

IS YOUR WATER SAFE TO DRINK?

COMMUNITY WATER MONITORING GUIDE



Acknowledgements

The Community Water Monitoring Guide is a tool to be used with the Governing Water Guide, and has been developed and trialled with communities, teachers and students through Live & Learn's formal and community education programmes.

Live & Learn Environmental Education acknowledges:

- ❖ The European Commission for support through The European Initiative for Democracy and Human Rights Programme
- ❖ The Provincial and District Offices of Tailevu, Naitasiri, Serua, Ba, Ra, Macuata, Cakaudrove and Bua provinces
- ❖ The Governing Water communities on Viti Levu and Vanua Levu
- ❖ World Health Organisation (South Pacific Regional Office); South Pacific Applied Geoscience Commission; School of General Studies, Fiji Institute of Technology; and Institute of Applied Sciences, University of the South Pacific
- ❖ The staff of the Kinoya National Water Quality Laboratory, Waila Pumping Station and Wailoku Treatment Plant – PWD Water Supply
- ❖ Primary and Secondary School Teachers

Special acknowledgement to the late Mr. John Robinson, Environmental Cartoonist, Earth Warrior, in recognition of his contribution to environmental education, conservation and community development!

What's in the Community Water Monitoring Guide?

- * Background information
- * User-friendly instructions on how to use the H₂S Test and Sanitary Survey to monitor drinking water quality
- * Tools: Result Card, Record Sheet, Sanitary Survey Sheets

Go through the Guide thoroughly before you begin working with your community group. We hope that this Guide will be useful in motivating communities to monitor drinking water sources and promote better sanitation, hygiene and access to safe drinking water.

Copyright © 2007 Live & Learn Environmental Education

Edited by Marie Fatiaki

Review Team: Kototuibou, S; Ravai, D; Bakaniceva, I; Ralulu, A

This material may be used for educational purposes but no part of this publication may be reprinted or presented without prior written permission of Live & Learn Environmental Education, Fiji.

All enquiries should be addressed to:

Live & Learn Environmental Education

87 Gordon Street, Suva

Private Mail Bag

Ph: +679 331 5868; Fax: +679 330 5868

Email: livelearn@connect.com.fj Web: <http://www.idea.org.au/liveandlearn/>



Linking Knowledge To Change

Community Water Monitoring Guide



Water, water everywhere but not a drop good enough to drink...

The people of Paradise Island lived in a village beside a crystal clear river...

They felt so blessed to have so much clean water close by for washing and cooking... but 'danger' lived in the river too!

The people could not understand why so many of them were sickly.

Mothers spent so much time tending to their sick children that housework was neglected and families lived in confusion.

With so many children getting sick, school work suffered and grades fell...

Men lost their jobs because they spent so much time on sick leave...

With so many of their bread-winners out of work the village called an emergency meeting to discuss their problems...

They also all went to church to pray for divine intervention.

They even wrote to government who sent a health officer to the village...

She looked in the bushes, she looked in the trees, she sampled the air, she took samples from the river... Then she found what she was looking for...

That evening there was a meeting for the whole village...

Then the health worker told them about contaminated water which was causing all their problems!

But what can they do about it?

Why test our water?



Unfortunately, pollution in water is sometimes difficult to detect. You cannot assume that water is safe just because it is clear.

Water that is odourless and clear is not necessarily free from contaminants or pollutants. If drinking water is untreated or improperly treated it may contain micro-organisms (bacteria) that can cause the spread of water-related diseases like diarrhoea, typhoid and cholera.

There are many types of micro-organisms on earth. Some are helpful to humans, but others can cause people to become sick. These organisms are so small that we cannot see them, unless we use a microscope.

How water gets contaminated...

We cannot assume that water is safe just because it is clear, because many contaminants, including bacteria and heavy metals, are either microscopic or dissolved in the water making them invisible to our naked eyes.

Coliform bacteria, commonly found in faecal matter are often associated with pathogenic organisms. Coliform bacteria lives in the intestines of both human and animals and discharged in their faeces. If these organisms are found in water, it is considered unsafe to drink.

This is why we need to treat our drinking water regularly.



Community Water Monitoring Guide

Why we need to test our drinking water?



Coliform Bacteria...



lives in the intestines of both humans...



and animals.



The bacteria is discharged...



through faeces into streams...



and if the water is drunk...



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

Why Community Water Monitoring?

Water monitoring can alert a community to contaminants in time to prevent health problems! Community water monitoring can help increase awareness and promote community actions for “healthy water and healthy people”.

Community water monitoring encourages us to look at the role we play in making sure that our drinking water is safe to drink and how we can manage our water resources better.



Community-based water monitoring

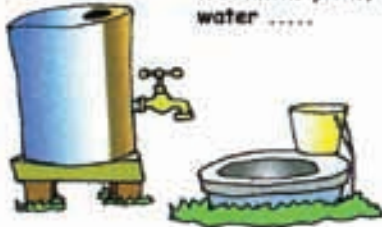
Community Water Monitoring Guide



When do we need to test our drinking water?



Whenever we get our water from streams, wells, water tanks or any other source other than a government monitored water treatment plant, the water



needs to be boiled.....



or tested.....



The water may look clean.....

but it is in fact contaminated by dangerous bacteria including the coliform type which can cause the spread of water-related diseases like diarrhoea, typhoid and many more.



Is drinking untreated water the only way to get water-borne disease?

Using water that is untreated, or not properly treated is not the only way we can get water-borne diseases. Other ways like collection, storage and handling of food, the disposal of human waste and the care of children can cause diseases. It is a common belief that children's faeces are harmless, whereas in fact they are the main source of infection to other children (WHO, 1997).

Simple practices like washing of hands after visiting the toilet, good disposal of wastewater and waste, covering of food and boiling drinking water can help prevent contamination and protect us from water-borne diseases like typhoid and diarrhoea.

Did you know....?

Waterborne diseases are spread through the drinking of contaminated water and food. About 80 percent (80%) of all diseases are water-related.

In many cases, sewage gets into the water and spreads disease. Also an infected person or animal may pass pathogenic bacteria, viruses, or protozoa through their waste into the water.

Because these micro-organisms that cause illness often cannot be seen, smelled or tasted, contaminated water can appear fresh and clean. This is a concern because contaminations often go unnoticed until people start seeing the doctor complaining of diarrhoea and other water related diseases.



The Hydrogen Sulphide Paper Strip Test (H₂S Test) and Sanitary Surveys

These are water monitoring tools that can be easily used to monitor and maintain the quality of our water supply.

The H₂S Test was first used in India to test for coliform or bacterial contamination in potable water. Since then many more communities have used it globally and in Fiji and the Pacific region.

The advantage of the H₂S Paper Strip test is that it is low-cost, does not require samples to be shipped or refrigerated, it does not require a laboratory or expensive equipment, and most importantly, it is easy to understand and carry out in the field!

The Sanitary Surveys for rainwater tanks, piped water systems, wells, and drums, help communities to check that their water sources are safe and free from contaminants. The Sanitary Surveys can be used with or without the H₂S Test, and does not need a laboratory to be able to identify sources of water contamination and actions needed to address this.



Participation, Awareness, Action!



H₂S sample bottles



The well should be cleaned regularly

Community Water Monitoring Guide



How does the H₂S Test work?

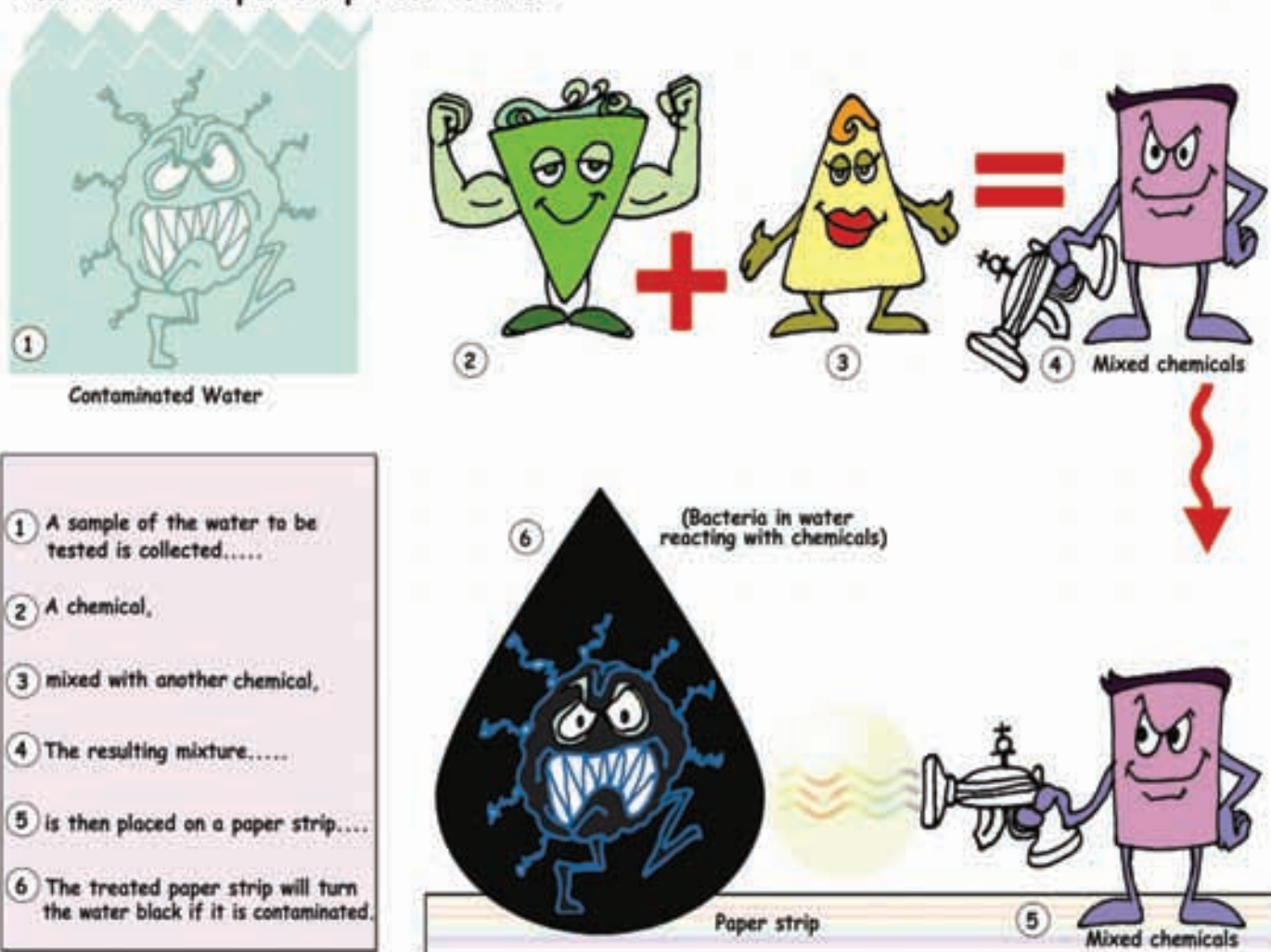
The H₂S Test uses a paper strip to check for bacterial contamination in drinking water sources.

Coliform bacteria produce a gas called hydrogen sulphide (this is the gas that smells like rotten eggs).

In order to check for the presence of coliform bacteria in water, a water sample is added to the test bottle with the paper strip. Chemicals have been mixed into a solution and placed on the paper strip. The paper strip will react with the water sample by turning black if it comes into contact with hydrogen sulphide.

If the water sample or paper-strip turns black, this means that the water is contaminated.

How the H₂S Paper strip Test Works:





What can we use the H₂S Test for?

1. For monitoring of rural and outer island water supply systems where it may be difficult to conduct conventional testing due to isolation or a lack of appropriate laboratory facilities.
2. For routine monitoring of reticulated systems; i.e. water that is distributed through a piped system.
3. To identify if there is a need for further analysis of the water sample.
4. To determine the cleanliness of water storage tanks, rainwater cisterns and other household storage containers.
5. To identify sources of contamination or the point in a piped system where bacteria may be entering the water source.
6. To select which spring is best to develop.
7. To check how effective you have been in disinfecting a water source, or to verify that a well has been properly protected.
8. As a tool in health and hygiene education to show villagers how water becomes contaminated and what they can do about it.
9. For monitoring during emergencies and disasters such as cyclones when water-borne diseases are more likely to occur and conventional testing is difficult.
10. To demonstrate how easily hands become contaminated and how easily they can contaminate food and water. For example, it can be used to demonstrate the effectiveness of washing hand with soap; i.e. to illustrate how bacteria can get from the hands to the mouth and into the body. This is done by pouring clean water over unwashed hands and testing it, and having others wash their hands with soap and repeating the exercise.



Water storage containers-
are they safe?



How well-protected is this well?

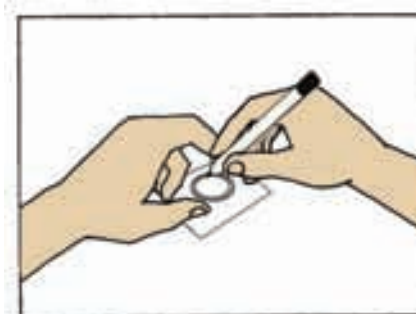




How do we carry out the H₂S Test?

Step 1: Fill in the details

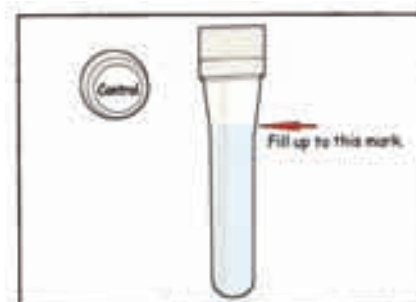
- Fill in sample number and date on the round sticker or strip label and stick on the sample bottle (be careful not to get the sticker wet).
- Record your sample number, date, time, location and description of the water sampled on the Result Record Sheet.
- Record any other information e.g. turbidity, smell, source of pollution, faulty pump etc.



SAMPLE INFORMATION			
Sample Number	Date	Time	Location- place where sample is
1			

Step 2: Collecting the control

- A control sample is used to compare the colour change in the test samples, and to ensure that the sample bottles are not contaminated before use.
- Collect a sample of uncontaminated water e.g. distilled water, boiled water, bottled water, water treated with chlorine. This is to be used as the control.
- There may be a slight change in the colour of the sample to a pale yellow or light brown due to the colour change of the reagent. This is normal.



Note!

- ▶ Do not open the test bottle until you are ready to fill them with your water sample.
- ▶ Make sure that no contamination occurs e.g. by touching the mouth of the bottle. Do not hold the test bottle cap from the inside.



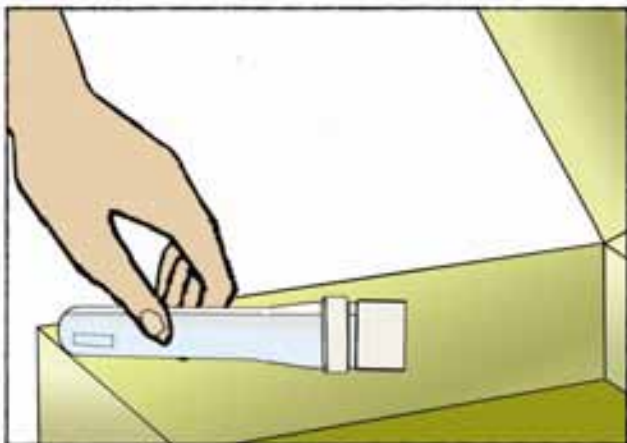
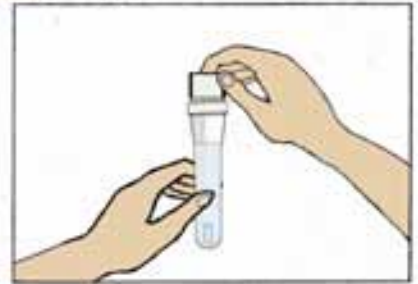
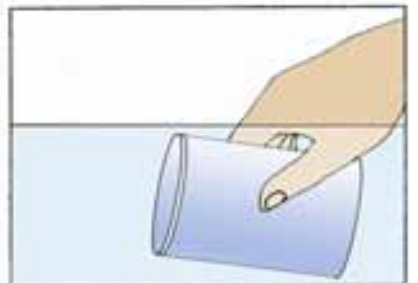
Step 3: Collecting the water sample

A. *From the tap*

- First clean the mouth or the outlet of the tap with a clean cloth.
- Turn on the tap and allow the water to flow for 15 to 20 seconds.
- Collect sample water from the tap by filling the sample bottle up to the mark.
- Fill the test bottle carefully and slowly, this is because it will fill very quickly to the marked line and may overflow.
- If you do overfill the bottle, do not spill the water out and do not worry. Your result will still be valid.
- Immediately close the sample bottle.

B. *From storage containers such as water tanks, and wells or rivers*

- Rinse the container to collect the water several times.
- Dip the container in the tank, well or river to collect a sample of water then fill the test bottle up to the mark.
- Close the sample bottle, make sure that no contamination occurs.
- Place all the test samples in a dark place at room temperature.





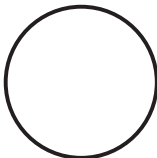
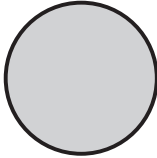
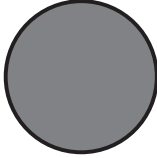

Step 4: Check your results

- Check your test sample at the same time each day for 3 days for changes in colour.
- Record the date and time for each observation on your recording sheet and your result for each day.
- Compare the colour change with that of the control.
- Use the H₂S Colour Code to indicate the degree of contamination.



Result Card

H₂S Colour Code

	(-) No change
	(+) Slight change, the paper strip or water sample has turned grey.
	(++) The paper strip or water sample is partially black.
	(+++) The paper strip and the water sample are noticeably black.

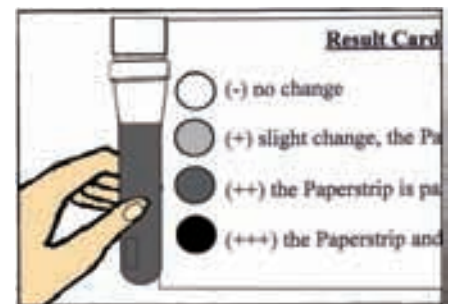
Note!

- ▶ Do not expose your bottles to direct sunlight. Store in a dark place. The sun's rays can kill the bacteria inside the test bottles and you will not get a true result.



Step 5: What do your results mean?

- (-) If there is no colour change after 3 days, this indicates that the water is clean and free from bacterial contamination.
- (+) If the water sample or paper strip has turned grey there is a possibility that bacteria is present in the water. ***Wait for a few days and test a water sample again.***
- (++) If the water sample or paper strip has turned partially black then there is some amount of bacterial contamination in the drinking water. ***Conduct a sanitary survey to check your water source! Take action!***
- (+++) If the paper strip and the water sample are noticeably black then there is a very high risk of bacterial contamination in the drinking water, therefore, it is not safe for drinking. ***Take immediate action!***
- (++++) If there is a fast reaction, that is the water sample and paper strip turns black overnight, there is a high probability of bacteria present. ***Your water is contaminated! You should clean out your water storage containers, tanks or well and boil the water before you drink it. Use the Sanitary Survey to check for the source of contamination and take action to eliminate this contamination. Sample the water in your well, tanks and containers again after this to check the water quality.***



Note!

- ▶ Keep the test bottles stored away from children! Do not put them in a place where a child can reach it.
- ▶ When you return the used test bottles, you will then get replacements.
- ▶ Do not open the used bottles!

Community Water Monitoring Guide



How to fill the Result Record Sheet?

Every time a Water Sampler is going out for water monitoring, he or she needs to fill in the provided Result Record Sheet.

All the relevant details need to be filled in:

1. Fill in the address or where you are doing the water sampling e.g. Nailega Village, Tailevu.
2. Write your sample number in the first column.
3. Fill in the type of water that you are sampling e.g. rainwater.
4. Record the date and time of sampling.
5. Identify the source of your sample e.g. the Nailega School main water tank.
6. In the “Remarks” column, fill in information like the color of the water, the smell, or if there is a faulty tap or pipe.
7. After storing the test sample in the dark overnight use the H₂S Colour Code to find out your results, e.g. “+” or “++” and record this in the relevant column. Fill in your observation each day for three days and record the date and time of observation.
8. The “Notes” space can be used for other information like the source of contamination or if there is a toilet built within a short distance from the drinking water source.

H ₂ S PAPER STRIP TEST – RESULT SHEET							
Community / Address:							

Name of Water Monitor:							

Sample Number	Type of water source (deep well, dam, borehole, river, rainwater etc.)	Date	Time	Location (place where the sample is collected)	Remarks (is the water muddy, coloured, contain solids or materials in suspension also an problems at sampling site like a leaking tap, unclean, drainage problems etc.)	Results each day over 3 days (-clear, +grey colour, ++part black, +++very black)	
Notes (Distance between water source and possible pollution like a compost pit, septic tank, toilet or farm):							



Community Water Monitoring Guide

TO COPY

H₂S PAPER STRIP TEST – RESULT SHEET

Community / Address:

Name of Water Monitor:

Sample Number	Type of water source (deep well, dam, borehole, river, rainwater etc.)	Date	Time	Location (place where the sample is collected)	Remarks (is the water muddy, coloured, contain solids or materials in suspension also an problems at sampling site like a leaking tap, unclean, drainage problems etc.)	Results each day over 3 days (-clear, +grey colour, ++part black, +++very black)

Notes (Distance between water source and possible pollution like a compost pit, septic tank, toilet or farm):



How to fill in the Sanitary Survey sheet?

It is important to fill in the relevant Sanitary Survey sheet every time there is water sampling.

The Sanitary Survey contains information that is linked to the water source or the water storage container e.g. drums and tanks. You can use the Sanitary Survey sheets provided for wells, piped distribution, rainwater systems, and trucked water to find out if your source is being contaminated.

Most of the time you can link the result that you get from the H₂S test with the results that are indicated from the Sanitary Survey of the same water source.

Before filling in the Sanitary Survey sheet, make sure that you are filling in the correct sheet for the water source. There are four Sanitary Survey sheets and accompanying diagrams as listed below.

1. Fill in the general information e.g. province, village, date and time.
2. Fill in the sample number for your collection point to indicate if it is the first sample, second, third, e.t.c
3. Answer the specific information for assessment questions by circling “Yes” or “No”.
4. Total the score of risks, which is the number of “Yes” answers.
5. Refer to the contamination risk score.
6. Try to link your risk score with the result from the H₂S test of water sampled from this source after the 3 days observation. If your water is contaminated, the Sanitary Survey sheet will give you a good idea why and where the source of contamination is from.



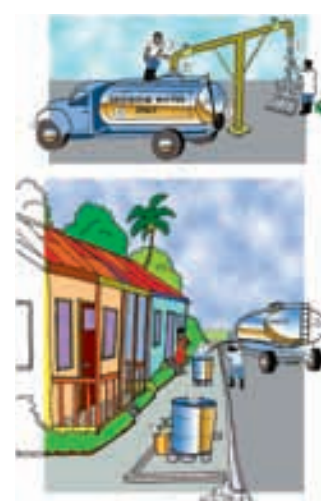
Open Dug Well



Piped Distribution



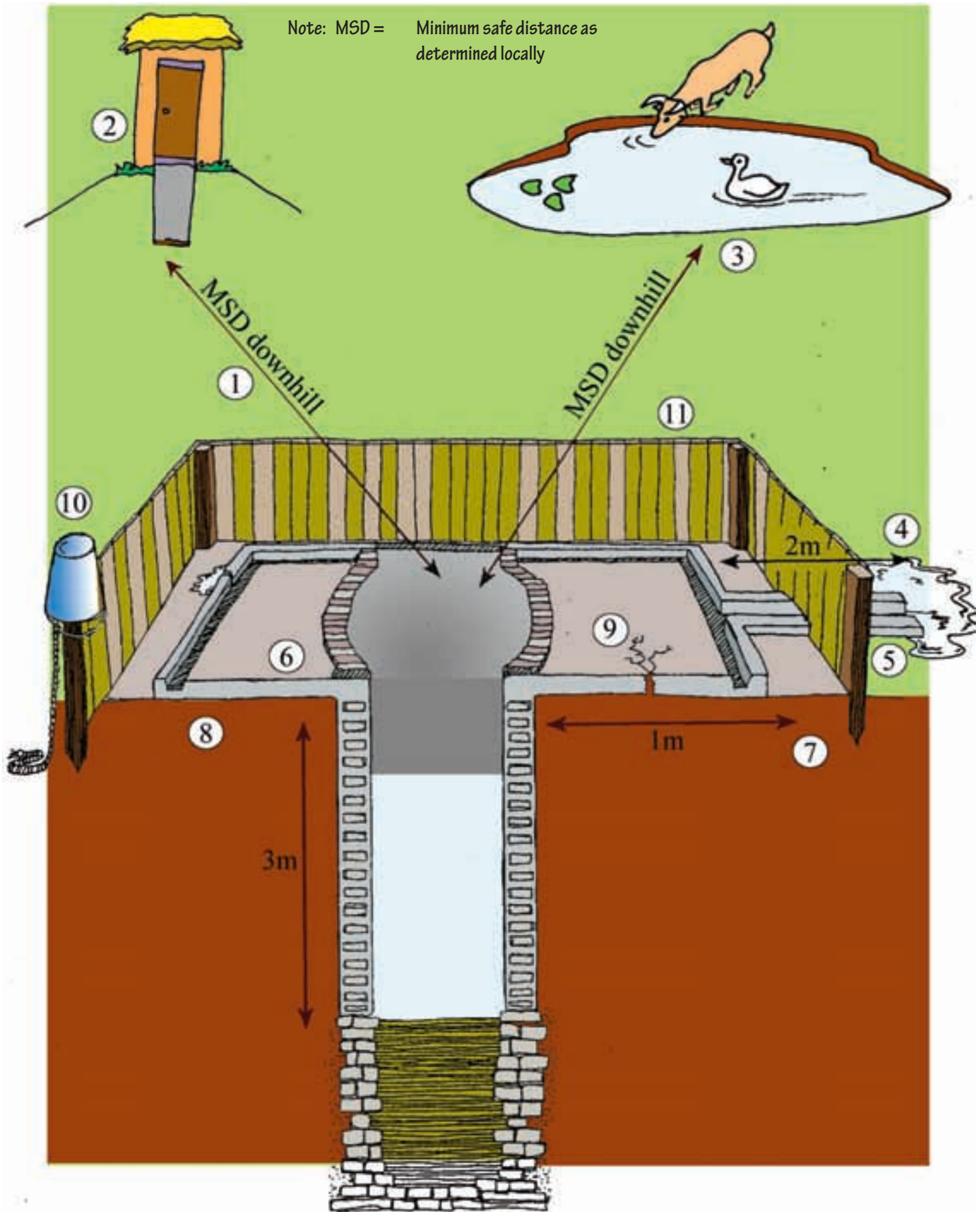
Rainwater Collection
Storage



Filling Stations,
Tanker Trucks &
Household Drums



Community Water Monitoring Guide





**SANITARY SURVEY SHEET
OPEN DUG WELL**

I General information

Province/Village:

Date:

Time:.....

Sample number:

II Specific information for assessment

Risk

- | | | |
|-----|--|-----|
| 1. | Is there a toilet within 10 m of the well? | Y/N |
| 2. | Is the nearest toilet on higher ground than the well? | Y/N |
| 3. | Is there any other source of pollution (e.g. animal excreta, rubbish) within 10 m of the well? | Y/N |
| 4. | Is the drainage poor, causing non-movement water within 2 m of the well? | Y/N |
| 5. | Is there a faulty drainage channel? Is it broken, permitting ponding? | Y/N |
| 6. | Is the wall (parapet) around the well cracked, or too low, allowing surface water to enter the well? | Y/N |
| 7. | Is the concrete floor less than 1 m wide around the well? | Y/N |
| 8. | Are the walls of the well inadequately sealed at any point for 3 m below ground? | Y/N |
| 9. | Are there any cracks in the concrete floor around the well which could permit water to enter the well? | Y/N |
| 10. | Are the rope and bucket left in such a position that they may become contaminated? | Y/N |
| 11. | Does the installation require fencing? | Y/N |

Total score of risks /11

Contamination risk score: 9-11 = very high; 6-8 = high; 3-5 = intermediate; 0-2 = low

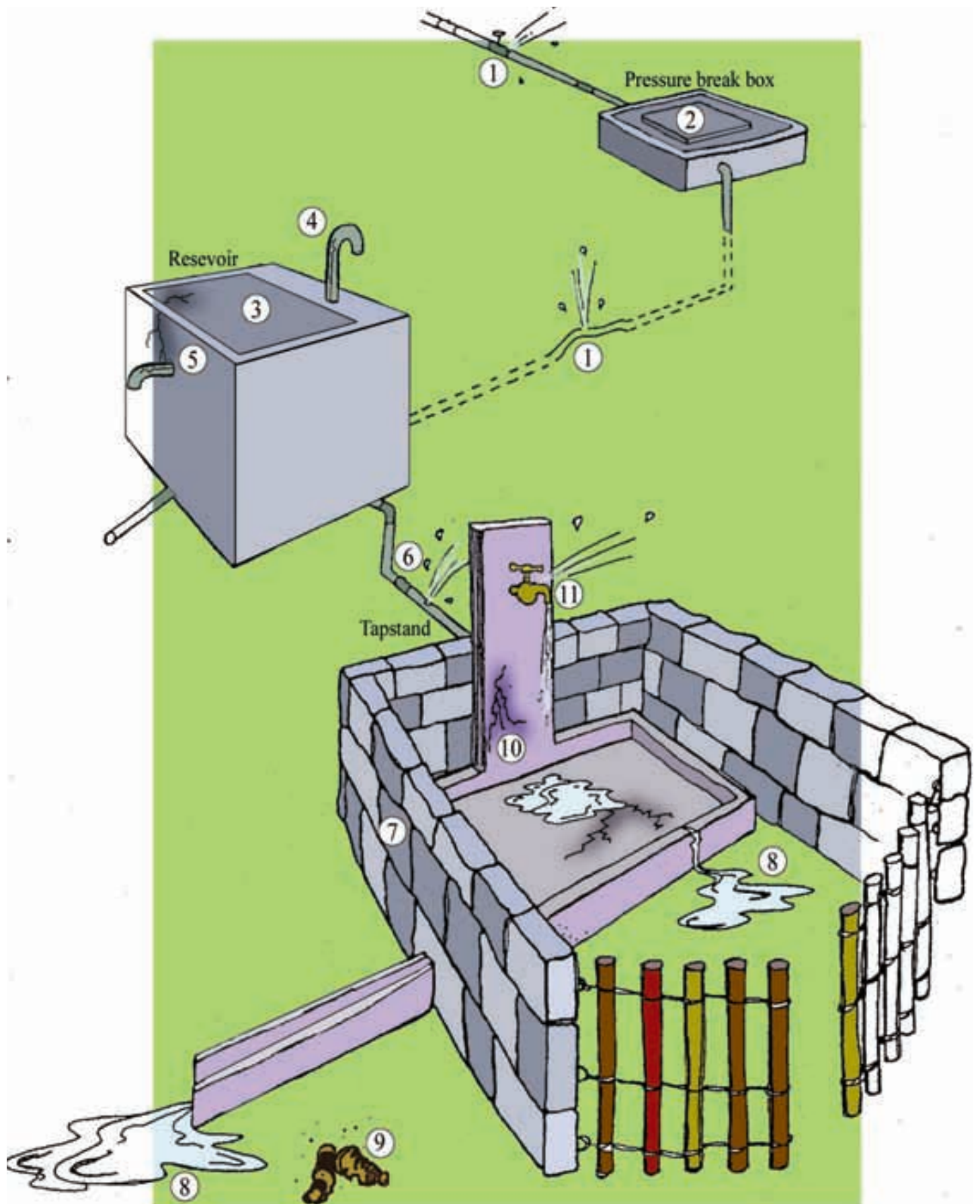
III Results and recommendations

Signature of the surveyor

COPY



Community Water Monitoring Guide





**SANITARY SURVEY SHEET
PIPED DISTRIBUTION**

I General information

Province/Village:.....

Time:

Date of visit:

Sample number:

II Specific information for assessment

Risk

- 1. Is there any point of leakage between source and reservoir? Y/N
- 2. If there are any pressure break boxes, are their covers dirty? Y/N

If there is a reservoir:

- 3. Is the inspection cover dirty? Y/N
- 4. Are any air vents dirty? Y/N
- 5. Is the reservoir cracked or leaking? Y/N
- 6. Are there any leaks in the distribution system? Y/N
- 7. Is the area around the tap stand unfenced (or fencing incomplete)? Y/N
- 8. Does water accumulate near the tap stand (requires improved drainage canal)? Y/N
- 9. Are there human excreta within 10 m of the tap stand? Y/N
- 10. Is the tap stand cracked or eroded? Y/N
- 11. Does the tap leak? Y/N

Total score of risks/11

Contamination risk score: 10-11 = very high; 6-9 = high; 3-5 = intermediate; 0-2 = low

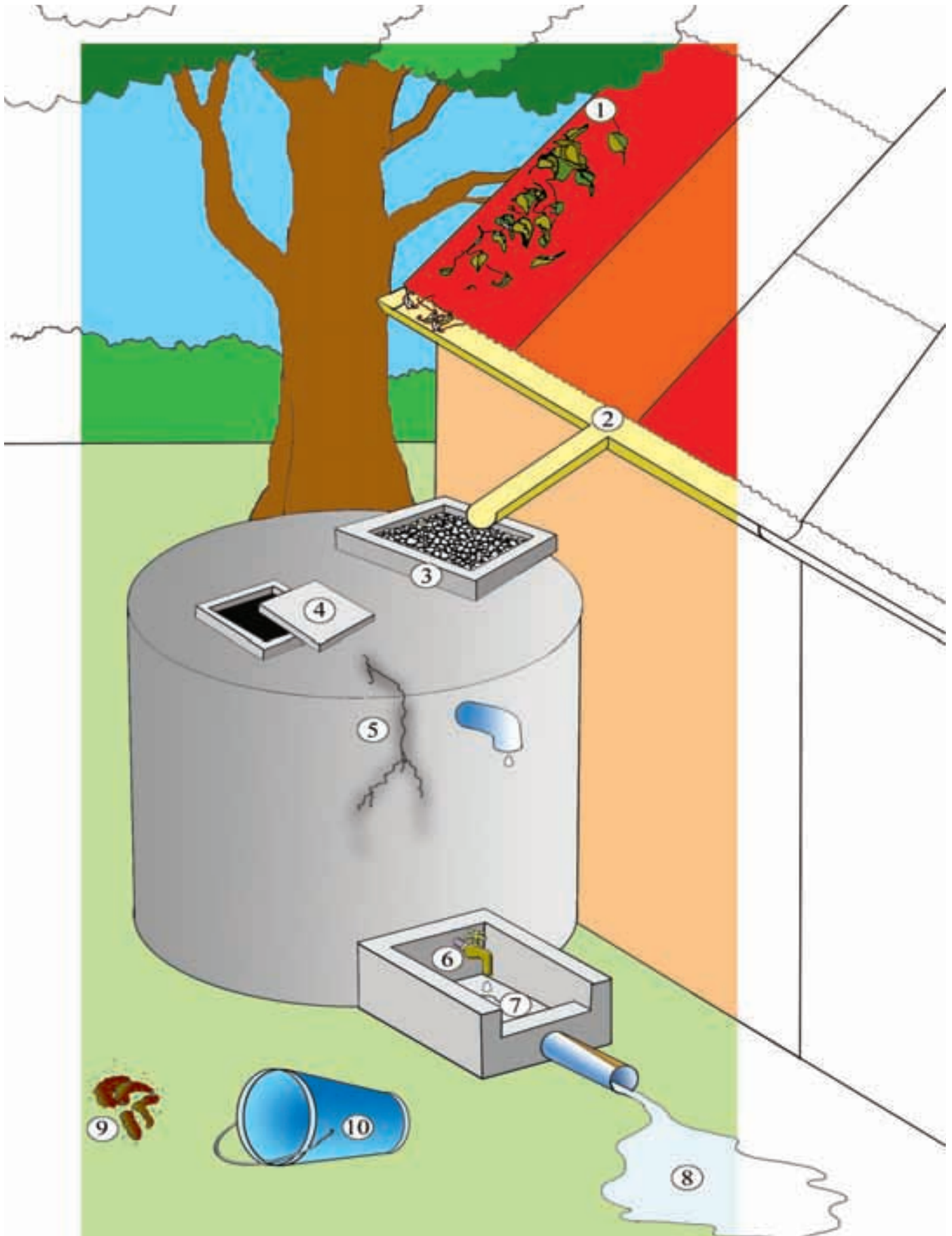
III Results and recommendations

Signature of the surveyor

COPY



Community Water Monitoring Guide





**SANITARY SURVEY SHEET
RAINWATER COLLECTION AND STORAGE**

I General information

Province/Village:

Date of visit:

Time:

Sample number:.....

II Specific information for assessment

Risk

- | | | |
|-----|--|-----|
| 1. | Is there any visible contamination of the roof catchment area (plants, dirt, or excreta)? | Y/N |
| 2. | Are the guttering channels that collect water dirty? | Y/N |
| 3. | Does the tank inlet not have any mesh sieve or fine gravel? | Y/N |
| 4. | Is there any other point of entry to the tank that is not properly covered? | Y/N |
| 5. | Are there any cracks on the walls or top of the tank that could let water in? | Y/N |
| 6. | Is the tap leaking or faulty? | Y/N |
| 7. | Is the concrete floor under the tap dirty? | Y/N |
| 8. | Is the water collection area inadequately drained? | Y/N |
| 9. | Is there any source of pollution around the tank or water collection area? (e.g. excreta, trees growing beside the tank) | Y/N |
| 10. | Is a bucket in use and left in a place where it may become contaminated? | Y/N |

Total score of risks/10

Contamination risk score: 9-10 = very high; 6-8 = high; 3-5 = intermediate; 0-2 = low

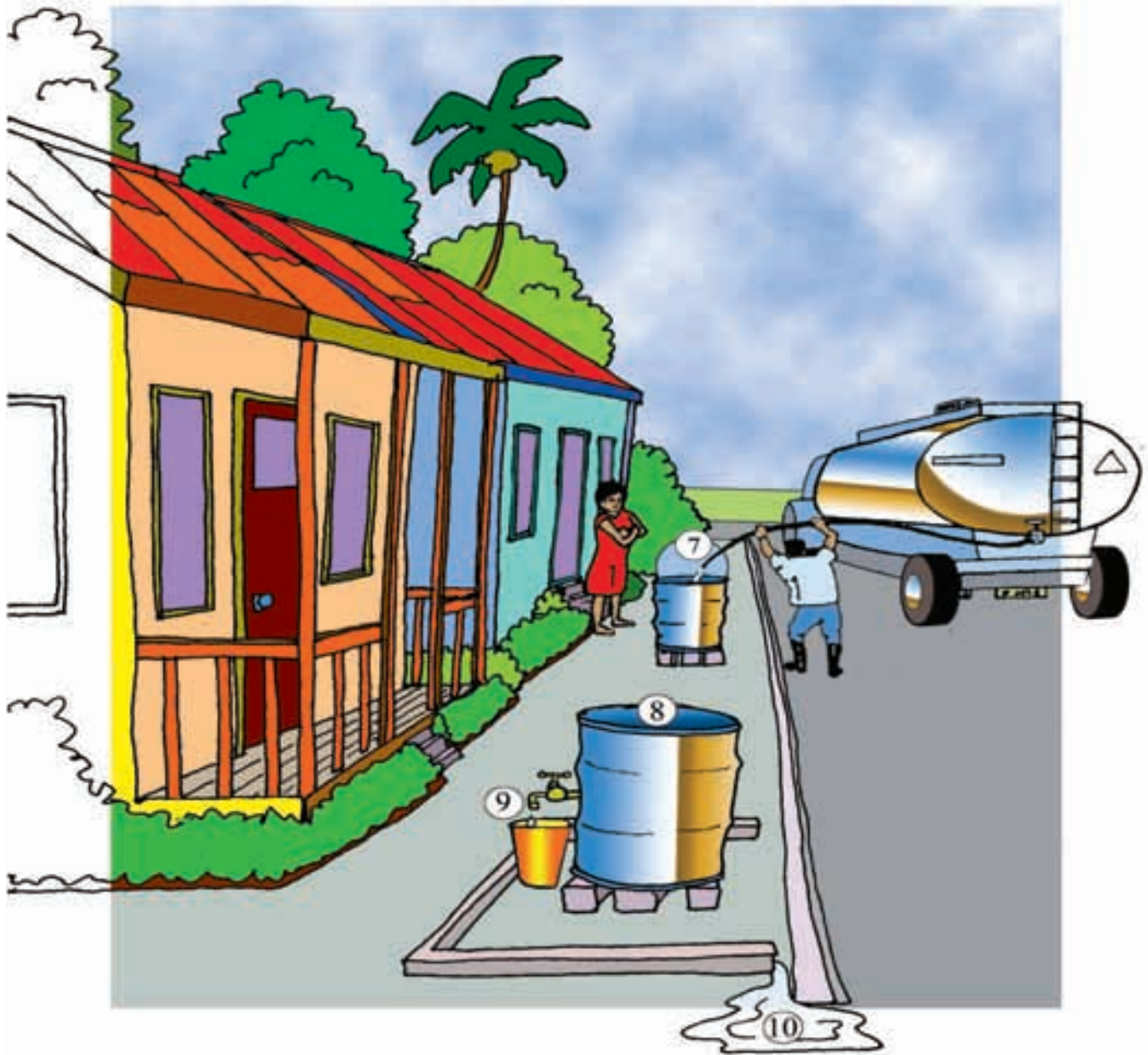
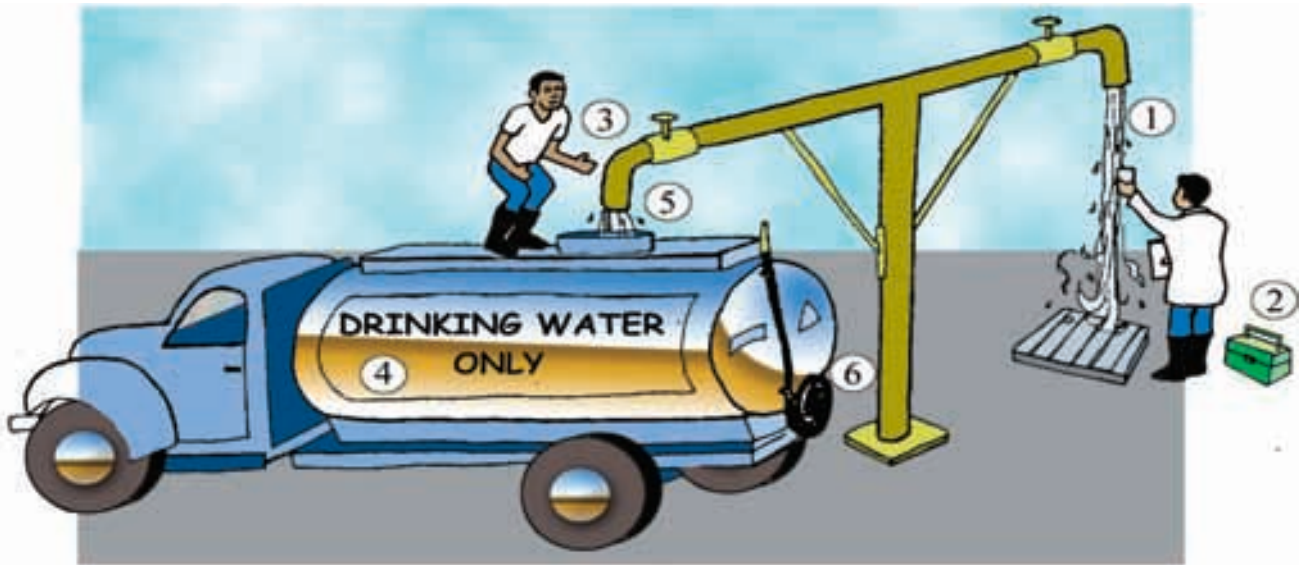
III Results and recommendations

Signature of the surveyor

COPY



Community Water Monitoring Guide





SANITARY SURVEY SHEET

FILLING STATIONS, TANKER TRUCKS AND HOUSEHOLD DRUMS

I. General information

Province/Village:.....

Date of visit:

Time:

Sample number:.....

II. Specific information for assessment

Risk

Tanker Filling Station

- | | | |
|----|--|-----|
| 1. | Is the chlorine level at the filling station less than 0.5 mg/litre? | Y/N |
| 2. | Is the filling station excluded from the routine quality-control programme of the water authority? | Y/N |
| 3. | Is the discharge pipe dirty? | Y/N |

Tanker Trucks

- | | | |
|----|--|-----|
| 4. | Is the tanker ever used for transporting other liquids besides drinking water? | Y/N |
| 5. | Is the filler hole dirty or is the lid missing? | Y/N |
| 6. | Is the delivery hose dirty or stored unsafely? | Y/N |

Household Drums

- | | | |
|-----|--|-----|
| 7. | Can contaminatants (e.g. soil, leaves or other rubbish) enter the drum during filling? | Y/N |
| 8. | Does the drum lack a cover? | Y/N |
| 9. | Does the drum need a tap for withdrawal of water? | Y/N |
| 10. | Is there stagnant water around the drums? | Y/N |

Total score of risks/10

Contamination risk score: 9-10 = very high; 6-8 = high; 3-5 = intermediate; 0-2 = low

III. Result and recommendations

Signature of the surveyor

COPY



Extra: A Quick Photo Guide to Monitoring Water Sources

RAINWATER TANKS



Courtesy of SOPAC

Visible contamination of the roof catchment area

Dirty gutters and down pipe can contribute to the poor quality of water in the tank. Bird droppings add contamination and leaves, twigs, soil and dust can deteriorate the quality of the water.



Guttering channels that water sits in

Algae and mosses found growing on the guttering channels for collection of water can also increase algae growth on the walls of the tank, affecting the quality of the water.



No wire mesh at the tank inlet

Mesh wire over the tank inlet is mainly used to trap larger debris like twigs, leaves, dirt and bird droppings. It also prevents the entry of animals such as mice, rats and birds into the tank, which can drown and contaminate the water.



Other points of tank entry that are not covered

Any other opening on the rainwater tank that is not covered might allow organisms and dirt to enter the rainwater tank.



Courtesy of SOPAC

Cracks on the walls of the tank

Leakage means that a lot of water is wasted and cracks can also be an entry point for contamination.



Other sources of pollution around the tank or water collection area

Other sources of pollution include trees and shrubs beside the tank that drop debris in the water and crack pipes and tanks with their roots.



Community Water Monitoring Guide



Concrete floor under the tap is dirty

If the concrete floor under the tap is not clean and collection of the water not done properly then contamination of the water in the bucket is possible.



Water collection area not drained properly

If the water collection area is not properly drained, algae are encouraged to grow under the tap. Also the sitting water can be a source of contamination and breeding area for mosquitoes.



Outside wall of tank is not clean

When the outside wall of the rainwater tank is not clean and plants are growing on the sides then leakage is indicated. Water quality is best in a totally sealed tank.

Inside wall of tank not clean

The wall inside the tank may get dirty due to algae and mould growth or mud that will affect the water quality. Tanks need to be occasionally emptied and cleaned out.



Community Water Monitoring Guide



OPEN DUG WELL



Water entry points

Cracks in the concrete floor around the well can allow contaminated water from the ground to seep into the well water.



No cover

When the mouth of the well is not covered, water inside is exposed to bacteria, animals, leaves and dust.



No barrier

Fencing would protect the well from animals and other possible sources of contamination.



Exposed collection system

The rope and bucket being used to draw water from the well are left in a position where they may become contaminated by animals.

THINGS TO CHECK FOR?

- * *Toilet within 10 m of the well*
- * *Nearest toilet on lower ground than the well*
- * *Poor drainage, causing non-movement water within 2 m of the well*
- * *Wall around the well cracked*
- * *Concrete floor less than 1 m wide around the well*
- * *Walls of the well inadequately sealed at any point*



RIVERS AND STREAMS



Courtesy of Fiji Institute of Technology

Solid waste pollution

There are physical signs of rubbish in the water and a color that indicates the poor water quality. Examples of solid waste often found in water include plastics, cans, bottles and food wrappers.



Streamside dumping

Throwing rubbish carelessly beside the riverbank is a sign of land pollution but this solid waste will end up in the water affecting the quality.



Waste water

Waste water from homes and industry affect water quality, increasing levels of nutrients such as nitrates and phosphates which promote algae growth.



Pig pens beside a waterway

Pig pens built beside a river or mangrove swamp lead to increased levels of nutrients in the water from the pig waste. This contaminates the water, destroys habitat and kills some organisms.



Home discharge pipes

Household discharge pipes that empty directly into a waterway deliver waste water with detergents from washing, soap and other contaminants that increase the level of nutrients. The nutrient phosphate, from detergents and soaps, and fertilizers in land runoff, causes water pollution and the growth of algae and water weeds.



Courtesy of Fiji Institute of Technology

Color of water

If the water looks green then this indicates high algal growth and that the quality of the water is poor. Algal growth is boosted by high levels of nutrients like nitrates and phosphates that come from waste water and inland runoff.



Bank erosion

When trees growing along the riverbank are removed this can cause soil erosion, changing the color of the water to a dirty brown. This sediment in the water prevents sunlight filtering through, impacting aquatic plants.

Linking Knowledge To Change



LIVE & LEARN ENVIRONMENTAL EDUCATION

