

# Rainwater collection and storage

## A. GENERAL INFORMATION

### A.1. Rainwater collection system

**System location** (e.g. building name or number, village, town, community, parish, district, province, state)

**Additional location information**

State the reference system and units, if using coordinates (e.g. national grid reference coordinates, GPS coordinates)

**Year of construction of the system**

**Approximate rainwater catchment area** (e.g. roof size, including units)

**Approximate number of people using this water source**  
Circle one of the options below

1–5

6–15

16–30

31–50

&gt;50

Circle the options below

If **Yes**, describe (e.g. what happens, how often, for how long)

**Is the system affected by flooding?**

Unsure

No

Yes

**Is the system affected by drought?**

Unsure

No

Yes

### A.2. System functionality

Circle **Yes** or **No** to indicate if water is currently available from the rainwater collection system. If **No**, describe why (e.g. broken gutters, low rainfall) and then go to Section B. In Section C, record the corrective actions needed for the rainwater collection system to provide water, and record the details of any alternative water source(s) currently being used.

**Is water currently available from the rainwater collection system?**

If **No**, describe why (then go to Section B)

Yes

No

### A.3. Weather conditions during the 48 hours before inspection

Circle the temperature and precipitation options below to indicate the main conditions during the 48 hours before the inspection. More than one option may be circled if conditions changed during this time. Record additional information in Section C if needed.

**Temperature**

&lt;0 °C

0–15 °C

16–30 °C

&gt;30 °C

**Precipitation**

Snow

Heavy rain

Rain

Dry

### A.4. Water quality sample information

Record details of any water quality samples taken during the inspection. Include information for any parameters tested. Add **NA** if information is not applicable. Record additional information in Section C if needed.

**Sample taken?**  
Circle **No** or **Yes**

No  
(go to A.5)

Yes

**Sampling location**

**Sample identification code**

**Other information**

**Parameter tested**

*E. coli*<sup>a</sup>

or Thermotolerant  
(faecal) coliforms<sup>a</sup>

**Additional parameter**

**Additional parameter**

**Additional parameter**

**Results and units**

Results

Units

Results

Units

Results

Units

Results

Units

Results

Units

**A.5. Water treatment**

Tick (✓) the appropriate box(es) and provide additional information as needed.

☐ **No treatment applied.**

☐ **Treatment applied at the storage tank.** Describe (e.g. chlorine dose, frequency of dosing, how it is applied).<sup>b</sup>

☐ **Treatment applied downstream of the storage tank.** Describe (e.g. household water treatment).

<sup>a</sup> The presence of *E. coli* (or thermotolerant [faecal] coliforms) suggests recent faecal contamination. If detected, further action is needed, such as additional sampling and investigation of potential sources of contamination, and/or household water treatment advisories (e.g. boil water notice). *Note* – thermotolerant (faecal) coliforms are distinct from “total coliforms”, where total coliforms do not necessarily indicate recent faecal contamination.

<sup>b</sup> Where chlorine is applied, the free chlorine residual concentration in the drinking-water should be tested and the result recorded in Section A.4. Where possible, turbidity and pH should also be measured. For general information on chlorination, refer to [Technical notes on drinking-water, sanitation and hygiene in emergencies: measuring chlorine levels in water supplies](#) (WHO & WEDC, 2013).

**General notes**

- This form is intended for use on a single rainwater collection system. Where there are multiple rainwater systems to be inspected, additional forms will be needed. Rainwater systems may be inspected on a rotational basis where there are too many to cover during each inspection.
- If other water sources are in use (e.g. spring, borehole), or if users collect and store water in the home, carry out additional sanitary inspections using the corresponding sanitary inspection packages.

**B. SANITARY INSPECTION****IMPORTANT: Read the following notes before completing the sanitary inspection**

1. Tick (✓) the appropriate box for each question. For guidance, refer to the numbered risk factors in Figure 1; the numbers in the figure are linked to the questions. Record any additional risk factors present in Section C. Refer also to the *Technical fact sheet* for information on the individual components of the rainwater collection system. *Note* – the questions in this section are example risk factors only, which can be used as a starting point for adapting the form to the local context.
2. Tick the **NA** (not applicable) box if the question **does not apply** to the rainwater collection system being inspected.
3. Tick the **No** box if the question **does apply** to the rainwater collection system being inspected, but the risk factor is not present.
4. Tick the **Yes** box if the risk factor **is present**. For important situations that require attention, record the corrective actions to be taken in the last column. These notes can be used to develop a detailed improvement plan, documenting what will be done, who will do it, by when it will be done and what resources are required. For guidance, refer to the *Management advice sheet*. Where possible, address the most serious risk factors first, considering low-cost or no-cost improvements that can be made immediately.
5. If a question cannot be answered because access to a component is not possible, tick the **Yes** box. Record these issues in Section C for further investigation.



**Figure 1.** Typical risk factors associated with a rainwater collection system

Sanitary inspection questions		NA	No	Yes	If Yes, what corrective action is needed?
<b>1</b>	<p><b>Are there any visible contaminants on the roof or in the guttering channels?</b></p> <p>Contaminants on the roof or in the guttering channels (e.g. from animal faeces, corroded or damaged roof or gutter materials, leaves, moss) could contaminate the water. This could also cause blockages and an overflow, which could result in water loss.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>2</b>	<p><b>Do the roof or guttering channels have an inadequate slope for drainage?</b></p> <p>Stagnant water could contaminate the water supply if the roof or guttering channels do not have a downward slope for water to fully drain into the storage tank. <i>Note</i> – ponding of water on the roof or in the guttering channels may indicate an inadequate drainage slope.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>3</b>	<p><b>Is there any vegetation or structures above the roof?</b></p> <p>Contaminants (e.g. from animal faeces) could enter the water supply if there is overhanging vegetation, balconies or wires above the roof. Fallen leaves could also block gutters and cause an overflow, which could result in water loss.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>4</b>	<p><b>Is the filter box absent, damaged or blocked?</b></p> <p>Contaminants could enter the water supply if the filter box is absent. This could also happen if it is damaged (e.g. holes or gaps in the filter screen) or blocked (e.g. from sediment, leaves). A clogged filter box could also cause an overflow, which could result in water loss.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>5</b>	<p><b>Is the first flush system absent, damaged or blocked?<sup>c</sup></b></p> <p>Contaminants from the first flush of rainwater could enter the water supply if the first flush system is absent. This could also happen if it is damaged (e.g. not flushing completely) or blocked. A blocked first flush system could also cause an overflow, which could result in water loss.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

<sup>c</sup> Between rain events, contaminants may accumulate on the roof. Following rain, the first flush system diverts this first portion of poor quality water out of the system so it does not enter the storage tank. For more information, refer to the *Technical fact sheet*.



Sanitary inspection questions		NA	No	Yes	If Yes, what corrective action is needed?
<b>6</b>	<b>Are there any signs of contaminants inside the storage tank?</b> The presence of animals or faeces inside the storage tank is a serious risk to the safety of the drinking-water, and indicates that harmful microorganisms are present. Sediments may also contain harmful microorganisms and other contaminants (such as metals) that can affect the safety or acceptability of the water.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>7</b>	<b>Is the storage tank cover absent or in poor condition?</b> Contaminants could enter the storage tank, particularly after rain, if the tank cover is absent. This could also happen if the tank cover is damaged (e.g. broken, missing sections, deep cracks).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>8</b>	<b>Is the storage tank inspection hatch lid missing or in poor condition?</b> Contaminants could enter the storage tank (e.g. from the entry of contaminated water following rain, entry of animals) if the inspection hatch lid is missing (or open, unlocked). This could also happen if the lid is damaged (e.g. deep cracks, severely corroded, does not fit tightly when closed).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>9</b>	<b>Are the storage tank walls cracked or leaking?</b> Contaminants could enter the storage tank if the tank walls are damaged (e.g. with deep cracks). A leaking tank could also result in stagnant water contaminating the collection area, as well as water loss.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>10</b>	<b>Does the overflow pipe lack adequate protection from vermin?</b> Contaminants could enter the storage tank (e.g. from insects, rodents, birds) if the overflow pipe is not covered with a vermin-proof screen (e.g. mesh, gauze).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>11</b>	<b>Are the air vents poorly designed so that contaminants could enter the storage tank?</b> Contaminants could enter the storage tank if the air vents are facing upwards, or are not covered with a vermin-proof screen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Sanitary inspection questions		NA	No	Yes	If Yes, what corrective action is needed?
12	<b>Is the storage tank tap dirty or in poor condition?</b> Contaminants could enter the water if the tap is dirty. This could also happen if the tap is damaged (e.g. broken, severely corroded) or leaking. A leaking tap could result in stagnant water contaminating the area, and water loss.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13	<b>Is drainage inadequate, which could allow water to accumulate in the collection area?</b> Stagnant water could contaminate the collection area if there is no drainage system in place. This could also happen if the drainage system is damaged or blocked (e.g. from leaves, sediment). This is especially likely after rain. <i>Note</i> – the presence of pooled water during the inspection may indicate poor drainage.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14	<b>Is the fence or barrier around the water collection area missing or inadequate so that animals could enter the collection area?</b> Animals could contaminate or damage the collection area if the fence or barrier is missing. This could also happen if the fence or barrier is broken or poorly built (e.g. has large gaps), or the entry point (e.g. gate) does not close securely.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15	<b>Can other sources of pollution be seen in the water collection area (e.g. open defecation, animals, drinking troughs for livestock, rubbish, commercial activity, fuel storage)?</b> The presence of animals or faeces on the ground close to the collection area poses a serious risk to the safety of the drinking-water. Contaminants from other waste (e.g. household, agricultural, industrial) could also be washed into the area during rain and contaminate the water during collection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16	<b>Is there local activity (e.g. industry, agriculture) that could contaminate the roof?<sup>d</sup></b> Airborne contaminants from local activities (e.g. slurry spreading, crop spraying, burning, mining) could land on the roof and contaminate the water supply following rain.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Total number of Yes responses					

<sup>d</sup> For appropriate setback distances for specific activities, consult with the local environmental authority.

Include any additional risk factors,<sup>e</sup> recommendations, observations (e.g. roof material, guttering material, storage tank construction material, tank volume) or remarks from users of the water source (e.g. problems with the taste, odour or appearance of the water, water source reliability). Attach additional sheets and photographs if needed.

[illegible]

## D. INSPECTION DETAILS

Signature (if available): \_\_\_\_\_ Date: \_\_\_\_\_



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# Rainwater collection and storage

This technical fact sheet provides information on a rainwater collection system, which supports the sanitary inspection of this drinking-water source.<sup>a</sup>

A rainwater collection system consists of a catchment area (e.g. the roof of a building) and guttering channels that direct rainwater into a collection vessel (e.g. storage tank).

Rainwater typically contains lower levels of contaminants compared to groundwater or surface water sources. However, rainwater can become contaminated during collection and storage. For this reason, rain collected for drinking-water purposes should be appropriately treated/disinfected.

Rainwater collection can be applied in many places, from individual household systems to systems serving multiple households or institutions (e.g. schools). Rainwater can be the primary source of drinking-water where there is sufficient rainfall all year round and adequate storage capacity. Often, rainwater collection is used to supplement other sources of water.

Rainwater collection (L/year) can be estimated by multiplying the rainfall (mm/year) by the roof catchment area (m<sup>2</sup>) by a run-off coefficient, using the following formula:

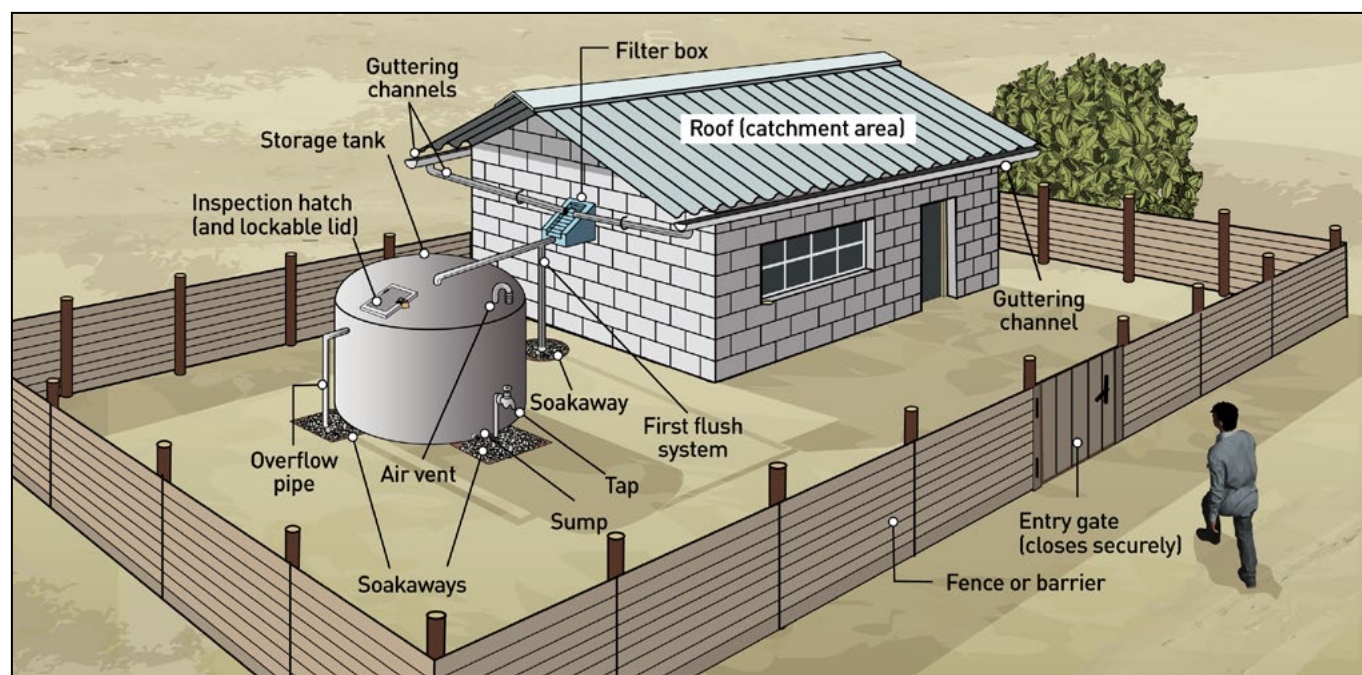
$$\text{Rainwater collection (L/year)} = \text{Rainfall (mm/year)} \times \text{Roof area (m}^2\text{)} \times \text{Run-off coefficient}$$

The run-off coefficient will depend on the roof material, and considers water losses (e.g. from evaporation, gutter overflow, leaks from pipes). The coefficient value is always less than 1 and may range from 0.9 for metal roofing to >0.4 for organic roofing materials.<sup>a</sup>

Figure 1 shows a common type of rainwater collection system. Figure 2 shows a common type of first flush device. These figures show a typical design. Other designs can also provide safe drinking-water.

For communal systems, the water collection area should be built so it is accessible for all users.<sup>b</sup>

Typical risk factors associated with a rainwater collection system are presented in the corresponding *Sanitary inspection form*.



**Figure 1.** A common rainwater collection system in a sanitary condition

<sup>a</sup> This fact sheet is not intended to serve as a design guide. For guidance on the design of rainwater collection systems, refer to [Rainwater collection: WEDC Guide No. 43](#) (Skinner, 2022).

<sup>b</sup> For guidance on designing accessible facilities, refer to [Water and sanitation for disabled people and other vulnerable groups: designing services to improve accessibility](#) (Jones and Reed, 2005).

Rainwater collection systems typically include the following main components.

- **Roof (catchment area):** A non-permeable surface (e.g. the roof of a house, school, shed) that captures rainwater and directs it via guttering channels to a collection system (e.g. water storage tank). Roof catchment areas are typically made from galvanized corrugated iron/steel, aluminium, stones, tiles, slates. *Note* – rainwater can also be collected from free standing structures that are not associated with a building (e.g. plastic sheeting).
- **Guttering channels:** Directs water from the catchment area to a collection system. Guttering channels are typically made from polyvinylchloride (PVC), aluminium, galvanized iron/steel or zinc.
- **Filter box:** Consists of a coarse filter that prevents larger pieces of debris (e.g. leaves, moss) from entering the storage tank. This type of filter will not effectively remove harmful microorganisms.
- **First flush system:** Diverts the first flush of rainwater away from the water storage tank (see Figure 2). This first flush of rainwater is typically of poorer quality due to the build-up of contaminants on the roof between rain events. The first flush system should be big enough relative to the size of the roof, to allow the first flush of rainwater to divert to waste (or for uses other than drinking-water).
- **Water storage tank:** Stores rainwater that has been collected from the catchment area. Storage tanks are commonly made from high density polyethylene (HDPE), PVC, ferro-cement, metal or concrete. The tank should be covered and sealed to stop contaminants entering the storage tank.
- **Inspection hatch:** Allows access to the storage tank for inspection or operations and maintenance. The inspection hatch should have a lid that is tightly fitting and lockable to stop contaminants from entering the tank, and to stop unauthorized access by people.
- **Tap:** Allows users to collect water from the storage tank in a sanitary way, minimizing water wastage or spillage. The tap should be raised off the floor-level of the tank to minimize the risk of withdrawing sediment from the bottom of the tank during use. The tap also allows easy collection of water quality samples for analysis.
- **Overflow pipe:** Directs excess water from the storage tank to a drainage point (e.g. soakaway, drain). This stops the tank overflowing in an uncontrolled way, which could contaminate the collection area or damage components. The overflow pipe should be facing downwards and have a vermin-proof screen (e.g. gauze or mesh) to prevent contaminants entering the storage tank. Water from the overflow pipe should not erode the ground beneath the pipe, as this could undermine and damage the tank, which could lead to contamination or water loss.
- **Air vent:** Allows ventilation in the storage tank. The air vent should be facing downwards and have a vermin-proof screen to stop contaminants entering the tank.
- **Storage tank sump:** Allows the storage tank to be emptied for cleaning and maintenance. The sump should be located at the lowest point of the tank floor to ensure the tank can be drained completely.
- **Fence or barrier:** A physical barrier to stop animals from contaminating the collection area or damaging the components. It may also prevent unauthorized access by people. The fence or barrier should have an entry point (e.g. a gate) that can be closed tightly and latched shut/locked.
- **Soakaway:** A hole in the ground filled with coarse material (e.g. gravel, stones, rocks), or that has a permeable wall, that allows water to drain back into the ground. This prevents water ponding and stagnating, which could contaminate the collection area. More robust drainage options (e.g. drainage channel or drain) may be required for higher volumes of overflow. Drainage water may be used to provide water for livestock or other activities, provided that these activities occur at a safe distance from the storage tank.

### Additional considerations

After a new rainwater collection system is constructed, it should be cleaned, flushed and disinfected (e.g. with chlorine), and flushed again, to disinfect the components before the water is used.<sup>c</sup> Ideally, water quality testing should be conducted before the system is commissioned to confirm the water is safe for consumption. Periodic disinfection and testing may also be required (e.g. after long periods without rain, after maintenance).

Construction materials (e.g. lead, copper, certain metallic paints) could affect the safety of the drinking-water. When constructing new rainwater collection systems or rehabilitating old ones, all materials used should be safe for contact with drinking-water (e.g. using materials approved through an appropriate certification scheme).

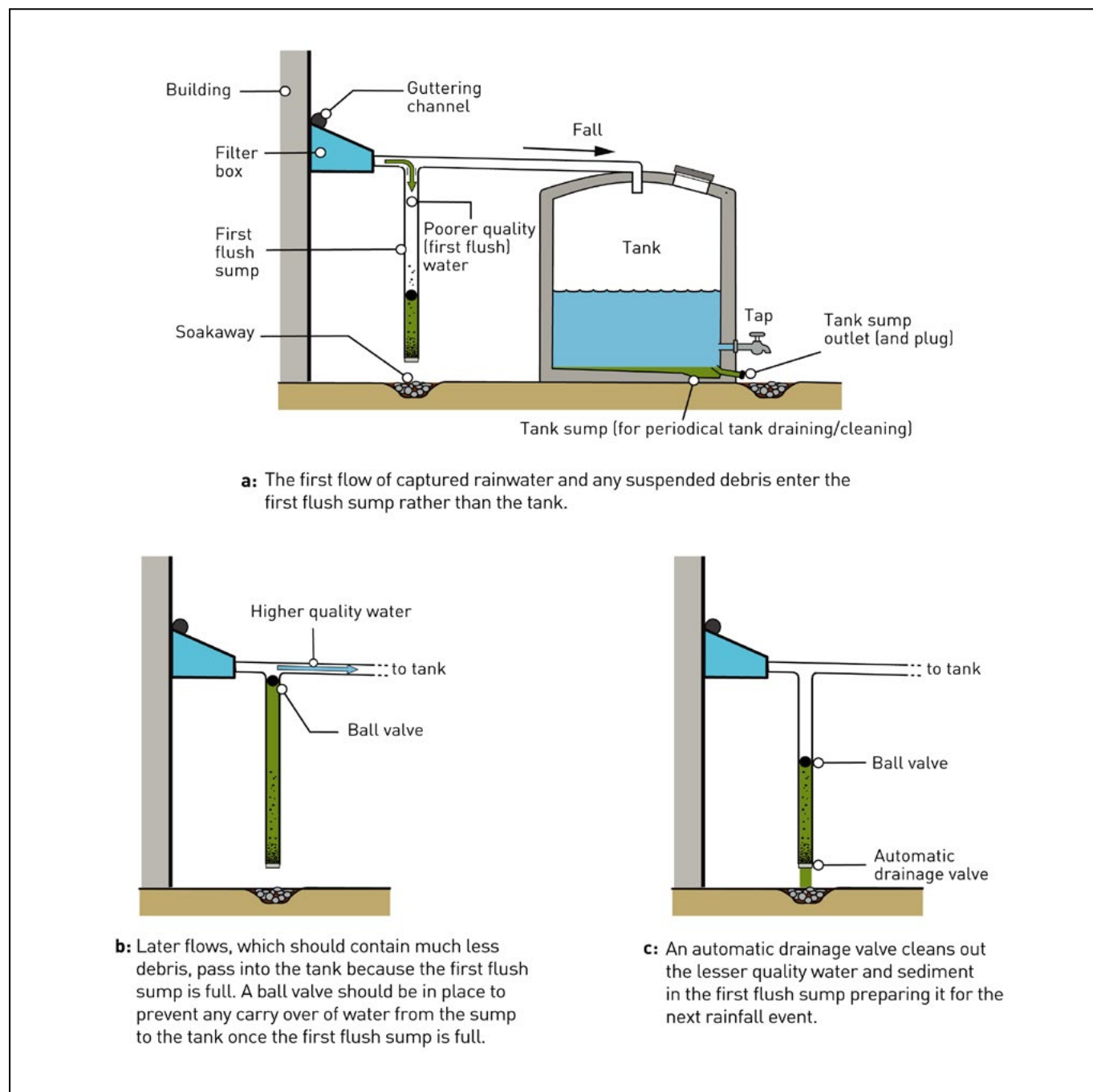
<sup>c</sup> See [Technical notes on drinking-water, sanitation and hygiene in emergencies: cleaning and disinfecting water storage tanks and tankers](#) (WHO & WEDC, 2013).

Mud or organic roof materials (such as thatch) should be avoided where possible, as they typically result in lower volumes of rainwater being collected (i.e. have a lower run-off coefficient) and could contaminate the rainwater during collection.

Where asbestos-containing roof materials are in place, the materials should be sealed with appropriate paint or resin to prevent fibres entering the water.

Rainwater collected from asbestos roofing should be allowed to settle before use (i.e. allowing fibres to settle to the bottom of the container, before decanting off the water).

Efforts should be made to minimize activities that can result in the degradation and release of asbestos fibres (e.g. roof cutting, drilling, use of high-pressure roof cleaning materials).



**Figure 2.** A common first flush system used in rainwater collection systems

#### World Health Organization

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Website: <https://www.who.int/health-topics/water-sanitation-and-hygiene-wash>





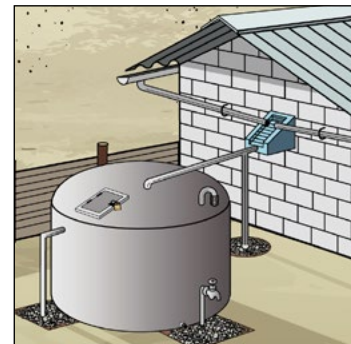
# Rainwater collection and storage

**This management advice sheet provides guidance for the safe management of a rainwater collection system, which supports the sanitary inspection of this drinking-water source.**

Guidance for typical operations and maintenance (O&M) activities is provided in Table 1, including suggested frequencies for each activity. These activities are important for keeping the rainwater collection system in good working condition and protecting drinking-water quality.

Table 2 lists potential problems that may be identified during a sanitary inspection, and provides basic corrective actions to consider for each problem.

This management advice sheet can also support routine management and monitoring practices, which are required to help ensure the ongoing safety of the water supply.



## A. OPERATIONS AND MAINTENANCE

Basic O&M can usually be carried out by a trained owner, user or caretaker (e.g. simple maintenance tasks such as cleaning the roof and guttering channels). Larger repairs and maintenance tasks (e.g. repairing the filter box, replacing guttering channels) may need skilled labour which can be provided by local craftspeople, or with support from outside of the local area.

The condition of the rainwater collection system should be inspected routinely to help prevent contaminants entering the water supply. Any damage or faults should be repaired immediately (e.g. cracks in the guttering channels, leaking tap, broken fence).

Standard operating procedures (SOPs) should be developed for important O&M tasks (e.g. inspecting and repairing the storage tank). These should be followed by trained individuals so the work is carried out safely and the water supply is not contaminated during the work.

The rainwater storage tank should only contain drinking-water - no other liquids, including water of lesser quality, should be stored in the tank. Taps and related fittings should be maintained routinely. The storage tank should be periodically cleaned and disinfected according to SOPs.

Where there is no first flush system in place, the first portion of rainwater should be manually diverted away from the storage tank - this water could contain contaminants that have accumulated on the roof between rain events (e.g. from animal excrement, insects, dust, leaves).

Adequate treatment/disinfection of the rainwater is required before consuming the drinking-water (e.g. by household water treatment).

Activities other than drinking-water collection (e.g. laundry, washing, bathing) should not be conducted at the water collection point. Certain activities can result in airborne contaminants, such as mining or spray drifts from local agricultural practices (e.g. manure spreading, crop spraying, burning). This could contaminate the roof catchment area. Consultation with the relevant authorities may be needed to ensure that such activities are carried out at a safe distance from the roof catchment area (ideally downwind of the rainwater collection system based on the prevailing wind direction). The impact from other events on drinking-water quality (e.g. bushfires, volcanic eruptions) should also be considered if relevant in the local context.



Table 1. Guidance for developing an operations and maintenance schedule

Frequency	Activity
Daily to weekly	<ul style="list-style-type: none"> <li>Check and clean the area around the rainwater collection system, including the tap. Remove any polluting materials (e.g. faeces, rubbish).</li> <li>Check that the inspection hatch lid is in place and in good condition, and is closed and locked securely. Repair or replace damaged parts, and lock as needed.</li> <li>Check that the inside of the storage tank is clean (e.g. free from animals, faeces, sediment build-up). Drain as needed, then clean and disinfect the tank (e.g. with chlorine).<sup>a</sup></li> <li>Check that the soakaway or drain is clear and in good condition. Remove debris or repair as needed.</li> <li>Check that the fence or barrier is in good condition and that the entry point (e.g. gate) can be closed securely and latched shut/locked. Repair or replace damaged parts.</li> </ul>
Weekly to monthly	<ul style="list-style-type: none"> <li>Check that the following are clean and in good condition: filter box; first flush system; guttering channels; roof. Clean, repair or replace these components as needed.</li> <li>Check that the storage tank air vent and overflow pipe are in good condition. Ensure that protective vermin-proof screens are securely fitted and in good condition. Repair or replace damaged parts.</li> </ul>
Annually	<ul style="list-style-type: none"> <li>Perform a detailed inspection of the roof, guttering channels and storage tank (and the tank support base if present) for signs of damage or failure. Repair or replace damaged parts.<sup>b</sup></li> </ul>
As the need arises <sup>c</sup>	<ul style="list-style-type: none"> <li>Drain the storage tank, remove sediment and clean the internal tank walls (e.g. using a brush and clean water), and then disinfect (e.g. with chlorine) the storage tank.<sup>a</sup></li> <li>Drain the first flush system if manual draining is in place.</li> <li>Remove vegetation that is overhanging the roof (or other catchment area).</li> <li>Monitor activities in the surrounding area that could result in airborne contaminants landing on the roof.</li> <li>Monitor water use and yield (e.g. during periods of drought).</li> <li>Ensure procurement of any materials in contact with drinking-water and water treatment chemicals (where used) are safe for drinking-water use.</li> </ul>

<sup>a</sup> For guidance on safely cleaning and disinfecting storage tanks, refer to [Technical notes on drinking-water, sanitation and hygiene in emergencies: cleaning and disinfecting water storage tanks and tankers](#) (WHO & WEDC, 2013). This activity is required following a contamination event (e.g. presence of animals in the storage tank, *E. coli* detection). *Note* – in water scarce areas, consult with local health authorities before draining the storage tank to make sure that the risk to water quality justifies the water loss. Alternative water supply arrangements may then be needed to ensure that users have sufficient water quantity to meet domestic needs.

<sup>b</sup> For guidance on the appropriate design of rainwater collection systems, refer to [Rainwater collection: WEDC Guide No. 43](#) (Skinner, 2022).

<sup>c</sup> See Table 2 for potential problems that could trigger these activities.

### General notes

- The suggested frequencies in Table 1 are a minimum recommendation. The frequency of activities may need to be increased depending on the local context. A suitable O&M schedule should be made for each site, including who is responsible for the work. Completion of activities as per the O&M schedule should be recorded, including additional details for any problems identified and corrective actions undertaken.
- Only people with relevant training and skills should undertake the activities in Table 1. Appropriate safety measures should be in place when entering a storage tank for inspection or maintenance. Safety risks such as storage tank collapse or asphyxiation should be appropriately managed. Care should be taken when handling disinfection products.
- For guidance on appropriate frequencies for monitoring (e.g. sanitary inspections, water quality testing), refer to [Guidelines for drinking-water quality: small water supplies](#) (WHO, 2024).



## B. PROBLEMS AND CORRECTIVE ACTIONS

Each problem in Table 2 is linked to the same question number in Section B of the *Sanitary inspection form*. Where relevant, corrective actions should be completed by trained individuals according to SOPs. Where needed, develop awareness raising and education programmes, and if necessary, local rules or regulations, to support safe drinking-water management in the context of the guidance provided in Table 2.

If problems are identified that represent an immediate threat to drinking-water safety (e.g. likely presence of faecal contamination in the water supply, positive *E. coli* detection), consider what immediate actions should be taken to minimize the risk to public health (e.g. advise users to seek an alternative safe drinking-water source, disinfect the water at the point of use).

**Table 2. Common problems associated with a rainwater collection system, and suggested corrective actions**

Question	Problem identified	Corrective actions to consider
1	There are visible contaminants (e.g. from animal faeces, corroded or damaged roof or gutter materials, vegetative matter such as leaves) on the roof or in the guttering channels which could contaminate the water, or cause blockages.	<ul style="list-style-type: none"> <li>• Clear the roof and guttering channels.</li> <li>• Repair or replace any damaged or corroded sections of the roof or guttering channels.</li> <li>• Communicate the importance of regular inspection and maintenance to prevent this issue from recurring.</li> </ul>
2	The roof or guttering channels are inadequately sloped, which could result in stagnant water contaminating the storage tank.	<ul style="list-style-type: none"> <li>• For the guttering channel, increase the slope of the gutters to encourage rainwater to fully drain towards the storage tank. Repair or replace any damaged gutters.</li> <li>• For the roof, speak to local craftspeople about appropriate options to increase the roof slope, or seek an alternative rainwater catchment option (e.g. a free-standing structure made from plastic sheeting or galvanized corrugated iron).</li> </ul>
3	There are vegetation or structures overhanging the roof that could contaminate the catchment area (e.g. by encouraging animals), or cause blockages (e.g. from fallen leaves) which may lead to water loss.	<ul style="list-style-type: none"> <li>• Remove any overhanging vegetation.</li> <li>• Deter birds or other animals from any structures overhanging the roof area.</li> <li>• Where practical, relocate any overhanging structures (e.g. move overhanging wires in consultation with the responsible authority).</li> </ul>
4	The filter box is absent, or it is damaged or blocked, which could introduce contaminants into the water, or lead to water loss.	<ul style="list-style-type: none"> <li>• If the filter box is absent, engage local craftspeople to install a filter box unit. In the interim, provide a temporary filter with a suitable mesh or gauze to prevent debris from entering the storage tank.</li> <li>• If the filter box is damaged, provide a temporary filter (as per above). Repair or replace the filter box as soon as possible.</li> <li>• If the filter box is blocked, remove the material and clean the unit.</li> </ul>
5	The first flush system is absent, or it is damaged or blocked, which could introduce contaminants into the storage tank, or lead to water loss.	<ul style="list-style-type: none"> <li>• If the first flush system is absent or damaged, engage local craftspeople to install or repair the system as soon as possible. Until the system is operational, manually divert the first flush of rainwater following rain.</li> <li>• If the first flush system is blocked, manually drain and clean the system.</li> </ul>

Table 2. ...continued

Question	Problem identified	Corrective actions to consider
<b>6</b>	There are signs of contaminants in the storage tank (e.g. animals, faeces, sediment build-up) that could present a serious risk to water quality.	<ul style="list-style-type: none"> <li>Remove the contaminants immediately if possible.</li> <li>Consider what immediate actions should be taken to minimize the risk to public health (e.g. advise users to treat the water before consumption).</li> <li>Drain, clean and disinfect (e.g. with chlorine) the storage tank.<sup>a</sup></li> <li>Consider appropriate measures to minimize the risk of contamination entering the storage tank from this source in the future (e.g. install a storage tank cover, lock inspection hatch lid, fence the collection area).</li> </ul>
<b>7</b>	The storage tank is inadequately covered, which could allow contaminants to enter the storage tank.	<ul style="list-style-type: none"> <li>Provide a temporary cover (e.g. impermeable plastic sheeting) to minimize the entry of contaminants into storage tank. Install or repair the tank cover as soon as possible.</li> <li>Clean and disinfect (e.g. with chlorine) the storage tank.<sup>a</sup></li> </ul>
<b>8</b>	The inspection hatch lid is missing (or open, unlocked) or in poor condition (e.g. deep cracks, severely corroded, does not fit tightly when closed), which could allow contaminants to enter the storage tank.	<ul style="list-style-type: none"> <li>If the inspection hatch lid is missing, or it is in poor condition, provide a temporary seal (e.g. impermeable plastic sheeting) over the inspection hatch to minimize the entry of contaminants. Repair or replace the hatch and/or lid as soon as possible.</li> <li>If the inspection hatch lid is open or unlocked, communicate the importance of closing and locking the lid securely when not in use.</li> </ul>
<b>9</b>	The storage tank walls are cracked or leaking, which could allow contaminants to enter the water, or result in water loss.	<ul style="list-style-type: none"> <li>If the storage tank walls are cracked or leaking, engage local craftspeople to repair or replace the storage tank as needed.</li> <li>Clean and disinfect (e.g. with chlorine) the storage tank.<sup>a</sup></li> </ul>
<b>10</b>	The overflow pipe is inadequately protected (e.g. with a mesh or gauze), which could allow vermin (e.g. insects, rodents, birds) to enter the storage tank and contaminate the water.	<ul style="list-style-type: none"> <li>If the overflow pipe is unprotected, cover the pipe with a vermin-proof screen (e.g. gauze or mesh).</li> <li>If the overflow pipe screen is damaged (e.g. ripped, broken) or has wide gaps, replace with a functioning vermin-proof screen.</li> </ul>
<b>11</b>	The air vents are poorly designed (e.g. facing upwards) or unprotected (e.g. without a vermin-proof screen), which could allow contaminants to enter the storage tank.	<ul style="list-style-type: none"> <li>If the air vents are facing upwards, modify the vents so they face downwards.</li> <li>If the air vent screens are absent, cover the vents with vermin-proof screens.</li> <li>If the air vent screens are damaged or have wide gaps, replace with functioning vermin-proof screens.</li> </ul>
<b>12</b>	The storage tank tap is dirty or in poor condition (e.g. damaged, severely corroded, leaking), which could allow contaminants to enter the water during collection, or result in water loss.	<ul style="list-style-type: none"> <li>If the tap is dirty, clean and disinfect the tap (e.g. with chlorine).</li> <li>If the tap is in poor condition, repair or replace the tap as needed, then clean and disinfect it.</li> <li>Communicate the importance of routine cleaning/maintenance to the caretaker or owner.</li> </ul>

Table 2. ...continued

Question	Problem identified	Corrective actions to consider
<b>13</b>	The drainage is inadequate (e.g. absent, damaged or blocked drainage channel or soakaway), which could result in stagnant water contaminating the collection area.	<ul style="list-style-type: none"> <li>• If a drainage channel or soakaway is absent, dig a temporary channel to divert water away from the water collection area. Construct a permanent drainage system as soon as possible.</li> <li>• If a drainage channel or soakaway is not working, consider whether maintenance is needed (e.g. repair, cleaning), or if deepening, widening or extending is required.</li> </ul>
<b>14</b>	The fence or barrier around the storage tank is absent or inadequate, which could allow animals to contaminate or damage the collection area.	<ul style="list-style-type: none"> <li>• If absent, construct a robust fence or barrier with a lockable gate that closes securely.</li> <li>• If a fence or barrier is present but inadequate to prevent animal access, repair or replace it.</li> <li>• If the entry point (e.g. gate) to the collection area is damaged and/or does not close securely, repair or replace it.</li> </ul>
<b>15</b>	There are sources of pollution (e.g. open defecation, animals, drinking trough for livestock, rubbish, commercial activity, fuel storage) around the storage tank that could contaminate the water collection area.	<ul style="list-style-type: none"> <li>• Where practical, remove the pollution (e.g. remove animal faeces, rubbish). Communicate the importance of maintaining the collection area in a clean condition.</li> <li>• Consult with local authorities and users to consider: <ul style="list-style-type: none"> <li>◦ appropriate actions to relocate or eliminate the source of pollution</li> <li>◦ other actions to minimize the issue from occurring again (e.g. signage, enforcement measures).</li> </ul> </li> </ul>
<b>16</b>	There is spray drift from local activity (e.g. industry, agriculture) that could contaminate the roof catchment area.	<ul style="list-style-type: none"> <li>• Consider what immediate actions should be taken to minimize the risk to public health (e.g. suspend rainwater collection until the activity has ceased).</li> <li>• Clean the roof and allow the wash water to drain to waste (i.e. ensure it does not enter the storage tank).</li> <li>• Clean and disinfect (e.g. with chlorine) the storage tank if contaminated water has entered it.<sup>a</sup></li> <li>• Consider appropriate steps to eliminate the hazard, liaising with the responsible individuals or groups and the local environmental authority as required.</li> </ul>

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