be overcome?



Community Comment:  
Ranking allows us to examine our values and priorities. We also understand what other people feel is important.

# Water Statement Cards to copy

Set 1	Set 2
Contamination of rivers caused by animal waste from cattle and pigs.	Providing drinking water for everyone in an over populated world.
Soil erosion caused by land clearing.	Ocean pollution.
Pollution of rivers caused by industrial waste.	Destruction and degradation of the World's wetlands and river environments.
Weakness in environmental laws and the ability to enforce them.	Deaths and sickness from water-borne disease due to contaminated water (e.g. diarrhoea, hepatitis, cholera and typhoid).
Lack of public awareness about the causes of pollution.	Water wars – countries fighting over access to water resources that span political boundaries.
-----	
Set 3	Set 4
Rusted guttering and pipes.	Water collection areas under the tap are mouldy.
Uncovered well and borehole.	Illegal fishing method eg: Dynamite.
Leaking taps and pipes.	No mesh wire on the mouth of the tap.
Using poisonous chemicals to kill prawns.	Unfenced well.
Poor farming practices leads to surface run offs into rivers.	Building pit toilets near water sources.



# Water Conservation Choices



60 Minutes

**Purpose:** Examine personal values and priorities to water conservation, and assess various responses to water conservation.

**Materials:** Copies of Water Conservation Choice Cards. *Feel free to make up your own choice cards.*

## What to do:

1. Ask the participants if they know what a dilemma is. Explain using the following scenario: *(or make one up)*

You and your friends are playing soccer one afternoon. One of you kicks the ball very hard and it breaks the window of a nearby house. Most of your friends want to run home and hide before the owner can find out who broke the window. Some of you think that it would be better to confess and deal with the results and consequences.

**What should you do?**

*This is a dilemma, a conflict between the right thing to do and the easy, convenient, less stressful thing to do.*

*Life is full of choices and consequences.*

2. Divide participants into small groups. Give each participant a Water Conservation Choice Card. Make a set of this before the workshop/ Learning Circle.
3. Each participant should read through the dilemma silently and think about the situation and their response. Tell them to be realistic about what they would do, even if it means choosing an option that may not be favourable to others.
4. Give participants 10-15 minutes to prepare their responses, and then as participants to take turns within their groups to read out their water choice cards, identify the choice they made and explain the reasons for making this choice.
5. After each presentation, the other group members should score individual responses on a scale of 1-5. (1 point should be in complete agreement with the response and 5 should be in complete disagreement with the response).

## Use This Point Scale To Allocate Scores

Totally agree	1 point
Agree	2 points
Cannot decide/ not sure	3 points
Disagree	4 points
Totally disagree	5 points

6. Work out the total of scores from the group for each situation. The lower the total, the greater the level of group consensus on the chosen course of action.

### Example score sheet

Presenter/ Scores	A	J	I	R	K	Total scores
Alex		1	1	1	1	4
Josh	5		4	4	5	18
Iva	1	1		1	1	4
Rocky	3	4	3		5	15
Kelera	2	1	1	1		5

7. Continue until all group members have had a turn and facilitate a discussion with participants. Suggested questions to ask:
- \* Which 'water problem' was the most difficult? Why? Read this dilemma out and ask participants to discuss the problem, and the pros and cons of the choices given.
  - \* What are the various water use and water conservation choices that we are faced with every day? What factors affect the choices and decisions we make? What can we do to make good choices?
  - \* Were participants unable to decide (score 3) for any of the 'water problems'? What were the reasons for this?
  - \* What disadvantages or problems could we face if we were unable to make decisions on important issues?
  - \* What are the advantages and disadvantages of everyone agreeing to decisions that are made to address issues?

## Conservation Choice Cards to copy

Your family has inherited a farm from an uncle. It has several rice fields that use a flood irrigation system, where water is pumped to the fields, flowing along the ground. This system is simple and cheap, but wastes a lot of water. Before your uncle died he was going to invest capital to install a more efficient irrigation system. The funds for this are part of the inheritance, and you have to decide whether to go ahead with this plan or not.

You could:

- i. Take the money and invest it for your children's education.
- ii. Go ahead with your uncle's plan to develop more efficient irrigation.
- iii. Stop irrigating and let the farmland return to a more natural state.
- iv. Keep using flood irrigation and save the money for a rainy day.
- v. Sell the farm with the condition that the new owners install more efficient irrigation systems.
- vi. Other?

Your island has been affected by a drought for the last few months and the community well could soon dry up. The main water source for your community is an underground water supply.

You could:

- i. Restrict each household to 2 litres of water per person per day and ban use of water for washing vehicles and irrigation purposes.
- ii. Develop a long-term water use plan that would address everything from household use to agricultural irrigation.
- iii. Fundraise for a desalination plant that can be purchased from China.
- iv. Keep using water as usual as you don't know for sure that the well will dry up and heavy rains may be coming soon.
- v. Build wells in other parts of the island.
- vi. Other?

On your way home one hot afternoon, you come across a group of children playing in water gushing out from a fire hydrant that they were able to turn on. You know that this wastes a lot of water and that water shortages are getting worse every year. But it is such a hot day and the kids are having a great time.

You could:

- i. Keep walking home and forget about it.
- ii. Go home and report the incident to the fire department.
- iii. Join in the fun.
- iv. Try to talk to the children and convince them to turn the water off again.
- v. Discipline the children at the next Village Council meeting.
- vi. Other?



## Conservation Choice Cards to copy

You are helping your cousin change the oil in the tractor. He gives you a bucket of dirty oil and tells you to dump it in the drain. He tells you to hurry up because the two of you are going to a new movie that you have been looking forward to watching the whole week.

You could:

- i. Dump the oil down the drain because you don't want to argue with your cousin.
- ii. Quickly explain to your cousin that everything dumped in the drain will end up in the nearby river, and that you will find out how or where to dispose of the oil.
- iii. Take the bucket to the side of the house and hide it in the bushes.
- iv. Dig a hole in the ground and pour the oil into it.
- v. Refuse to dump the oil and tell your cousin to dump it in the drain himself.
- vi. Other?

A friend of yours drives a really nice car and sometimes invites you along for a ride. He likes to keep his car clean and spotless, and washes it at least once a week. He leaves the water running each time he washes the car, wasting a lot of water.

You could:

- i. Point out to him that this habit wastes water, and hope he makes changes.
- ii. Do some simple maths to show how much water is wasted each month, and share the results.
- iii. Leave it as it is his business.
- iv. Point out that he will save money on his water bill by shutting off the hose.
- v. Decide that you don't want to risk losing his friendship (and the rides) and keep quiet.
- vi. Other?

The choir group that you belong to will be singing at a friend's wedding and you have all been asked to wear your special choir uniform. On the day of the wedding you realise that your uniform has not been washed since the last function and is still dirty. You have the time to wash and dry your uniform in the washing machine, but there is no other dirty washing to put in the machine.

You could:

- i. Put the uniform in the washing machine to wash alone.
- ii. Collect towels and bed-sheets to wash with your uniform and make up a load for the washing machine.
- iii. Decide you can do without your uniform even if you won't fit in with the group.
- iv. Decide to stay home and not go with the group to sing at the wedding.
- v. Put on your uniform without washing and wear it anyway.
- vi. Other?

# Watery Case Studies



45 Minutes

**Purpose:** Identify characteristics of decision-making.

**Materials:** Case study cards, newspaper, marker pens, blue tac, pins or cello tape

## What to do:

1. Divide members into groups. Distribute a case study card to each group with newspaper to record answers.
2. Group members discuss their case study cards, answer the questions listed and present to the whole group.
3. Allocate enough time for questions and discussion after group presentations. Facilitate a discussion. Suggested questions to ask:
  - \* How are decisions made about water in our community?
  - \* How do these decisions affect people within and beyond our community?
  - \* How can we make good decisions about our water resources – ones that work for our community and for other communities?
  - \* What is the role of women in community decision-making

*Note to the facilitator:*

*This activity could create opportunities to examine governance practices.*

*Highlight examples of good and bad decision-making and discuss with the group possible reasons for this.*

*As an alternative, get the groups to act out or role-play the scenarios in the case study.*



Case studies involve participants trying to 'put themselves in the shoes of those in the case studies' as they examine various issues or events. What would he do?



Case studies help us to understand how other communities deal with the issues they face.

## Case study cards to copy

Case Study 1: Tarumba Village

Tarumba Village is located at the mouth of Wainivore River and it has a population of 700 people. The villagers depend on water from the river for cooking, drinking, bathing and washing. They also use water from the river to clean the community pig sites built on the riverbank. The pig sites were built in 1999 and the Village Headman approved it at their monthly village meeting.

Also, in 1999 decision-makers from Tarumba Village gave the green light for the construction of low cost housing, 3 kilometers inland from Tarumba. Outlets from the housing were directly deposited to the Wainivore River.

As years went past, villagers of Tarumba noticed some changes in their water. The colour had changed and they noticed a funny stench. Plastic bottles, food wrappings and other litter were seen floating in the river.

- Is there a problem in this community? If yes, what is the problem?
- Can you identify the origins or root cause of the problem(s)?
- Is decision-making part of the problem?
- Who do you think will be greatly affected by the water problems?
- How could the problem be avoided? Briefly, map out the procedures.

Case Study 2: Senitamole Village

Fifteen years ago, the village men walked five kilometers upstream and built a dam so that they were able to supply water to their homes for cooking and drinking. With the dam, they were able to have flush toilets, bathrooms and taps in their kitchens. Water coming to their homes was untreated water from the river.

In 1999, nine years after the dam was built, the man who owns the piece of land the dam sits on decided to start a dairy farm on his piece of land. He then built his dairy farm 2 km upstream from the village dam. All the waste from the farm flows into the river and pollutes the water that goes to the village homes.

Statistics from the nearby Health Center indicated a rise in water-borne diseases in the village especially with children. Attempts by the Village Headman to close the dam were hard because it was not their piece of land. The landowner told them to move the dam somewhere else. This would cost the villagers a large sum of money, something that they cannot afford.

Today their dam still sits there and they are still using water from the river.

- What is the problem of this community?
- How do you think the problem could be solved?
- Were the decisions made in this community good or bad?
- Who and what kind of decisions can be done to avoid or minimize problems.
- How could the problem be avoided? Briefly, map out the procedures.



## Case study cards to copy

Case Study 3: Village Water

Roma is a small village in an area of dry hills and desert. Most of the villagers raise sheep and goats. The women used to spend five hours every day walking six kilometres to the stream and back to collect water. It was difficult to carry enough and so the women and children only washed once every 20 to 30 days. Often the women were too tired to go for fresh water and used water from the local river. This was badly polluted by the village animals and so the children would become ill with diarrhoea. All this changed when a local organization offered to help the villagers install a water supply in their village. The men dug the three-kilometre trench amazingly fast because they were so keen to get the water! The local organization laid the pipes and installed six taps in the village. Now the villagers have clean water near their houses. The women say they are so happy they could fly as they now have lots of free time. Everyone can wash regularly and the children no longer suffer from diarrhoea and skin sores.

- Can you relate to this story? Is the situation similar to that in your community?
- Imagine only being able to wash once a month, and often being ill. How would this affect the way you feel? How would this affect your education? How would this affect your family?
- What difference could it make to have clean water and not get ill so often?
- What decisions can be made to ensure clean water access for all



Contamination by animal waste, construction of flush toilets and purchase of infrastructure are all water issues for many communities!



**Purpose:** Examine water use problems and practice decision-making.

**Materials:** Case study cards, newsprint, marker pens, blue tac, pins or cello tape

**What to do:**

1. Divide members into small groups. Distribute case studies and worksheets to each group with newsprint to record answers.
2. Inform participants that they need to put themselves in the 'shoes' of the people or communities highlighted in the case studies.
3. Ask group members to allocate a recorder, group leader, and presenter. The group leader should facilitate discussions using the worksheet.
4. Allocate enough time for groups to discuss, and record results. Once groups have completed, give out the relevant '**What really happened?**' cards to each group.
5. Ask groups to compare the '*real solutions*' to the solutions developed by the group. How is this different from what each group predicted?
6. Groups should list the pros and cons of each approach to the problem, that is, the solution they have developed and what really happened. Can the groups develop a better solution with the information they now have?
7. Each group should record answers and present all their findings to the rest of the participants.
8. Facilitate a discussion with all participants. Suggested questions to ask:
  - \* Did participant responses to the problems 'match up' with 'What really happened?' Explain and highlight any interesting approaches to resolving the water problems.
  - \* Were there any problems faced in developing solutions to the problems given in the case studies? Why and how could these have been addressed?
  - \* Discuss lessons learnt: What have we learnt about water issues? What have we learnt about 'solutions' to water issues, or community issues? What have we learnt about making good decisions?
  - \* What were the advantages / disadvantages of using the Case Study Worksheet? How did this affect choices and decisions made?
  - \* How can we apply what we have learnt through the activity and from each other to everyday living in our community?

## Case Study to copy: The Waisarava Creek

The Waisarava Creek runs across a piece of land that belongs to the Mataqali Vola, a Fijian landowning unit. The creek flows over 10-12 kilometres discharging into the Wainibau River about 500-700 metres upstream of the Lodon Water Pump that supplies water to the city.

Land on both banks of the Waisarava Creek and adjacent hinterland are used for farming and housing for urban employees who commute to work in the Nausori and Suva corridor.

Recently, residents living on both sides of the creek have complained about the foul smell from the creek. The residents claim that the foul smell comes from the chicken abattoir upstream.

Observations by the Mataqali Vola suggest that sources of pollution apart from the chicken abattoir are rubbish dumped by residents along the creek and activities related to household chores.

Agriculture activities have also contributed to the pollution of the creek. The absence of fish and other fresh water organisms in the upper creek testify to reduction of biological diversity in the stream.

### What happened next?

- \* What are the environmental and social impacts of polluted rivers?
- \* How do agricultural activities affect rivers?
- \* What are practical community actions that can be taken by the community?
- \* What are actions that can be taken by the abattoir?

### What really happened?

In December 2004, the Mataqali members approached a consultant to advise them on the best approach to clean up the creek and its long term sustainable management. The Mataqali and their decision-makers have agreed to initiate a community-based project to enhance the stream water quality.

They conducted workshops and invited landowners and tenants in the Waisarava Creek catchment. The workshop focused on water. Key government stakeholders and environment organizations were also invited to the workshop.

The Mataqali also approached the Native Land Trust Board and presented on how their environment has been degraded by activities of leaseholders. They are hoping that the NLTB will ensure that all leaseholders abide to decrease environmental pollution. They have agreed that to approve a lease, the applicant must promise that all activities he/she wants to carry out on the piece of land are environment friendly.



## Case Study to copy : Ariel City

By the late 1980s, Ariel City was entering a water use crisis that had been developing gradually for the two previous decades. Since the 1960s the city's demand for water was more than what the reservoir was able to supply. To make matters worse, the wastewater flowing to treatment facilities either approached or exceeded the permitted levels. During the 1980s, three drought warnings greatly tested Ariel City's water supply and treatment infrastructure.

The population of Ariel City has always consumed a lot of water, on average more than 100 litres per person per day. It became very clear that something had to give. New sources of water had to be developed, new treatment facilities built and water use habits of the city changed. In the late 1970s, the city town council was also close to being bankrupt. The last thing the taxpayers needed was a high water development bill!

Many options were discussed, including large development projects, leak detection programmes, increase in water rates, installation of water hydrant locks, and more. One suggestion was to replace the old toilets and showerheads, which waste a lot of water, with more efficient models. Research had shown that 75% of household water use was concentrated in bathrooms, and approximately 350 million litres of water per day flowed down the toilets on Ariel City residents! Planners estimated that there were as many as 4.5 million toilets in Ariel City.

### Stop and think! What could you do to change the situation?

- \* What are some realistic measures you can put in place or actions you can take to conserve water?
- \* Choose one of the actions and develop a thorough project plan.
- \* How can you motivate the population of Ariel City to support the project?
- \* What problems may you have along the way and how can you resolve these?

#### What really happened?

The Mayor of Ariel City decided to start a Toilet Replacement Programme. Homeowners under this programme would be paid to replace their toilets. This water conservation programme would be administered by the Department of Environment. Homeowners could also claim up to \$240 if they had plumbers install low-flow showerheads at the same time.

In 1994 the programme began, and within a year and a half, 500,000 toilets had been replaced, and applications filed for 300,000 more 'water conservation' toilets. The programme had benefits – property owners saved money on water bills by reducing consumption, and there was a boost in labour, especially the plumbing trade.

## Case Study to copy: The Water Droplet District

Back in 1961, the Water Droplet District was a sleepy farming area with about 300 residents. By 1971, the population had grown to 14,500, and it was predicted that by the year 2000, the population would be 300,000.

The Water Droplet District is in a very dry region, and to be able to cater for all the population, almost half of the water needed, has to be piped in from the neighbouring region. Despite this, people were unaware of the need for water conservation. Traditionally, the communities in other districts had separate water and sewage treatment systems. Water was used once, sent to the wastewater treatment plants and then piped directly into the ocean.

Had the Water Droplet District planners chosen to set up a water system like in other districts, they would have had to pay millions of dollars for discharge pipes only! Luckily, the Water Droplet District had great planners!

Today, the Water Droplet District is showcased for forward-thinking water conservation practices, due to the planning decisions made by a handful of experts more than 30 years ago.

### **Prediction problem:**

Put yourself in the position of the planners who oversaw the Water Droplet District when population in the area was just beginning to grow. You can start fresh. There is no existing system that has to be reworked or replaced. The residents are few and scattered. You are free to look ahead and plan for a crowded future with high demands for water and high levels of wastewater.

Consider the following questions:

- \* What are your thoughts on how to supply water and get rid of waste?
- \* What steps would you recommend to facilitate the planning process?

Use the case study worksheet to guide and record your progress.



It is important to have access to healthy clean water

## Case Study to copy: The Water Droplet District (continued)

### What Really Happened?

The most important part of the Water Droplet District Plan was to combine the water and sewage treatment systems. By combining the two, they were able to study and plan for the entire water supply, water use, water treatment, and wastewater discharge, as a whole system.

Reclaimed water was planned from the beginning. Wastewater was not seen as just something to be disposed of, but as a resource in a drought-prone area. Treated wastewater was reused and resold as reclaimed water to water users.

Reservoirs were built to store reclaimed water, and pipe directly to water users. These reservoirs are completely separate from the drinking water reservoirs. Dual pipes, one for carrying drinking water, and the other for carrying reclaimed water, were constructed for all new district sub-divisions that were built. This has saved a lot of money on pipes!

Reclaimed water used for irrigation actually acts as a fertiliser (having high levels of nitrogen and phosphate), saving farmers money as they do not need to buy fertilisers and minerals. Money is saved also, as less water is imported from other districts. Reclaimed water is also used to water parks and school grounds, some residential gardens, and for toilets in office and commercial buildings.

### Case Study Worksheet

Use this form to record the progress of the group decision-making process.

- i. Write a two to three sentence summary of the problem, the challenge or situation outlined.
- ii. List any important information you may be able to supply from general knowledge or experience or add through research.
- iii. After brainstorming and narrowing options, record the handful of possible solutions or responses that the group have decided on.
- iv. Once options have been evaluated, record the option that has been selected.
- v. List the main points to defend the chosen strategy. Briefly explain reasons and describe why this solution is better than the other proposed solutions.



# Water for All (Pass the Jug. Used with permission)



45 Minutes

**Purpose:** Understand the importance of access to water and appreciate the value of water as a shared resource.

**Materials:** About 25 plastic cups, a 600 ml bottle of water and a 2 litre bottle (fill both bottles with water), prepared set of Birth Date Cards and Water User Cards.

A definition of 'access'  
To obtain or make use of, or  
take advantage of  
something...

*What is access to water?*

## What to do:

1. Introduce the activity. Tell participants that they will role-play two situations that I look at having access to water. Facilitate a brief discussion. *What do participants understand about the term 'access'? Do all people have equal access to water?*
2. Using the example below, introduce the first system of water access:  
*Imagine that you have a bottle of orange juice (600ml) to share between 6 people who are all expecting to drink juice. What do you do?*
3. Show the 600ml water bottle to the participants and inform them that this represents the water source. Ask six volunteers to stand in a row in the front of the room. Give each volunteer a plastic cup.
4. The six volunteers represent the Water Users who use the water source. They should decide how they will share the water. Each person should pour out as much water as he/she needs and pass the bottle to the next person. Continue until all six volunteers have received the bottle.
5. Facilitate a group discussion. Suggested questions to ask:
  - \* Was there enough water for everyone? Did everyone get the same amount?
  - \* What decisions were made about how the water was shared?
  - \* What are the advantages or disadvantages of this system of getting water?
6. Explain to the participants the next situation: *You live in a country that has a Water Law. This law gives people who first moved into an area and started using water, the right to use the water first, even though the water source is not in or next to your land boundary!*

### Water Law!

People who first moved into an area and started using water, have the right to use the water first!  
This is even though the water source may not be in or next to your land boundary.

7. Select a group of 10 volunteers. Instruct each volunteer to choose a **Birth Date Card** and show it to the rest of the participants. *Access or right to water will depend on the date of birth.*
8. Select another 10 volunteers and give each a **Water User Card**. Inform the participants that the Water User cards are numbered.
9. Ask each Water User to find the person with the correct Birth Date card and pair up. For example, *Water User 1* should look for the volunteer with the earliest *Birth Date Card*. They become the first water users.

*Note to facilitator:*

*If there are more than twenty participants, the extras should join in with any of the ten Water User volunteers. Reduce cards and amount of water in the bottle for fewer participants, for e.g. 5 Birth Date cards, 5 Water Users cards and 1 litre water for 11 participants. Get a volunteer to help you distribute the plastic cups and fill the water.*

10. Once all participants have paired up, show the 2 litre bottle of water to the participants. Tell them that this represents the water source in the area, in this case the river. *According to the law of the land, the right to use the water depends on who comes first!* The Water User who was born first and moved into the area first, therefore has the first right to water!
11. Each Water User Card states how the water is used and how much water is needed (and returned). *For example, the Water User that represents the hydroelectric company uses and returns water back to the river.* This is shown by having water poured first into the cups and then pouring some water back into the bottle.
12. Start from Water User 1 (first Birth Date to last). They should read out how they use water and how much water they need, (this amount is written on the card). They should take the number of cups required – fill the cups up with water from the 2 litre bottle. Continue with the rest of the Water Users *(The water may run out before the end but get all Water Users to read out their cards and the amount of water that they need).*
13. At the end of the activity, facilitate a group discussion:
  - \* *What are the advantages and disadvantages of this system of accessing or sharing water?*

- \* What factors influenced how much water each person received?
- \* How did those who received enough or not enough (not any) water feel?
- \* Should the system be changed? Why and how should it be changed?
- \* How does the second system compare to the first system of sharing water?
- \* What can be done for water users who did not receive any water?
- \* Discuss the lessons learnt. How does this situation apply to people in our communities or in our country? To water and decision-making?
- \* Have participants experienced real situations when they did not have access to clean water? What were the causes of this? How did this affect them?
- \* Will we always have access to clean, good quality water? What are some factors that may prevent this from happening?
- \* What are some things that individuals and communities can do to ensure everyone has access to clean water?
- \* What do participants think about the saying ‘Save tomorrow’s water today’?

*Note to facilitator:*

*Explain to participants that poor access to clean water is experienced by many people in countries around the world today. Safe water supply and adequate sanitation to protect health are among the basic human rights. Today, there are still almost 1.1 billion people who have inadequate access to water and 2.4 billion without appropriate sanitation.*



Youth of Driti in Vanua Levu clean out weeds and rubbish from their village creek

Millennium Development Goal (MDG) 7:



Ensure Environmental Sustainability Target 10:

- Halve by 2015, the proportion of urban people without sustainable access to safe drinking water;
- Halve by 2015 the proportion of rural people without access to safe drinking water;
- Halve by 2015 the proportion of urban people without access to basic sanitation;
- Halve by 2015 the proportion of rural people without access to basic sanitation.



BIRTH DATE CARDS to copy

January 01

August 21

February 14

September 12

March 18

October 10

April 01

November 25

May 14

December 25

# WATER USER CARDS to copy

## Water User 1

settlers. You own the largest dairy farm in the area.

**Use 2 cups**

## Water User 2

Your ancestor settled near the river and started planting rice. Over the years this has turned into a major commercial rice and dairy farm. You have inherited the business.

**Use 2 cups**

## Water User 3

Your great-great grandmother came to teach the children of the dairy farmers. You live on the land that she bought and need water for personal use and crop irrigation.

**Use 1 cup**

## Water User 4

You represent a small community of families who work at the rice and dairy farms. You use water for daily domestic and small-scale farming purposes. Your water need may increase as your community grows.

**Use 3 cups**

## Water User 5

You represent a hydroelectric company with a dam upstream of the town. The water you use passes through the dam to generate electricity. Show this by pouring 2 cups of water back into the bottle.

**Use 3 cups. Return 2 cups**

## Water User 6

Your grandparents left the city to come back and start a farm here. Your grandfather is still alive and insists on using the old irrigation system. This wastes a lot of water.

**Use 4 cups**

## Water User 7

You represent a town that grew as more people escaping the city moved to the countryside. You use water for domestic and irrigation purposes.

**Use 3 cups**

## Water User 8

To avoid the competition in the city, your father moved his garment factory to this growing town. This industry provides a means of income for both the town and community members.

**Use 2 cups**

## Water User 9

You are a small farmer that has moved here to supply food to the growing population.

**Use 1 cup**

## Water User 10

You have decided to move here and start an industry that you think meets a growing need: furniture making.

**Use 1 cup**

# Water Roles



2 hours

**Purpose:** Look closely at the role of different groups in the community in relation to water resources.

**Materials:** Fact sheet, case study card, newsprint and markers

**What to do:**

1. Divide participants into three groups – men, women and youth.
2. Distribute newsprint and marker pens to each group. Ask the group to draw the picture of a man, woman or youth (according to their group) on the lower left-hand corner of the newsprint. For example, the women’s group will draw a woman.
3. Draw a balloon coming out from the picture and write in it a problem faced by the group regarding water.
4. Draw more balloons coming out from the first balloons and showing further effects as a result of the first problem.
5. After creating a whole chain of balloons, get each group to present the problems they face regarding water in the community.
6. Ask groups to identify where the members feel the chain may be broken and how this can be done.



**Women and Water**

Two thirds of the world’s households use a water source outside the home and the water carriers are traditionally women. In these areas water is usually collected from a standpipe in the village, a well or a muddy river by women and children.

A person needs 5 litres of water a day for drinking and cooking and 25 litres more to stay clean. The most a woman can comfortably carry is 15 litres. The work involved in collecting and carrying water uses up to 50 percent of a woman’s energy.

If a supply of water were available in the village near their homes, women could spend more time looking after their families, developing income generating activities, improving their education or growing food for family use or sale.





7. Facilitate a discussion with suggested questions:

- \* What were some of the issues raised?
- \* Did all groups face the same problems?
- \* Is there a group that faced the most problems regarding water? Why is this so and can it be changed?
- \* Can the groups identify a link in their chain of balloons where the problem can be stopped?
- \* Can participants relate lessons learnt in this activity to everyday life in the community? Discuss roles and responsibilities in communities.
- \* How can we all contribute to sharing and accessing water fairly?

*Note to the facilitator:*

*This activity examines how different things are connected and gives a good over view of the consequences of one problem on other sectors of society and actions for change.*

*Issues related to limited and poor quality water are identified as well as connections with other community problems.*

*Actions and decisions for ensuring good water access are listed.*

*Areas for involvement of women in water decision-making are highlighted.*



Youths in action



**Purpose:** Identify the challenges in providing and maintaining water infrastructure and recognise ways to improve water infrastructure in the community.

**Materials:** Fiji water fact sheet, newsprint and marker pens

**What to do:**

1. Read the information in the fact sheet below and discuss this question.

**“What are some of the difficulties in providing adequate infrastructure?”**

**Fact Sheet**

**Fiji Water**

Fiji faces water supply and contamination problems because of ageing water infrastructure and treatment systems. Without funds or money to improve water infrastructure and water utilities, the pipes are getting old and need repair. The water pipes are rusting and breaking, with water leaking out and being wasted. Some cannot afford to fix these problems, which continue to deteriorate over time.

Many people in Fiji are moving and migrating to live in urban areas. The large increase in the urban population creates major challenges in providing freshwater for all citizens. Large towns do not have infrastructure that can cope with the demands of the growing population. As a result there is a greater chance for contamination and pollution of water sources and water and sanitation issues.

2. Discuss the condition of water infrastructure in your community.
3. Brainstorm the issues and write them up on newsprint, e.g. Are the pipes and hoses working and pumping water? Are pipes broken, damaged, and stolen, not being used properly?
4. Facilitate a group discussion. Suggested questions to ask:
  - \* How can we improve the water infrastructure in our community?
  - \* Who do we need to talk to?
  - \* How do we maintain and keep our water infrastructure in good condition?
  - \* What actions do we need to take to improve our water infrastructure?
  - \* How do we raise the money to pay for infrastructure?
  - \* What are the reasons the infrastructure is broken?
  - \* How do we fix it?
  - \* Does anyone in the community have the skills to fix the problem?

*Note to facilitator: You may decide to invite a guest speaker for this Learning Circle.*

# Water Users



1 hour

**Purpose:** Identify the different ways individuals and groups make use of available water resources, and examine activities contributing to pollution of water resources.

**Materials:** Newsprint and coloured pens

**What to do:**

1. Divide participants into four groups and give each group a water use sector from the list below:

*Domestic and Personal Use*

*Agricultural Use*

*Industrial Use*

*Towns and Cities*

2. Ask each group to list all the possible activities (ways) in which water is used in that sector.
3. Copy the water use table below onto newsprint and paste up on the wall or board. Ask each group to copy the table onto their own newsprint and fill in the different sections.
4. Give each group 20 minutes to complete the activity. The groups should then present their results to everyone.



**Water Use Table to copy**

Activity	Type of Use	Contributes to Pollution?	What can be done? Solutions if any.



**Purpose:** Brainstorm on ways to manage water in the community and appreciate the role individuals can play to work together to promote safe water access.

**Materials:** Newsprint or big sheets of paper

**What to do:**

**Part I: Identifying Water Issues!**

1. Put participants in three groups and distribute newsprint and markers to each group.
2. Ask each group to answer the following questions:
  - o *What water issues or problems are faced by your community?*
  - o *What are the causes of these water problems?*
  - o *What are the effects of these water problems?*
3. Give 15 minutes to complete the activity and ask each group to present their results. Facilitate a discussion with the participants. Suggested questions to ask:
  - \* *What were the main water sources listed? Are there any other water sources?*
  - \* *What are the problems?*
  - \* *What can you do to reduce the problems?*

**Part II: Brainstorming Actions!**

4. Explain that the purpose of this part of the activity is to brainstorm (think of) opportunities and actions that communities could do to improve water management.
5. Give each of the three groups a sheet of newsprint.
6. Ask the groups to refer to their community water problems and brainstorm actions they can take to resolve these. Allow 20 minutes for the groups to brainstorm ideas.
7. At the conclusion of the brainstorm, select one or two people from each group to present their findings to the whole group.
8. Review the findings and facilitate a group discussion. Ask the participants:
  - \* *What have we learnt about water?*
  - \* *What is the best thing we can do to manage water in the community?*
  - \* *Which of these options may be difficult to implement?*





**Part III: Making a Difference!**

9. Provide each group with a copy of the Water Action Plan templates. Explain that there are two templates.

***The Water Action Plan template on individual actions focuses on actions each person can do on their own to make a difference. Each person in the group should contribute an action that they can do.***

***The Water Action Plan template on collective actions focuses on actions that group members or the community can do as a group to make a difference.***

10. Ask each group to nominate a person who will play the role of the **‘Clean Communities Leader’**. The other members of the group will play the role of the **‘Householders’** in the community.
11. The role of the ‘Clean Communities Leader’ is to facilitate participation of group members, get ideas from group members and organize them into creating Water Action Plans. *Stress that the whole group should participate in developing the Water Action Plan.*
12. Provide support and advice to the groups as they work. Give each group 20 minutes to complete their plans and ask them to present these to the rest of the groups.
13. Facilitate a discussion with participants. Suggested questions to ask:
  - \* Why is it important for ‘Householders’ or everyone in the community to participate in developing the plan?
  - \* Who does the plan belong to?
  - \* What could we do if the ‘Householders’ didn’t come up with a very good plan?
  - \* What could we do if we thought that the plan was too difficult or unrealistic?
  - \* Is it possible for Households, Families or Individuals to draw up their own Water Action Plans?



The participants may decide to take on the task of developing a **Community Water Action Plan** as a community project to manage water.

If they decide to do this, they should appoint a coordinating team and make a list of decisions that will need to be made. The list could include:

- Which households will each person visit?
- Will they do it individually, in pairs or in teams?
- When will they start?
- How will they inform the various households?
- What is the best day of the week to do it?
- What preparation needs to be done?

## Water Action Plans to copy

### Individual Actions: What Can I Do?

Actions I will take	How will I know I've made a difference?

### Collective Actions: What Can We Do Together?

Actions we will take <i>together</i>	How will we know we have made a difference?

# Water and Community



30 Minutes

**Purpose:** Explore the advantages of communities taking ownership of problems and participating in finding their own solutions.

**Materials:** Nil

**What to do:**

1. Ask the participants to stand in a circle, each person holding the hand of the person standing next to them.
2. Explain to the group that:  
*“Everyone in the circle is a member of the same community. This is shown by community members holding hands – this is a rule, and you are not allowed to let go of the hands of the people standing next to you.”*
3. Ask the group to nominate a person who is a **good ‘problem solver’** and have this person leave the circle and to go to a place (e.g. outside the room) where they cannot see the group.
4. Instruct the group to create a ‘knot’ of people. This must be achieved without releasing hands (*this is very important*). For example, people can go under some one else’s arms, twist or turn around to ‘tie the knot’. They should not release each other’s hands while doing this.
5. When the ‘community knot’ is completed, invite the ‘problem solver’ back into the room.
6. Tell the ‘problem solver’ that: *“This community has a big problem – as you can see they are really tied up in a big knot. The task of the problem solver is to solve this problem for the community. You must untangle the knot by telling them what to do. You cannot ask them for advice, physically touch anyone and they are not allowed to let go of the next person’s hand. You must solve the problem as quickly as you can.”*
7. Allow the problem solver 5 minutes to solve the problem. If the problem solver finds it too difficult to untie the knot, give him or her the option to give up.

*Before you begin this activity, you should be aware of traditional protocol and sensitivities. The activity can be conducted with certain members of the group such as elders, chief etc playing the role of observers. Invite them to comment after the activity.*

8. Facilitate a discussion with the participants: Ask the group and problem solver:
  - \* Was it easy or difficult to solve the problem? Explain answers.
  - \* How well did the problem solver understand the problem?
  - \* Have you ever been in a situation where an 'outsider' has tried to solve a community problem? What happened?
9. Now repeat the exercise by asking the community to make the same knot again. This time include the 'problem solver' in the knot as a member of the community.
10. Tell the group that they must solve the problem by themselves, with everyone's participation. When the group is ready tell them to untangle themselves as quickly as possible (they should not let go of each other's hands).
11. Facilitate a discussion with the participants: Ask the group:
  - \* Was it easy or difficult to solve the problem? Explain answers.
  - \* How well did the group understand the problem, and how did they participate to solve it?
  - \* What are the advantages of solving a problem from within the community?
  - \* What are the advantages of community participation?
  - \* How can we relate this activity to our community water resources?

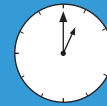


Men's group all in a knot.





# Healthy Water



45 Minutes

**Purpose:** Understand how easily water-borne diseases can be spread and water sources can be polluted.

**Materials:** Water, clean spray bottle

**What to do:**

1. Inform participants that the human body is home to all kinds of bacteria. Some bacteria can be very helpful while some can be very harmful. In this activity they will demonstrate how germs (pathogens) are passed along to others through touch.
2. Fake a sneeze, covering your mouth with your hand. Using a spray bottle, spray water onto your hand to demonstrate how fluid can get onto your hand when sneezing.
3. Use your wet hand to shake hands with a participant. Instruct that participant to shake hands with the next person without drying his/her hand. Continue this until everyone has shaken hands.
4. How many participants shook a wet hand? What if germs or pathogens were in the sneeze fluids? Facilitate a discussion:
  - \* How are germs spread?
  - \* Water is a main carrier of bacteria and pollutants. Discuss the links between water and human health.
5. Divide participants into three groups and distribute newsprint and marker pens.
6. Ask participants to identify their various water sources. Each group should choose a water source. One group may choose the water tank, while the other group chooses the well.
7. Ask each group to draw their water source in the middle of the newsprint. Use arrows pointing towards the water source to show the ways their water source can become contaminated. Label these arrows.
8. Draw arrows pointing out from the water source with labels or drawings showing the results or impacts of drinking contaminated water in their community.
9. Ask each group to present their drawings to the rest of the group and encourage discussion and questions. Facilitate discussion. Suggested questions to ask:
  - \* What are some of the factors that might affect drinking water supplies?
  - \* What are the water-related problems faced by the community?
  - \* How do these problems affect the community? The family? The children?
  - \* Are these problems easily resolved?
  - \* What are some things we can do to address these problems?

# Observing Our Water Sources



1-2 Hours

**Purpose:** Identify the condition of the community water source.

**Materials:** Water quality testing kits, recording sheets and pens

**What to do:**

1. Get your group to walk down to your local river or water source.
2. Discuss these questions at the site.
  - \* What do people use the water source for?
  - \* Can you see any signs of pollution or water contamination?
  - \* Where might the contamination be coming from?
3. The next step is to do water quality testing of the water source. Let the group members take samples of the water and test it using the water test kits. (Next activity!)
4. After the group has conducted the water quality testing, discuss results. Work out how often the group should monitor the water source or river before presenting the results to the community.



Going to identify the condition of the water source

*Note to the facilitator:*

*Choose a fine day to take your group out to monitor. If the water source is polluted, let the group work out what actions can be taken to address this.*



# Community Water Monitoring



1-2 Hours

## Purpose:

- o Test for bacterial contamination in drinking water using the Hydrogen Sulphide Paper Strip Test ( $H_2S$  Test). **Contact Live & Learn for information on conducting tests using the  $H_2S$  test bottles.**
- o Monitor community water sources and identify possible sources of pollution using the Sanitary Surveys.

**Materials:**  $H_2S$  Test bottles and Community Water Monitoring Guide, copies of the Result Recording Sheet and Sanitary Surveys

## What to do:

1. Divide the participants into two groups. Each group should assign a Group Leader and a Note Taker.
2. Distribute the Community Water Monitoring Guide,  $H_2S$  Test bottles and copies of the Result Record Sheet and Sanitary Surveys to each group. The groups should read through the monitoring guide and study the Result Sheet and Sanitary Surveys. Encourage participants to ask questions.
3. Allocate each group to the various water sources in the community such as river, rainwater tank, boreholes, wells etc.
4. Once out in the field, each group is to carry out a survey of the water storage container or water source using the appropriate Sanitary Survey.
5. After doing the Sanitary Survey, the groups are now ready to test the waters!
6. Assign someone in the group to read the instructions in the Community Water Monitoring Guide for carrying out the  $H_2S$  Paper Strip Test. Follow the steps carefully.



Collecting the water sample from the tap using the  $H_2S$  test



7. After the water testing the group can return back inside the meeting room for further discussion. Suggested questions to facilitate discussions:

- \* Were they able to follow the instructions?
- \* Was the Sanitary Survey useful? How?
- \* What other observations did they make of the surrounding environment and peoples behaviour?
- \* Were the water sources located nearby a rubbish heap or toilet?
- \* Who will be responsible for checking and recording the results?
- \* When shall the group next meet to discuss the results?
- \* If the water source is contaminated, what can be done?



*Note: A 'quick snapshot' photo guide has also been added to the water monitoring guide to also help you assess whether your water source is protected from contamination.*



Interpreting the results of the water test. What do the results mean to me/ to my community and what can I/we do about it?

**Community comment on the H2S test from the Chief of Nakalawaca Village**

*“This water testing is simple and practical for us to check or monitor our water regularly. It helps us help ourselves to see that our drinking water is safe for our people”*

**Community comment from Village Headman**

*“This short exercise- using the H2S test has given us new knowledge and helped us to make informed decisions on what we can do to monitor and improve our water quality so it will be safe for us and our children in future.”*



# Water for Life



50 Minutes

**Purpose:** Identify necessary support mechanisms, actions and benefits for better water management and water quality monitoring in communities.

**Materials:** Newsprint, marker pens, paper leaves, fruit and roots (*cut out enough leaves, fruit and roots before the workshop/Learning Circle*)

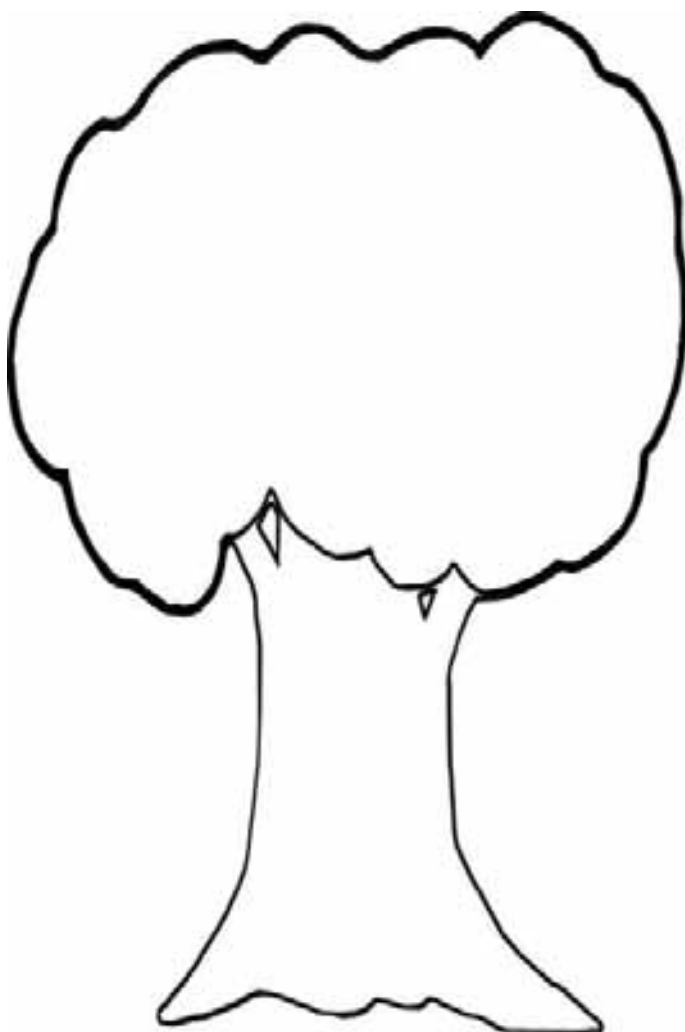
## What to do:

1. Draw the outline of a tree on newsprint and pin up on the blackboard or wall. Inform participants that in groups, they will be nurturing/building the community 'Water for Life Tree'.
2. Divide participants into small groups and give **each group 4 leaves, 2 fruit and 2 roots**. (*If they need more, they can collect extras from facilitators*).
3. Instruct participants to think about the **appropriate actions** they could implement in communities to improve water use and management, and mobilise community water monitoring. They should write these actions on the **leaves**.
4. Ask each group to come up and paste their leaves on the newsprint – they should read this out to everyone.
5. Ask participants to then discuss the **types of support** that will be needed to ensure that these actions are successful. They should write their responses on the **roots**. Attach these to the tree. (*Read out first*).
6. Ask participants to discuss the **benefits** of better water use and management, and of community water monitoring.  
*What would some of the benefits be? To the community? The nation? To individuals? To the environment?*  
They should write their responses on the fruit cards. Paste these on the tree.  
(*Read out first*).

7. Referring to the completed 'Water for Life Tree', facilitate a group discussion.

Suggested questions to ask:

- \* How does the support that is received guide the specific actions and activities that have been identified?
- \* Why are roots important? What is the function of roots? What will happen to the tree if you remove the roots?
- \* Using this as an example, what would happen if the things (approaches and structures) needed to carry out the actions and activities in communities are removed?
- \* Why are the benefits represented as fruit of the tree?
- \* Are there any specific actions that have been listed, that will be hard or challenging to do? Why? What can you do about it?
- \* Who should be in charge of nurturing this "Water for Life Tree"?



A "Water for Life" Tree

# Making a Difference



2 Hours

**Purpose:** Identify community water problems, identify causes, potential solutions, plan for action and keep track of changes.

**Materials:** Newspaper, marker pens, coloured cards

**What to do:**

1. After the groups have tested their drinking water they may want to develop an action plan to regularly monitor their water supply or to address their water issues.
2. The group can develop a work plan – this examines the issues, the effects, the causes, potential solutions, people responsible and proposed time when changes should take place. Draw a work plan table for the group using the example given below.
3. Distribute the tasks to be done amongst group members. Give out coloured card and write the name of the person responsible in the top left hand corner of the card or notepaper.
4. Give each task a deadline and stick the card onto the work plan or a calendar outline.

### EXAMPLE WORK PLAN

PROBLEM	CAUSES	ACTIONS & RESPONSIBILITIES	WHEN TO TAKE ACTION	GOALS
Dirty drinking water especially from the well and rainwater tank	<p><b>Tank:</b></p> <ul style="list-style-type: none"> <li>-Dead leaves and debris from the gutter.</li> <li>-No sieve on the mouth of the tank</li> <li>-Tanks are not washed regularly</li> </ul> <p><b>Well:</b></p> <ul style="list-style-type: none"> <li>-Well not covered</li> <li>-People throwing their rubbish in the well</li> <li>-Cracks on the wall of the well</li> </ul>	<p>Set up a regular water monitoring group to ensure the following is done:</p> <ul style="list-style-type: none"> <li>• Gutters cleaned;</li> <li>• Netting placed on mouth of the tank;</li> <li>• Drainage system under the tap of the tank cleared;</li> <li>• Cover for well provided</li> <li>• Cracks on wall repaired;</li> <li>• Develop plan for water monitoring and maintenance.</li> </ul>	<p>Plan of action to be taken up during the Bose ni Koro and Bose ni Tikina 04/07/05</p>	<p>Decrease in the number of water related diseases</p>
Leaking pipe	<ul style="list-style-type: none"> <li>-Damaged tap and pipe</li> </ul>	<p>Repair pipe and change the tap</p>	<p>July</p>	<p>No more leaks</p>

*Note to the facilitator:*

- \* *Have regular meetings to review your work plan and fill in any missing tasks that come to mind – write a new action card for each additional task and place on the planning calendar.*
- \* *Review progress, as a group, on a regular basis. Cross out each accomplished task with a bold red line. Replace action cards and give a new date if behind schedule.*
- \* *Celebrate every small task when it gets done!*

## **Celebrate WORLD WATER DAY every day!**

World Water Day is 22nd March each year. People everywhere raise awareness about the importance of safe water for all. Think about what you could do! Celebrate World Water Day every day!

### **Make a difference – get involved!**

- Step 1: With your friends, choose any issue that interests or concerns you.
- Step 2: Get informed about the issue and decide what changes are needed.
- Step 3: Make a list of who needs to know about the changes you would like to see, and who has the power to make the changes.
- Step 4: Decide what you need to do to persuade others, like contacting people that have the power to make the changes, contacting the press or organizing an event.
- Step 5: With your campaign in gear, set some targets and a timetable.

*Every now and then have a review. Have you made a difference? How do you know? How would you do it differently next time?*

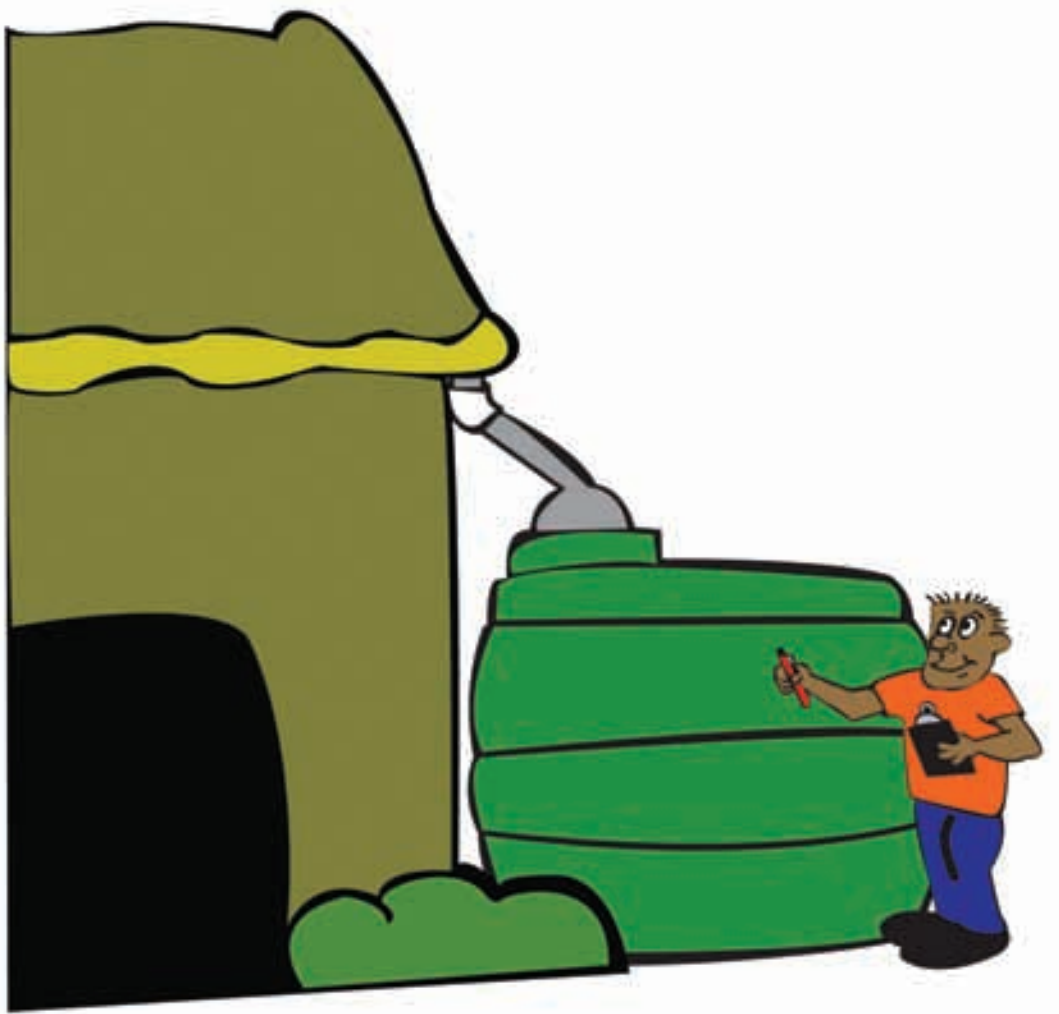


Observing World Water Day every day every year!





# Extra Tools



Rainwater Harvesting Extra Tools Adapted from  
Harvesting the Heavens: Guidelines to Rainwater Harvesting in Pacific Island  
Countries, South Pacific Applied Geoscience Commission (SOPAC), 2005

# Example: Community Workshop Programme: Governing Water

*(Title of workshop)*  
*(Name of village and date)*

**Workshop Objectives:**

1. Create more understanding and awareness on the importance of water as a resource.
2. Develop good decision making practices on water use and management.
3. Identify water issues and plan for change.
4. Empower communities to monitor water quality and mobilise action for good water governance.

**Day 1 Monday .....date**

Time	Activity	Purpose
8:30 -9:00am	<ul style="list-style-type: none"> <li>• Participants arrive and registration</li> <li>• Devotion</li> </ul>	<ul style="list-style-type: none"> <li>• List of participants</li> <li>• Acknowledgement and support of the workshop programme by community</li> </ul>
9:00 – 9:30am	<ul style="list-style-type: none"> <li>• Watery Thoughts</li> </ul>	<ul style="list-style-type: none"> <li>• Sharing feelings and thoughts about water.</li> </ul>
9:30 – 10.00am	<ul style="list-style-type: none"> <li>• Water! The Big Picture!</li> </ul>	<ul style="list-style-type: none"> <li>• Exploring the importance of water.</li> </ul>
10:30 – 10:45am	<b>MORNING TEA</b>	
10:45 – 11:25am	<ul style="list-style-type: none"> <li>• Watery Connections</li> </ul>	<ul style="list-style-type: none"> <li>• Understand that water pollution is an environmental, social and economic issue.</li> </ul>
11:25 – 12:25	<ul style="list-style-type: none"> <li>• Water Responsibility</li> </ul>	<ul style="list-style-type: none"> <li>• Appreciate the role we all need to play to use water responsibly.</li> </ul>
12:25 – 1:00pm	<ul style="list-style-type: none"> <li>• Water for the Future</li> </ul>	<ul style="list-style-type: none"> <li>• Promote sustainable water use and management.</li> </ul>
1:00 – 2:00 pm	<b>LUNCH</b>	
2:00 – 2:40pm	<ul style="list-style-type: none"> <li>• Ranking Water Issues</li> </ul>	<ul style="list-style-type: none"> <li>• Critically think and discuss water issues.</li> </ul>
2:40 – 3:20pm	<ul style="list-style-type: none"> <li>• Water Conservation Choices</li> </ul>	<ul style="list-style-type: none"> <li>• Examine values and priorities on water conservation.</li> </ul>
3:20 – 4:00pm	<ul style="list-style-type: none"> <li>• Watery Case Studies</li> </ul>	<ul style="list-style-type: none"> <li>• Identify characteristics of decision making.</li> </ul>

**Day 2 Tuesday .....date**

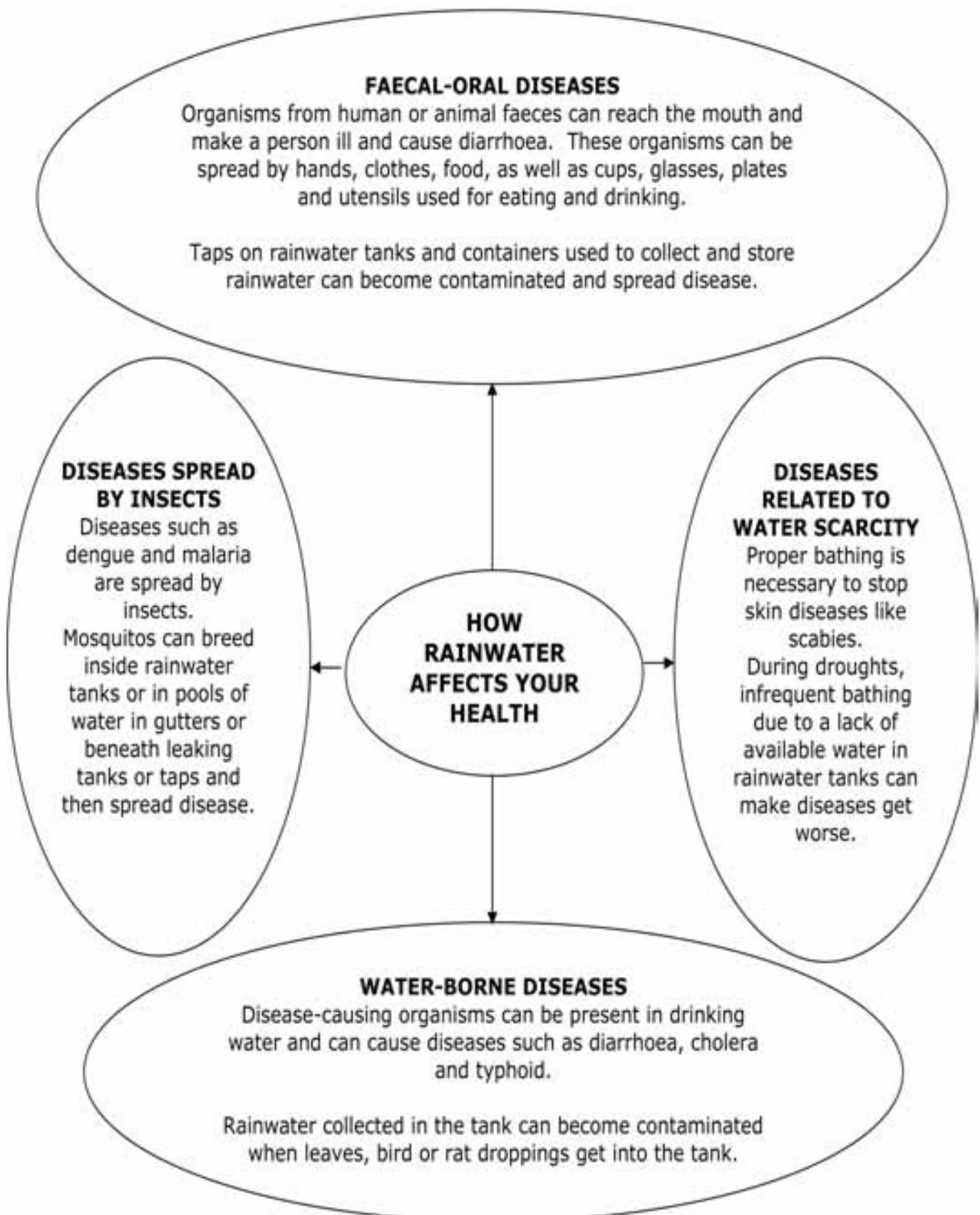
<b>Time</b>	<b>Activity</b>	<b>Purpose</b>
8:30 -9:00am	<ul style="list-style-type: none"> <li>• Registration</li> <li>• Devotion</li> <li>• Recap on Day 1</li> </ul>	<ul style="list-style-type: none"> <li>• List of participants</li> <li>• To explore feelings of participants regarding lessons learnt on Day 1</li> </ul>
9:00 – 10:00 am	<ul style="list-style-type: none"> <li>• Case Study and Prediction Problem</li> </ul>	<ul style="list-style-type: none"> <li>• Examine water use problems and practice decision making.</li> </ul>
10:00- 10:45am	<ul style="list-style-type: none"> <li>• Water for All</li> </ul>	<ul style="list-style-type: none"> <li>• Understand the importance of access to water and appreciate the value of water as a shared resource.</li> </ul>
10:45– 11:00am	<b>MORNINIG TEA</b>	
11:00 – 11:40am	<ul style="list-style-type: none"> <li>• Water Roles</li> </ul>	<ul style="list-style-type: none"> <li>• Analyse the roles of different water users in the community.</li> </ul>
11:40 – 12:10pm	<ul style="list-style-type: none"> <li>• Water Infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Identify challenges in providing and maintaining water infrastructure.</li> <li>• Recognise ways to improve water infrastructure in the community.</li> </ul>
12:10 – 1:00pm	<ul style="list-style-type: none"> <li>• Water Users</li> </ul>	<ul style="list-style-type: none"> <li>• Identify how individuals and groups use the water resources and how they contribute to its pollution.</li> </ul>
1:00 – 2:00pm	<b>LUNCH</b>	
2:00 – 3:20pm	<ul style="list-style-type: none"> <li>• Water Management</li> </ul>	<ul style="list-style-type: none"> <li>• Brainstorm on ways to manage water in the community.</li> <li>• Appreciate the role individuals can play to work together to promote safe water access.</li> </ul>
3:20 – 4:00pm	<ul style="list-style-type: none"> <li>• Water and Community</li> </ul>	<ul style="list-style-type: none"> <li>• Explore the advantages of communities taking ownership of problems and participating in finding their solutions.</li> </ul>

## Day 3 Wednesday.....date

Time	Activity	Purpose
8:30 -9:00am	<ul style="list-style-type: none"> <li>• Registration</li> <li>• Devotion</li> <li>• Recap on Day 2</li> </ul>	<ul style="list-style-type: none"> <li>• List of participants</li> <li>• To explore feelings of participants regarding lessons learnt on Day 2</li> </ul>
9:00 – 10:00 am	<ul style="list-style-type: none"> <li>• Healthy Water</li> </ul>	<ul style="list-style-type: none"> <li>• Understand how easily water sources can be polluted and water-borne diseases can be spread.</li> </ul>
10:00- 10:45am	<ul style="list-style-type: none"> <li>• Observing Our Water Sources</li> </ul>	<ul style="list-style-type: none"> <li>• Identify the condition of the community water source.</li> </ul>
10:45– 11:00am	<b>MORNINIG TEA</b>	
11:00 – 1:00pm	<ul style="list-style-type: none"> <li>• Community Water Quality Monitoring.</li> <li>• Presentation and Discussion of results.</li> </ul>	<ul style="list-style-type: none"> <li>• Test for bacterial contamination in drinking water using the H<sub>2</sub>S Paper Strip Test.</li> <li>• Monitor community water sources and identify possible sources of pollution using the Sanitary Survey Sheets.</li> </ul>
1:00 – 2:00pm	<b>LUNCH</b>	
2:00 – 2:40pm	<ul style="list-style-type: none"> <li>• Water for Life</li> </ul>	<ul style="list-style-type: none"> <li>• Identify support mechanisms, actions and benefits for better water management and water quality monitoring in communities.</li> </ul>
2:40 – 3:30pm	<ul style="list-style-type: none"> <li>• Making a Difference</li> <li>• Developing individual and community actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify communities' water problems, causes, potential solutions, plan for action and keep track of changes.</li> </ul>
3:30 – 4:00pm	<ul style="list-style-type: none"> <li>• Where Do We Go From Here? Discussion on the past three days and future plans.</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss and identify any changes in attitudes and behaviours of the participants.</li> </ul>
4.00 pm	<b>END OF COMMUNITY WORKSHOP PROGRAMME</b>	



# Fact Sheet - Rainwater and Health



## Fact Sheet – Advantages and Disadvantages of rainwater harvesting systems

Advantages	Disadvantages
<p>1. <b>Convenience</b> – Provides a supply at the point of consumption.</p> <p>2. <b>Good Maintenance</b> – The operation and maintenance of household catchments systems are under the sole control of the tank owner's family.</p> <p>3. <b>Low Running Cost</b> – These are almost negligible.</p> <p>4. <b>Relatively Good Water</b> – Better than traditional sources, especially from roof catchment.</p> <p>5. <b>Low Environment Impact</b> – Rainwater is a renewable resource and no damage is done either to the environment or to future supplies through its introduction.</p> <p>6. <b>Reliable Supply</b> – Rainwater is readily available, depending on how often it rains.</p> <p>7. <b>Simple Construction</b> – The construction of rainwater catchments systems is simple and local people can easily be trained to build these by themselves. This reduces costs and encourages community participation.</p> <p>8. <b>Flexible Technology</b> – Systems can be built to almost any requirement. Poor households can start with a single small tank and add more when they can afford it.</p>	<p>1. <b>Expensive</b> – When compared with alternative water sources, where these are available, the cost per litre for rainwater is frequently higher.</p> <p>2. <b>Supply is Limited</b> – Both by the amount of rainfall and size of catchment area.</p> <p>3. <b>High Initial Costs</b> – The main cost of rainwater catchment systems is always wholly incurred during the initial construction, when a considerable capital outlay is required.</p> <p>4. <b>Unattractive to Policy Makers</b> – Rainwater projects are always far more bulky to administer than single large projects, e.g. dam.</p> <p>5. <b>Supply is Easily Affected by Droughts</b> – Occurrence of long dry spells and droughts will adversely affect the performance of rainwater harvesting systems.</p> <p>6. <b>Water Quality Vulnerable</b> – The quality of rainwater may be affected by air pollution in the surrounding areas of certain industries. Contamination from animals or bird droppings, insects, dirt and organic matter can also be a problem.</p>



## Fact Sheet – Guide to sizing of gutters and down pipes for rainwater harvesting system in tropical regions

Roof area (m <sup>2</sup> ) served by one gutter	Gutter width (mm)	Minimum diameter of down pipe (mm)
17	60	40
25	70	50
34	80	50
46	90	63
66	100	63
128	125	75
208	150	90

### Lessons learned on system components and design.

- Select tank material based on comparison of price, durability, availability and community's preferences.
- To ensure that tanks are durable, good quality and clean construction material which meets the required specifications must be used.
- A solid foundation is essential for surface rainwater tanks and this can also double up as the tank floor. A 02-04 cm reinforced-concrete slab cast in two layers on the same day is normally sufficient.
- Tank walls can be constructed in several ways, including using bricks, blocks or concrete poured in situ, and Ferro-cement.
- Proper construction of gutters is essential and these must slope evenly towards the tank.
- Apply simple flush systems such as the manual or semi-automatic methods.
- Ensure the installation of an access manhole, screen, overflow and also a fence when required.

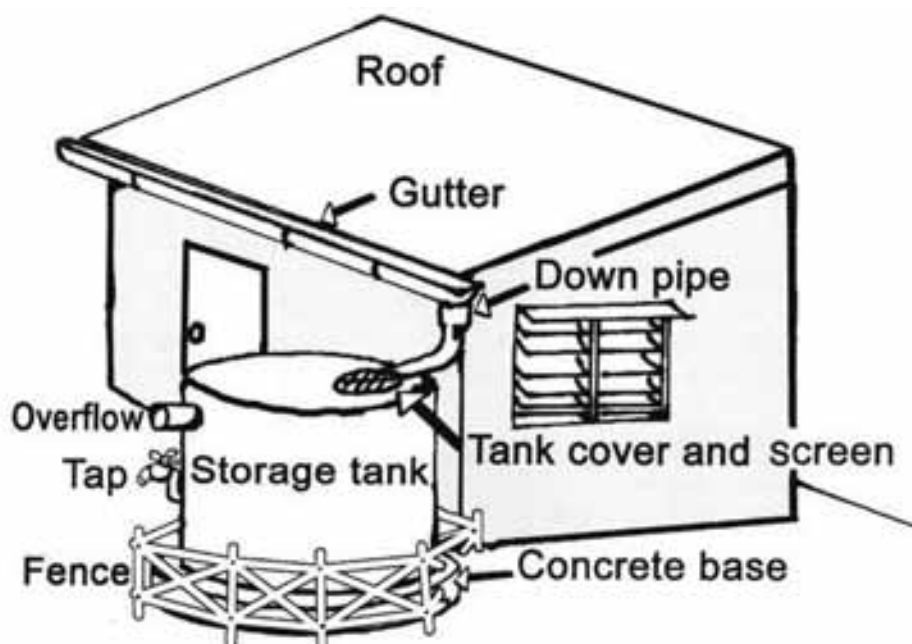
### Lessons learned on operation and maintenance

- Rainwater harvesting systems that are well constructed, operated and maintained will provide good quality drinking water without the need for further treatment.
- Regular inspections of the system help to maintain the water quality.
- Integrate water quality testing in follow up activities.
- Identify the necessary tasks to maintain and repair rainwater harvesting systems.
- Awareness should be raised on the relation between water, hygiene and health.
- Perform simple absent-present tests like the H<sub>2</sub>S Test and use results to raise awareness in the community.
- Funding mechanism for ongoing maintenance and repair should be identified as part of rainwater harvesting projects.

## Fact Sheet – Rainwater Harvesting Checklist

Desirable pre-conditions for rainwater harvesting projects	
<i>Technical Feasibility</i>	<ul style="list-style-type: none"> <li>▪ Rainwater and catchment area must be sufficient to meet demand</li> <li>▪ Design should be appropriate</li> <li>▪ Skills or training potential must be available locally</li> </ul>
<i>Social and Economic Feasibility</i>	<ul style="list-style-type: none"> <li>▪ A real need in the community for better water provision</li> <li>▪ Designs should be affordable and cost-effective</li> <li>▪ The community should be excited and fully involved</li> <li>▪ Experiences with previous projects should have been positive</li> <li>▪ Existence of social cohesion (no conflict) essential</li> </ul>
<i>Environmental Feasibility and Health</i>	<ul style="list-style-type: none"> <li>▪ The project should have an acceptable level of environmental impact</li> <li>▪ The project should be designed to enhance the environment</li> <li>▪ The project should improve both the quantity and quality of water available and should have a positive impact on the health of the community.</li> </ul>
<i>Alternatives Considered</i>	<ul style="list-style-type: none"> <li>▪ All reasonable alternatives means of water provision should be investigated.</li> <li>▪ Consideration should be given to using more than one alternative in combination</li> </ul>
<i>Institutional Arrangement</i>	<ul style="list-style-type: none"> <li>▪ The community should have the institutional capacity to manage the development and operation of the system</li> <li>▪ Local humans resources should be available to ensure the institutions continue to function effectively once any external agency assistance is withdrawn</li> </ul>
<i>Traditional and Current Practices</i>	<ul style="list-style-type: none"> <li>▪ Consideration should be given to traditional rainwater harvesting practices</li> <li>▪ Existing approaches to rainwater utilization and possible upgrading should be investigated.</li> </ul>

## Fact Sheet – Parts of a Rainwater Harvesting System





## Fact Sheet – Maintenance and Repair of Rainwater Harvesting Systems

Parts	Ongoing maintenance and repairs	How Often?	Materials	Tools
Roof	<p>Wash off roof with water when dust/dirt accumulates diverting runoff away from tank inlet.</p> <p>Trim and cut trees around tank.</p> <p>Replace rusted roofing.</p> <p>Fix holes for maximum runoff.</p> <p>Paint if rust is present using lead-free paint.</p>	<p>Check monthly and especially after long period of dry weather and cyclone and heavy wind.</p> <p>When required</p> <p>When required</p> <p>When required</p> <p>When required</p>	<ul style="list-style-type: none"> <li>○ Roofing iron</li> <li>○ Paint</li> <li>○ Water</li> </ul>	<ul style="list-style-type: none"> <li>○ Hand saw</li> <li>○ Nails</li> <li>○ Hammer</li> <li>○ Brush</li> </ul>
Gutters	<p>Clean and washout bird droppings, leaves, etc. with water.</p> <p>Check and repair gutters.</p> <p>Add more guttering to increase water collected.</p> <p>Ensure guttering is slanted to ensure steady flow of water to avoid pooling of water, collection of dirt, debris, etc.</p>	<p>Check monthly and especially after a long period of dry weather and cyclone or heavy wind.</p> <p>When possible</p> <p>When possible</p>	<ul style="list-style-type: none"> <li>○ Water</li> <li>○ Guttering</li> <li>○ Gutter hanger</li> <li>○ Gutter fittings</li> </ul>	<ul style="list-style-type: none"> <li>○ Brush</li> <li>○ Screwdriver</li> <li>○ Screws</li> <li>○ Hammer</li> <li>○ Nails</li> <li>○ Level</li> </ul>
Tank	<p>Clean.</p> <p>Repair leaks.</p> <p>Disinfect.</p> <p>Cut nearby tree roots.</p> <p>Ensure lid is sturdy and secure to prevent animals and children from falling in.</p>	<p>Once a year</p> <p>When required</p> <p>When contaminated</p> <p>When required</p> <p>When required</p>	<ul style="list-style-type: none"> <li>○ Water</li> <li>○ Disinfectant</li> <li>○ Cement</li> <li>○ Sand</li> <li>○ Gravel</li> <li>○ Proper lid</li> </ul>	<ul style="list-style-type: none"> <li>○ Brush</li> <li>○ Shovel</li> <li>○ Wheelbarrow</li> <li>○ Saw</li> <li>○ Trowel</li> </ul>

Parts	Ongoing maintenance and repairs	How Often?	Materials	Tools
Tap	Fix leaking taps. If new taps are needed brass taps are stronger.	When required	<ul style="list-style-type: none"> <li>○ Tap</li> <li>○ Washer</li> <li>○ Plumbing tape</li> <li>○ Glue</li> <li>○ Rubber</li> <li>○ Stones / gravel</li> </ul>	<ul style="list-style-type: none"> <li>○ Spanner</li> <li>○ Wrench</li> <li>○ Pliers</li> <li>○ Screwdriver</li> </ul>
	Sponge out excess water to ensure it does not pool or collect under tap.	When required		
	Place stones or gravel on bottom of collection area to help drainage.	When required		
Downpipe	Repairing holes and replace if screen is damaged.	When required	<ul style="list-style-type: none"> <li>○ Stainless steel wire mesh</li> <li>○ Twine</li> <li>○ PVC pipe</li> <li>○ Glue</li> </ul>	<ul style="list-style-type: none"> <li>○ Pliers</li> <li>○ Tin snips</li> </ul>
	Ensure there are no gaps where mosquitoes can enter or exit.	When required		
	Repair leaks at elbows.	When required		
Overflow	Securely fasten mosquito screen over the end of the overflow pipe/valve.	When required	<ul style="list-style-type: none"> <li>○ Wire mesh</li> <li>○ Twine</li> </ul>	<ul style="list-style-type: none"> <li>○ Pliers</li> <li>○ Tin snips</li> </ul>
	Ensure there are no gaps where mosquitoes can enter or exit.	When required		
	Repair screen if damaged.	When required		
Fence	Ensure fence is high and strong enough around tank and collection area to keep out pigs, dogs and small children.	When required	<ul style="list-style-type: none"> <li>○ Fencing wire</li> <li>○ Poles</li> </ul>	<ul style="list-style-type: none"> <li>○ Nails</li> <li>○ Hammer</li> <li>○ Digging hoe</li> </ul>
	Repair any gaps or damage to fence.	When required		
First Flush Devices	Remove downpipe from tan inlet to divert water. Securely replace the downpipe after first flush.	Before starting to collect water, and especially after a long period of dry weather, a cyclone or heavy wind.	<ul style="list-style-type: none"> <li>○ PVC pipe</li> <li>○ Pipe fittings</li> </ul>	<ul style="list-style-type: none"> <li>○ Pipe wrench</li> </ul>

## Fact Sheet – Comparison of different storage tank types

Tank type	Indicative price	Capacity	Life Expectancy	Notes
Ferro-cement (Demonstration project Tonga)	\$2,500 FJD for 11m <sup>3</sup>	Up to 150m <sup>3</sup> but typically less than 12m <sup>3</sup>	If well built with good quality materials and maintained, can be 50+ years.	Tank built on site. Larger sizes need welded mesh or bars and roof supports Minimum 8 days for installation.
Ferro-cement (Contractor Fiji)	\$2,000 FJD for 11m <sup>3</sup>			
Concrete	\$5,000 FJD for 10m <sup>3</sup>	If well built with good quality materials and maintained can be 50+ years	Can be pre-fabricated or cast on site	
Corrugated galvanized steel	\$900 FJD for 10m <sup>3</sup>	Up to 25m <sup>3</sup>	Can be less than 2 years in corrosive environments but typically 5-8 years. Well maintained painted tanks can reach 20 years but this is not typical	Corrosion can be a problem galvanized tanks should be painted inside and out to prolong life and are not suitable for coastal areas.
Polymer – coated steel	\$1,300 FJD for 10m <sup>3</sup>	Up to 10m <sup>3</sup>	Tanks designed for rainwater storage have 10-20 year manufacturers warranties depending on location	
Plastic/HDPE	\$2,500 FJD for 10m <sup>3</sup>	Up to 25m <sup>3</sup>	15-25 years Limited experience past 15 years but some manufacturers now provide 25 years warranty	No joints, lightweight, non-toxic food grade PE
Fibreglass	\$2,700 FJD for 10m <sup>3</sup>	Typically less than 20m <sup>3</sup>	Minimum 25 years claimed by manufacturers	Complete with inlet, outlet and overflow connections
Brick and Blockwork	\$2,000 FJD for 10m <sup>3</sup>	Up to 6m <sup>3</sup> , if reinforced up to 175m <sup>3</sup>	Variable depending on design and local conditions and materials. Some designs have failed within 2 years while others have lasted more than 20 years	Constructions on site usually utilizing local skills and materials. Uses more cement than equivalent sized Ferro-cement tanks
Wood	\$4,400 FJD for 11m <sup>3</sup> (excluding freight ex-NZ)	Up to 100m <sup>3</sup>	Manufacturer claims 80 years for the tank and 25 years for the liner.	Constructed on site, can use local labour under supervision. Concrete ring-beam foundation required.

\* These prices are estimates for Fiji in 2004. 1 FJD = USD 0.60. Costs for pre-fabricated tanks do not include transport to site or cost of any foundation requirements. Prices will vary greatly with time and location and cost estimates for individual projects should always be calculated based on local conditions.



## Fact Sheet – Contaminants found in rainwater collection systems

Contaminant	Source	Risk of entering rainwater
Dust and ash	Surrounding dirt and vegetation, volcanic activity	<b>Moderate:</b> can be minimized by regular roof and gutter maintenance and use of a first-flush device.
Pathogenic bacteria	Bird and other animal droppings on roof attached to dust	<b>Moderate:</b> bacteria may be attached to dust or in animal droppings falling on the roof. Can be minimized by use of a first-flush device and good roof and tank maintenance.
Heavy metals	Dust, particularly in urban and industrial areas, roof materials	<b>Low:</b> unless downwind of industrial activity such as a metal smelter and/or rainfall is very acidic (this may occur in volcanic island)
Other inorganic contaminants ( e.g. salt from sea spray)	Sea spray, certain industrial discharges to air, use of unsuitable tank and/or roof materials	<b>Low:</b> Unless very close to the ocean or downwind of large-scale industrial activity.
Mosquito Larvae	Mosquitoes laying eggs in guttering and/or tank	<b>Moderate:</b> if tank inlet is screened and there are no gaps, risk can be minimized.



# Fact Sheet – Taking Care of Your Rainwater Tank

- Your rainwater tank will only give clean, safe water if you LOOK AFTER IT!
- If the tap leaks, fix it up so you do not lose water.
- Use water sparingly, particularly during the dry season or when there is a drought.
- Don't let trees grow over your roof as you want to keep leaves and bird droppings from the roof catchment and washing into your rainwater tanks.
- Plant shady bushes near your tank to help keep the water cool.
- Build a fence around your tank to keep pigs and other animals from licking the tap and contaminating this area.
- Regularly clean leaves from the top of your tank to prevent them entering the water.
- Make sure that you buy adequate guttering so that the whole roof will be a catchment area for rainwater. Some extra guttering will help fix any breakages.
- If a cyclone is coming, disconnect your down pipe from the roof to the tank to stop salt water getting into your tank.

## Remember to Clean Your Water Tank Once a Year

You will need:

- Liquid chlorine (such as Dash or Janola) or chlorine tablets
  - Bucket
  - Brush
  - Eye and hand protection (glasses, rubber gloves)
1. Drain any water in the tank to level at the tap. Transfer water to clean contaminant free storage or temporary vessel.
  2. Add 1 bottle of bleach or X number of chlorine tablets to the remaining water in the tank.
  3. Climb inside the tank. Using a brush thoroughly scrub the bottom and sides of the tank.
  4. Remove the water and bleach solution with a bucket.
  5. Refill the tank with water.
  6. Leave the water to settle overnight before use.

**Wear proper hand and eye protection when preparing and handling chlorine solutions to avoid burning skin and damaging eyes.**

# Linking Knowledge To Change



LIVE & LEARN ENVIRONMENTAL EDUCATION

