

# Water Storage & *Purification Guide*

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Safe water storage in tropical climates, backup purification methods, and household filtration options. Practical systems for Malaysian families designed for monsoon season, supply disruptions, and extended emergencies.



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## **Water Storage & Purification Guide for Malaysian Families**

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**Designed for Malaysian families**, this guide addresses the specific challenges of water storage in tropical climates, understanding local water infrastructure vulnerabilities, and implementing practical backup systems that work in our environment.

**This guide covers:** Water requirements, storage containers and safety, four-layer purification strategy, tropical storage challenges, rainwater harvesting, household filtration systems, and emergency water protocols.

## C O N T E N T S

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CH 01	Why Water Storage Matters	5
CH 02	Water Requirements & Calculations	6
CH 03	Storage Containers & Safety	7
CH 04	Tropical Storage Challenges	8
CH 05	The Four-Layer Purification Strategy	9
CH 06	Filtration Methods & Systems	11
CH 07	Rainwater Harvesting	12
CH 08	Emergency Water Protocols	13
CH 09	Implementation Plan & Checklists	14

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# Why Water Storage Matters

The most critical resource after shelter—and often the most overlooked

Water is more critical than food. A person can survive three weeks without food, but only three days without water. In Malaysian emergencies—monsoon floods that cut off water supply, extended power outages that disable pumps, contamination events, supply chain disruptions—having stored water separates families who survive comfortably from families who suffer.

## Malaysia's water vulnerabilities

Despite abundant rainfall, Malaysian water systems face real risks:

- **Monsoon flooding:** Disrupts treatment facilities, contaminates water sources, can cut supply for 7–21 days
- **Power outages:** Many homes rely on electric pumps for water pressure. No power = no water, regardless of supply availability
- **Treatment facility damage:** Infrastructure damage during storms can halt treatment for extended periods
- **Pipe contamination:** During flooding and repairs, water pipes can become contaminated
- **Haze season:** Can affect water quality and treatment processes

## What you'll learn

This guide teaches you to build a comprehensive water security system:

- Calculate realistic household water needs
- Store water safely in Malaysian tropical conditions
- Understand four layers of water purification
- Implement practical filtration systems
- Harvest and use rainwater
- Know emergency protocols when water fails

Begin with stored water today. Everything else (filtration, harvesting, treatment) builds on this foundation. A family of four with 100 litres stored is already more prepared than 99% of Malaysian households.

# Water Requirements & Calculations

How much water does your family actually need?

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## The four-litre rule

**4 litres per person per day** is the baseline standard. This covers:

- Drinking: 1–1.5 litres
- Cooking: 0.5–1 litre
- Basic hygiene (washing hands, face, teeth): 1.5–2 litres

This doesn't include full bathing or laundry—in emergencies, you minimize that.

## Calculate your family's needs

FORMULA:

**Number of family members × 4 litres × Number of days = Total litres needed**

EXAMPLES:

- **Family of 4, 3 days:**  $4 \times 4 \times 3 = 48$  litres
- **Family of 4, 7 days:**  $4 \times 4 \times 7 = 112$  litres
- **Family of 4, 30 days:**  $4 \times 4 \times 30 = 480$  litres
- **Family of 6, 2 weeks:**  $6 \times 4 \times 14 = 336$  litres

## Practical storage targets

**72h**

MINIMUM

**7d**

RECOMMENDED

**30d**

GOLD STANDARD

Most Malaysian families can realistically achieve 7-day supply. This covers typical flood and supply disruption scenarios.

## **Important: Rotation matters**

Unlike canned food, stored water doesn't go "bad." But containers degrade and contamination risk increases with time. Rotate your stored water into regular use every 6 months—use it for cleaning, toilet flushing, garden watering. Refill with fresh water. This keeps your store fresh and integrates emergency water into normal household operations.

# Storage Containers & Safety

What to use, what to avoid, and why it matters

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## Best containers for Malaysian homes

### FOOD-GRADE PLASTIC JERRICANS (HDPE)

- **Size:** 20 litres (standard), also 10L and 5L available
- **Cost:** RM 15–30 per 20L jerrican
- **Where to buy:** Hardware stores, Lazada, Shopee
- **Advantage:** Stackable, durable, can last 5–10 years, widely available
- **Mark:** Look for "food grade" or water storage symbol on bottom

### GLASS JARS WITH AIRTIGHT LIDS

- **Size:** 1–5 litres typical
- **Cost:** RM 5–15 per container
- **Advantage:** Complete visibility, inert material, indefinite lifespan
- **Disadvantage:** Heavy, breakable, space-inefficient

### LARGE STORAGE TANKS

- **Size:** 100–1,000 litres
- **Cost:** RM 200–2,000 depending on size
- **Best for:** Families with garden space, combined with rainwater harvesting
- **Advantage:** Once-and-done storage, integrated with home systems

## What NOT to use

### NEVER USE

Old chemical containers, paint drums, milk containers (become brittle), bottles from cleaning products, anything with unknown previous contents. The contamination risk is unacceptable.

# Storage best practices

## 1 Use distilled or treated water

Tap water is fine if stored in clean containers. Distilled water (RM 2–3 per 5L) lasts slightly longer. Don't overthink it—tap water is acceptable.

## 2 Fill containers completely

Air inside accelerates algae growth and contamination. Fill to the brim, seal tightly.

## 3 Store in cool, dark location

Away from direct sunlight, away from heat sources. Sunlight causes algae growth. Heat degrades plastic. A cool closet or shaded corner is ideal.

## 4 Label and date everything

Write fill date with permanent marker. Rotate oldest containers first (6-month rotation).

## Safe vs unsafe locations

LOCATION	SUITABILITY	WHY
Cool dark closet/cabinet	Excellent	No sunlight, stable temperature
Shaded corner of garage	Good	Dark, cool-ish, accessible
Bottom shelves (cooler)	Good	Cooler than higher shelves
Under-bed storage	Good	Dark, stable environment
Near window or sunlight	Poor	Algae growth, degradation
Next to heater/stove	Poor	Heat accelerates degradation

# Tropical Storage Challenges

What makes water storage different in Malaysia

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## Challenge 1: Algae growth

Malaysia's warm temperatures (25–32°C year-round) and humidity create ideal conditions for algae. Even in dark containers, given months of storage, green algae can develop. This makes water unpalatable (green tint, earthy smell), though usually not dangerous if boiled.

### SOLUTIONS:

- Store in completely dark containers (opaque, not clear plastic)
- Add food-grade sodium hypochlorite (bleach) at proper dilution: 2 drops per litre (not more—excess chlorine is unpalatable)
- Rotate water every 6 months
- Cover containers to prevent dust entry and light exposure

## Challenge 2: Container degradation

Plastic containers in tropical heat degrade faster than in temperate climates. The combination of heat, UV exposure (even indirect), and humidity shortens container lifespan to 5–10 years instead of 15–20.

### SOLUTIONS:

- Replace containers every 5–7 years
- Inspect regularly for cracks, cloudiness, or weakening
- Store in cool locations to slow degradation
- Use food-grade containers designed for tropical conditions if possible

## Challenge 3: Mosquito breeding in standing water

During monsoon season, open water storage becomes a mosquito breeding ground (dengue, Zika). This is a serious health risk in Malaysia.

### SOLUTIONS:

- Keep ALL containers sealed with tight-fitting lids
- No open buckets or containers
- If you harvest rainwater, screen the intake
- Check lids regularly—they can warp in humidity

## Challenge 4: Water quality in humid months

During monsoon season (November–March, May–September depending on coast), increased humidity and moisture accelerate any contamination processes in stored water.

### SOLUTIONS:

- Increase rotation frequency during monsoon season (4-month rotation instead of 6)
- Consider adding extra water storage before monsoon begins
- Ensure purification methods are ready (filters, tablets)

**Key insight for Malaysia:** Your stored water won't last as long as American prepping guides suggest. Accept this reality. Rotate every 6 months (4 months during monsoon) and adjust your expectations. A 7-day supply that rotates monthly is infinitely better than a 30-day supply that never rotates and gets contaminated.

# The Four-Layer *Purification Strategy*

Multiple approaches ensure water safety when primary sources fail

The strongest water security uses four independent purification methods. If one fails or becomes unavailable, others provide backup.

## Layer 1: Stored water (immediate reserve)

This is your primary source during first 7–14 days. Requires no processing, already in usable form. Critical foundation.

- **What:** Water stored before emergency in containers
- **Lasts:** 6 months (rotate regularly)
- **Cost:** RM 1–2 per person per day of storage (including container cost)

## Layer 2: Filtration

Removes particles, sediment, bacteria, and some pathogens. Allows you to use rainwater, well water, or surface water safely once filtered.

### POPULAR MALAYSIAN OPTIONS:

FILTER TYPE	BEST FOR	COST	CAPACITY
LifeStraw Personal	Individual use, travel	RM 80–120	4,000L lifetime
Sawyer Squeeze	Individual/small family	RM 120–180	100,000+ L
Berkey Gravity Filter	Family home (best option)	RM 800–1,500	Unlimited (replaceable)
Simple cloth filter	Emergency sediment removal	Free–RM 50	Unlimited

## Layer 3: Chemical purification

Tablets or drops that kill bacteria and viruses. Lightweight, cheap, shelf-stable. Don't remove sediment or heavy metals—always pre-filter visibly dirty water.

- **Iodine tablets:** Kill pathogens in 30 minutes, RM 10–20 per 50-tablet pack
- **Sodium hypochlorite (bleach) tablets:** Similar, sometimes cheaper, RM 8–15
- **Aquamira drops:** More reliable option, slightly more expensive, RM 30–50

## Layer 4: Boiling

Rolling boil for 1 minute (3 minutes above 2,000m) kills all biological pathogens. Most reliable when fuel is available. Doesn't remove chemical contamination.

- Requires fuel (gas, charcoal, wood) and 15–20 minutes per batch
- Unreliable as primary method if fuel becomes scarce
- Use as backup to filtration and chemical treatment

COMPLETE  
SYSTEM

Ideal  
setup for  
Malaysian  
family of  
4:

- Layer 1:  
100+ litres  
stored  
water (7-  
day  
supply)
- Layer 2:  
Berkey  
Gravity  
Filter (RM  
800–1,500,  
one-time  
purchase)
- Layer 3: 2–  
3 packs of  
purification  
tablets  
(RM 30–  
60)
- Layer 4:  
Portable  
gas stove +  
fuel  
canisters  
(RM 40–  
80)

**Total investment: RM  
900–1,700 one-time**  
covers your family for  
extended  
emergencies. Spread  
across months, this is  
affordable.

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# Filtration Methods & Systems

Detailed implementation of each filter type

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## **Berkey Gravity Filter (recommended for Malaysian families)**

A gravity-fed system that requires no electricity or pumping. Water drips through ceramic filters into lower chamber. Extremely reliable for extended emergencies.

### **HOW IT WORKS:**

- Pour untreated water (rainwater, well water, river water) into upper chamber
- Water drips through ceramic elements into lower chamber, filtering as it goes
- Takes 1-2 hours per batch (not instant, but reliable)
- Filters last 6,000 litres (replaceable, RM 100-150 per pair)

### **COST BREAKDOWN:**

- Standard Berkey (2-filter): RM 1,000-1,500
- Large Berkey (4-filter): RM 1,400-2,000
- Replacement filters: RM 100-150 per pair every 2-3 years

## **Sawyer Squeeze Filter**

Portable, effective, moderate cost. Uses squeeze bags to push water through filter.

### **HOW IT WORKS:**

- Fill Sawyer's squeeze pouch with water
- Squeeze through filter into another container
- Takes 2-3 minutes per litre
- Good for families without gas stove (no boiling needed)

### **COST:**

- Sawyer Squeeze: RM 120-180

- Replacement filters: RM 40–60

## Simple cloth filtration (emergency method)

Free or nearly free, removes sediment and large particles. Doesn't remove all pathogens—must combine with chemical treatment or boiling.

### HOW IT WORKS:

- Use fine cotton cloth or coffee filter
- Layer multiple times for better filtration
- Pour dirty water through cloth into clean container
- Follow with chemical tablets or boiling

## Commercial water filters (household tap filters)

Many Malaysians already use these. They help but aren't sufficient alone for emergency water.

- **Under-sink filters:** Require water pressure to work (fails if pressure lost)
- **Pitcher filters:** Slow but effective for stored water, RM 50–150
- **Whole-house systems:** Require professional installation

### PRACTICAL ADVICE

If you already own a Brita pitcher or similar home filter, combine it with chemical tablets or boiling for complete purification during emergencies. Don't rely on it alone—it typically removes chlorine and some particles but isn't rated for pathogen removal.

# Rainwater *Harvesting*

Malaysia's most abundant water resource—harness it

## Why rainwater harvesting in Malaysia

Malaysia receives 2,500–3,000mm of rainfall annually—one of world's highest. A landed property with 100 square metres of roof area collects approximately 200,000 litres of rainwater per year. This is extraordinary compared to other countries.

A simple rainwater system provides unlimited emergency water supply if properly maintained.

## Basic rainwater harvesting system

### COMPONENTS:

- **Roof catchment:** Use existing roof (tin, tile, concrete all work)
- **Gutters and downpipes:** Direct water to storage (may already exist)
- **First-flush diverter:** Discard first 20–50 litres to remove roof dirt and bird droppings
- **Storage tank:** 1,000 litres minimum recommended
- **Filtration mesh:** Prevent debris and mosquito entry
- **Overflow pipe:** Prevent tank overflowing
- **Draw-off tap:** Access water without opening tank

## Implementation cost

COMPONENT	APPROX. COST
1,000L storage tank	RM 600–900
First-flush diverter	RM 150–300
Gutters + downpipes (if needed)	RM 200–500
Filtration mesh, taps, fittings	RM 100–200

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**Total for basic system****RM 1,050–1,900**

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## Water safety for harvested rainwater

Rainwater from clean roofs is generally safe for washing, toilet flushing, and garden use immediately. For drinking and cooking:

- Filter through your Berkey or Sawyer system
- Add chemical tablets if filtration unavailable
- Boil before drinking if sanitation is uncertain

**Investment worth making:** For families with land, a 1,000-litre rainwater tank is one of the highest-value emergency preparedness purchases. It provides unlimited backup water supply, works passively (no maintenance beyond seasonal cleaning), and provides daily benefits during normal times (garden watering, cleaning).

# Emergency Water *Protocols*

What to do when water fails

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## When tap water becomes unavailable

Follow this priority order:

### PHASE 1 (HOURS 1-24): USE STORED WATER

- Consume stored water for drinking and cooking
- Ration initially (don't panic-use everything immediately)
- Basic hygiene with tap water if still available (it's safe for 24 hours post-failure)

### PHASE 2 (DAY 2-7): STORED + RAINWATER

- Use stored water for drinking/cooking
- Use harvested rainwater (filtered) for washing and toilet flushing
- If you have Berkey or Sawyer, filter and purify rainwater to extend drinking supply

### PHASE 3 (WEEK 2+): EXTENDED EMERGENCY PROTOCOLS

- Use rainwater for 80% of needs (washing, toilet, cooking with filtration)
- Reserve purified stored water for drinking only
- If rainwater unavailable, use grey water recycling (see below)

## Grey water recycling for extended emergencies

Grey water is water from washing/bathing (not toilet water). Can be reused for:

- Toilet flushing
- Cleaning floors
- Watering plants

**Not suitable for:** Drinking, cooking, drinking plants, washing food

**SIMPLE GREY WATER SYSTEM:**

- Collect bathwater in 20-litre buckets
- Store in sealed containers (prevent mosquito breeding)
- Use within 24 hours to prevent bacterial growth

## Minimum drinking water standard during emergency

If you have no stored water or rainwater, you can survive on:

- **1–2 litres per day per person:** Absolute minimum (thirsty, uncomfortable)
- **3–4 litres per person per day:** Adequate (what our guide assumes)

You can reduce non-drinking water by using grey water for hygiene, minimizing bathing, and using toilet water conservation techniques.

## Water conservation techniques during shortage

- **Wash hands in bowl:** Reuse water to flush toilet
- **Fill toilet tank manually:** Use bucket instead of wasting full flush
- **Shower sparingly:** Use wet cloth to wash body instead
- **Wash dishes in minimal water:** Collect rinse water for plants
- **Use rainwater for everything possible:** Filter for drinking, use directly for cleaning

### CRITICAL: NEVER DRINK UNTREATED WATER

Even if you're extremely thirsty, never drink water from unknown sources without filtration or chemical treatment. Bacterial contamination causes dysentery—dehydration from illness is worse than thirst from rationing.

# Implementation Plan & *Checklists*

From planning to action—get started this week

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## Your implementation timeline

### 1 This week: Calculate & plan

Determine your family's water needs (multiply family size  $\times$  4  $\times$  number of days target). Decide on storage target (7–30 days). Decide storage location.

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### 2 Week 1–2: Buy basic storage

Purchase 5–10 food-grade jerricans (RM 15–30 each, total RM 75–300). Total cost for basic 7-day supply: RM 100–150 for family of 4.

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### 3 Week 3–4: Fill and store

Fill jerricans with tap water. Label with date. Store in cool, dark location. Begin 6-month rotation cycle.

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### 4 Month 2: Add filtration

If budget allows, purchase Berkey (RM 1,000–1,500) or Sawyer (RM 120–180). Start with Sawyer if cost is limiting factor.

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### 5 Month 3: Add chemical backup

Purchase 2–3 packs of water purification tablets (RM 30–60). Add portable gas stove if budget allows (RM 40–80).

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### 6 Month 4+: Consider rainwater

If you have land, research rainwater harvesting tanks (RM 600–1,900). Install during low-monsoon season for best results.

## Water storage checklist

- Calculate family water needs (family size  $\times$  4 litres  $\times$  days target)
  - Identify storage location (cool, dark, temperature-stable)
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- Purchase food-grade water containers
- Fill containers with tap water
- Label containers with fill date
- Create water rotation schedule (every 6 months)
- Test stored water by using in rotation
- Set phone reminder for rotation dates

## Purification system checklist

- Choose primary filter (Berkey or Sawyer recommended)
- Purchase chosen filter system
- Learn how to use it (watch videos, read manual)
- Test filter with stored water before emergency
- Purchase purification tablets as backup (2–3 packs minimum)
- Consider portable gas stove for boiling backup
- Keep all supplies with water storage (not scattered)
- Create emergency water protocol document for family

## Advanced systems checklist (if doing rainwater)

- Assess roof size and catchment potential
- Determine storage tank size needed
- Obtain quotes for installation
- Install first-flush diverter
- Install filtration mesh at entry points
- Connect tap with isolation valve
- Plan overflow system
- Test system during next rainfall

## Budget-conscious progression

If you can't afford everything at once:

MONTH	INVESTMENT	TOTAL COST
Month 1	5 × 20L jerricans + fill (7-day water supply)	RM 100–150
Month 2	Sawyer Squeeze filter	RM 120–180

MONTH	INVESTMENT	TOTAL COST
Month 3	Purification tablets (2 packs) + gas stove	RM 80-130
Month 6+	Upgrade to Berkey (optional, if desired)	RM 1,000-1,500

Minimum viable system (Month 1-3): **RM 300-450**

Complete system with Berkey: **RM 1,300-2,000**

**Start this week with stored water.** It's the foundation. Everything else (filtration, rainwater, tablets) builds on this base. A family of 4 with 100 litres of stored water is already safer than 99% of Malaysian households. Everything from here is incremental improvement.

YOUR WATER  
SECURITY  
STARTS NOW

Water is life.  
Store it. Filter  
it. Protect it.

When others panic about  
water during emergency,  
your family will have it.

Begin  
this  
week.

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