A MANUAL OF ESSENTIAL KNOWLEDGE, MADE CLEAR

The Ark of Knowledge

Essential human knowledge,
from the first 72 hours onward

Water, food, health, craft, knowledge and care for one another.

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How to use this book

It took humanity thousands of years to get from fire to electric light — not because things were hard, but because it did not know what to look for. Whoever knows that disease comes from germs, that a mouldboard plough turns the furrow, that burnt lime binds stone, that a coil turning beside a magnet makes current, leaps over centuries. This book gathers these **shortcuts**, in the order in which they can be rebuilt: first survival, then food and health, then materials, tools, energy, knowledge and the community.

Each chapter gives the **principle** (why it works — so you can improvise), **what to salvage from the ruins** (in the first years, the old world is the richest mine), the **steps**, the **dangers** and how to check it worked. Do not try to do everything: choose what is needed now and teach others.

Box	For whom	What it means
■ **Anyone**	Every person	What everyone must know to stay alive.
■ **The Craftsman**	Whoever takes it up seriously	How to take the craft further and do it well.
■ **The Community**	Whoever organises	What comes first, how to share out work and people.

The order of rebuilding

When	What to do first
First days	Safe water, shelter, warmth, a latrine far from water, the group.
First months	Salvage from the ruins (seeds, tools, books, salt, metals), food, infirmary, simple community rules.
First year	Gardens and fields, seed saving, food preserving, soap, lime, repaired tools.
Years 2–5	Plough and animals, mill, forge, brick, school, records, 12 V from salvaged parts.
After that	Waterwheel, metal from ore, paper, printing, roads and markets with other communities.

WHAT THIS BOOK DOES NOT CONTAIN

Nothing on weapons, explosives or poisons, nor surgery or doses of strong medicines. This book is for rebuilding, not destruction; and a lost book can reach anyone.

How to read and how to check

This book opens a path of learning. A trade is formed through guided practice and checking.

Start with the concrete need, then read the whole chapter, including the limits and cross-references. The contents and bookmarks lead to chapters; the appendices at the end add quick reading routes, a subject index and the bibliography.

Three levels of reading

Principle: you understand why something works.
Exercise: you learn in a low-risk setting, with guidance. **Critical procedure:** you use validated instructions and proper competence, not just a summary.

A “small trial” does not prove that water is drinkable, that preserved food is safe, or validate sterilisation, a medicine or an electrical installation. Do not test these things on people. Do not carry temperatures, times and proportions over from one process to another.

Sources and Limits

When a chapter refers to S1–S8, the full source is in the Bibliography at the end of the book, alongside recommended reading for each part.

This book does not replace practical training or the advice of a doctor or licensed specialist. Where official rules and instructions exist, they take precedence.

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CHAPTER 01

The First 72 Hours: What to Do First

The order in which you do things in the first three days decides whether you see a fourth.

The First 72 Hours: What to Do First

The order in which you do things in the first three days decides whether you see a fourth.

FOR ANYONE

IN SHORT
In the first three days you do not mend the world; you stay alive and do not harm yourself. The order is always the same: immediate dangers, injuries, warmth, water, and only then food. While water still runs from the tap, fill everything you have; turn off the gas and the main fuse; gather your people in one warm room. Take stock of what you have before going after what you lack. Food can wait a few days; water and warmth cannot.

The principle is called the **rule of 3**. A person survives about 3 minutes without air, 3 hours without shelter in wet cold and wind, 3 days without water and 3 weeks without food. The figures are only guides: a child, an old or a sick person lasts less, and summer heat greatly shortens the time without water. But their order is true and tells you what to do first. Second idea: in the first days after a disaster, very many people die not from the disaster but from mistakes made in haste — a barbecue lit indoors, a smell of gas ignored, water drunk from a puddle, a small wound left dirty, a walk alone through a cracked building. Panic makes you run; a list of priorities keeps you alive.

What to salvage from the ruins in the first 72 hours

- Water containers: clean cans and jerrycans, buckets with lids, plastic bottles, large pots, thick plastic sacks that can line a crate.
- Light: torches, head torches, batteries, candles, lanterns; a battery or wind-up radio.
- The first-aid kit and, above all, the medicines your people depend on day to day: treatments for heart, blood pressure, diabetes, epilepsy, asthma.
- Warmth: blankets, sleeping bags, wool clothes, hats, gloves, thick socks, sturdy footwear, survival blankets.
- Fire: lighters, matches, candles — kept dry, in a jar or sealed bag.

• Food that needs no cooking: tins, biscuits, nuts, dried fruit, honey, chocolate — and a tin opener.
• Simple tools: work gloves, a short crowbar, a knife, a shovel, a hammer, string, wide adhesive tape, plastic sheeting and tarpaulins.
• Paper, pencils, a marker — for the inventory, for notes and to record who received what.

Hour zero: safety before anything

1. Stop for ten seconds and look around before you do anything. What is burning? What could collapse? Is there a smell of gas? Can you hear water running where it should not?
2. If there is a smell of gas: light nothing, do not touch switches, do not turn on a phone near the leak. Open doors and windows, turn off the gas tap if you can reach it safely, and go outside.
3. Switch off the main fuse at the board. When power returns unexpectedly, an iron or hotplate left on can set the house alight while you sleep.
4. Count the people. Who is missing? Who is hurt? Do not go after anyone into a building that is moving; shout, listen, call for help and work only from the safe side.
5. Stop bleeding: press directly and firmly on the wound with a clean cloth, for several minutes straight, without lifting the cloth to look. If it soaks through, put another on top and keep pressing.
6. Agree a meeting place and leave a written note in plain sight, on the door: who you are, how many of you, where you went and when you will be back.

The first 24 hours: water and warmth

If water still comes from the tap, fill up **now**: the bath, pots, buckets, bottles, the plugged sink. The water network usually fails a few hours or days after the power, because the pumps and treatment plants stop. Tap water collected in the first hours will long be the cleanest water you have. Cover the containers to keep dust out, and keep them away from small children — a child can drown in a bucket.

The house also has hidden reserves. The hot-water **boiler** usually holds between 50 and 200 litres; first cut off its power or gas and its water supply, then drain it from the bottom tap, opening a hot tap in the house to let air in. The **toilet cistern** (not the bowl!) holds a few litres of good water, if you have not put cleaning tablets in it. The **pipes** in the house drain from the lowest tap if you open one higher up. Radiator water is not for drinking: it is old, full of

rust and sometimes additives.

For warmth, gather everyone in one room, the smallest and most sheltered from wind, preferably in the middle of the house. Close the doors to the rest of the house, cover the windows with blankets or sheeting, put rugs and cardboard on the floor. The bodies of five people warm a small room more than you would think. Sleep dressed in several layers, with a hat and dry socks, two by two under the same blankets. If you must go out, keep your clothes dry: wet clothes lose heat many times faster.

Day two: the inventory and food that spoils

Eat in the order things spoil: first what is in the fridge, then what is in the freezer, and only then tins and dry goods. A fridge without power keeps food safe for about 4 hours, if you do not open it often. A full, closed freezer keeps about 48 hours; a half-empty one, about 24. In winter, put food outside in the shade, in a closed crate, safe from dogs and rats — the cold outside stands in for a fridge. Thawed meat is cooked at once and eaten the same day.

What you count	Why	How you record it
Water	the first limit	litres ÷ people = days
Food	the second limit	in days of food, not kilograms
Medicines	the chronically ill	name, for whom, how many days they last
Fuel	heating and cooking	armfuls of wood, litres, gas bottles
Light, batteries	the long nights	pieces, hours of use
People	tomorrow’s work	name, age, health, what they can do

The inventory tells you the truth. If you have 60 litres of water and there are five of you, you have 60 ÷ 5 ÷ 4 = three days of drinking water, not “plenty of water”. If someone has blood-pressure pills for ten days, you know from day one that you must look for more. Count once a day, at the same time.

The toilet on day one

If there is no more water, stop flushing the toilet: the sewer clogs and the filth comes back into the house. Put a thick bag in the toilet bowl or in a bucket, and after each use cover with a handful of ash, sawdust, dry earth or lime. Tie the bag when it is half full and put it in a lidded container outside, far from water and the kitchen. Washing your hands after the toilet

is no luxury: diarrhoea can kill in a camp faster than cold.

Day three: information and the first plan

Listen to the radio at fixed times, morning and evening, to save the batteries. A mobile phone can send short messages (SMS) even when calls no longer get through; keep it off and turn it on only at set times. Then decide together: do we stay or go? Stay if you have a roof, water close at hand and are in no immediate danger — a known place, with known neighbours, is worth more than a better but strange one. Leave only with a clear destination, with water for the journey, by day, in a group, and leave a note.

What NOT to do in the first three days

- Do not drink water from a river, pond or unknown well without treating it.
- Do not go alone into cracked buildings, flooded cellars or near fallen cables.
- Do not light a fire or barbecue in the house, garage or tent.
- Do not waste batteries, fuel and food on day one, as if everything will be back to normal tomorrow.
- Do not split the group without a meeting place and time.

WARNING
After disasters, carbon monoxide kills more people than cold. NEVER use a charcoal barbecue, generator, brazier or lit gas cooker in an enclosed space to keep warm. The gas has no smell and cannot be seen. The signs: headache, dizziness, nausea, weakness, drowsiness — especially if several people are affected at once. Get them into fresh air at once and do not go back inside until it is fully aired.

TIP
Write everything on a sheet stuck to the door: who is in the house, what was decided, what was used today, who went where. Under stress, memory lies; paper does not.

FOR ANYONE
Everyone: learn the order by heart — dangers, injuries, warmth, water, food. Keep water for three days in the house, starting now: at least 3–4 litres to drink per person per day, plus water for cooking and washing.

FOR THE CRAFTSMAN

Whoever knows houses: take on checking your home and the neighbours' — gas taps, fuse boards, cracks, chimneys. Make a list of safe houses and those no one enters, and mark them in chalk on the door.

FOR THE COMMUNITY ORGANISER

Whoever organises: on day one, do not give orders at random. Count the people, listen, then hand out three clear tasks — water, warmth, the injured — with one person responsible for each. Have someone keep written records. Hold a short meeting every evening at the same time: what we did, what we lack, who needs help.

REMEMBER

First the dangers, then injuries, warmth and water — only then food.

PRACTISE NOW

- Today, set aside water for three days for everyone in the house and write the date on the containers.
- Find out where the gas tap, the main fuse and the boiler drain tap are — and practise turning them off.
- Make a 72-hour kit for each family member: water, torch, change of clothes, their medicines, phone numbers written on paper.
- Agree a family meeting place, in case you are apart when something happens.
- Spend an evening without power, as an exercise, and note what you missed.

I CAN...

☐I know the order of priorities in the first three days. ☐I know where to get clean water in the house after the tap stops. ☐I know why I never light a barbecue indoors. ☐I know in what order to eat the stores, by how fast they spoil. ☐I know how to stop bleeding by pressing directly on the wound. ☐I know how to make an emergency toilet from a bucket, a bag and ash.

TEST YOURSELF

1. What do you do first if water still runs from the tap?
Answer: Fill everything you can — bath, pots, buckets, bottles — because the network will soon stop.

2. Why switch off the main fuse when the power fails?
Answer: So that nothing left on catches fire when power returns unexpectedly.

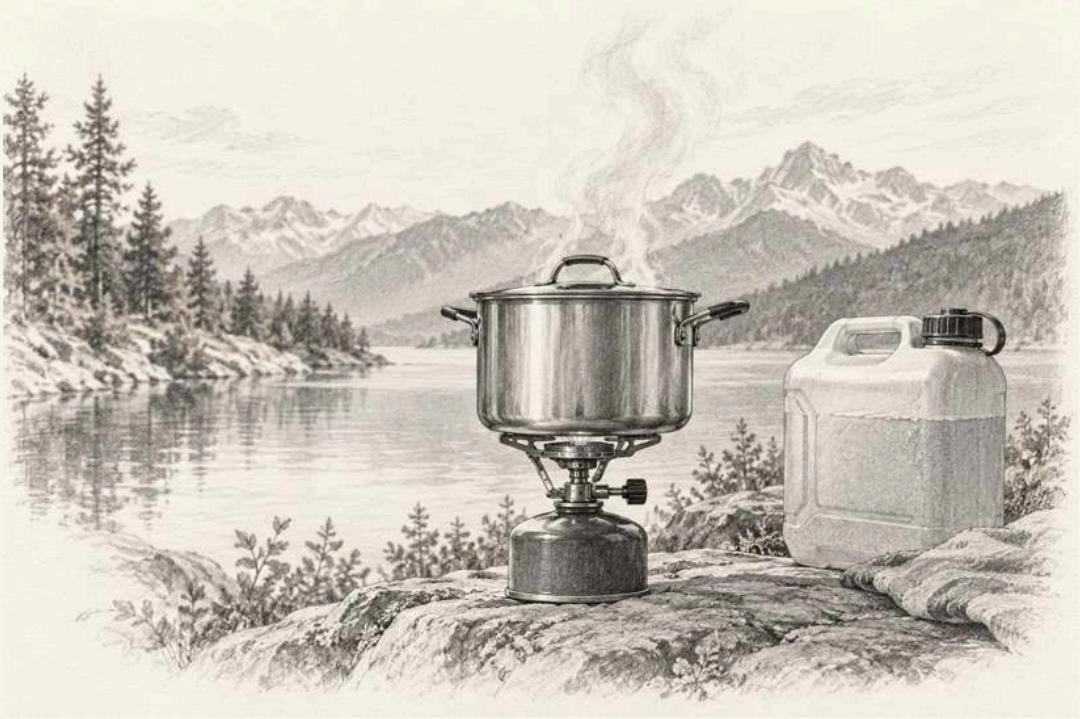
3. How long does a full, closed freezer keep food without power?
***Answer:* About 48 hours; a half-empty one, about 24 hours.**

4. What are the signs of carbon monoxide poisoning?
Answer: Headache, dizziness, nausea, drowsiness, especially in several people at once.

5. Where do you find clean water in the house after the tap stops?
Answer: In the boiler, the toilet cistern (not the bowl) and the pipes, drained from the lowest tap.

CHAPTER 02

Safe Water: Boiling, Filtering, Sun, Chlorine



Clear water is not the same as safe water: first you clear it, then you kill what cannot be seen.

Safe Water: Boiling, Filtering, Sun, Chlorine

Clear water is not the same as safe water: first you clear it, then you kill what cannot be seen.

FOR ANYONE

IN SHORT
Germs in water cannot be seen, so clear water can kill just as well as cloudy water. You work in two steps: first you clear the water (let it settle, strain it, filter it), then you disinfect it — boil it, leave it in the sun in clear plastic bottles, or add chlorine. A rolling boil for one minute is the safest method. No home-made filter and no boiling removes petrol, pesticides or metals from water, so choose your source with care.

The diseases that kill after disasters — cholera, dysentery, typhoid, hepatitis A, childhood diarrhoea — nearly all come from water and dirty hands. They are caused by bacteria, viruses and parasites so small they pass through any cloth. You have three ways
to kill them: **heat** (it ruins their proteins), **the sun's ultraviolet light** (it damages what they breed with) and **chlorine** (it burns them from within). All three work badly in cloudy water: silt particles hide germs from the light and use up the chlorine. That is why clearing always comes first. And one more principle: disinfection does not remove chemicals. If the water smells of oil, has rainbow sheens or comes from near a factory, you do not "fix" it — you find another source.

What to salvage from the ruins for water

• Large metal pots with lids, cauldrons, boilers — for boiling.
• Clear, colourless PET bottles of 1–2 litres, with caps — for sun disinfection.
• Plain laundry bleach ("sodium hypochlorite" on the label), unscented and without detergent; water purification tablets.
• Alum from chemists and shops — it helps cloudy water clear.
• Water filters of any kind: portable, ceramic, cartridges; droppers, needle-free syringes, measuring cups.
• Cans and barrels that have held only food or water, with lids; small plastic taps.

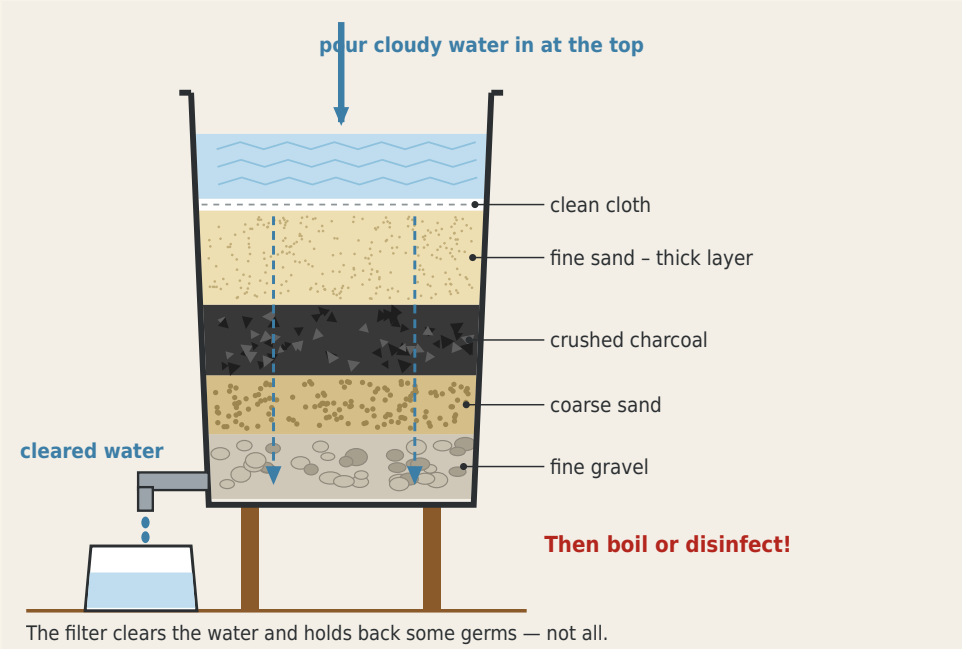
- Gutters, downpipes, corrugated sheet, funnels, hoses, mosquito netting — for collecting rainwater.
- Clean sand, gravel, charcoal, dense cotton cloth — for filters.
- Chlorine test strips or tablets from swimming pools.

First choose the source

The order, from best to worst: tap water collected before the network fails; rainwater from a clean roof; a capped spring that animals cannot reach; a deep, covered well; a river, taken as far upstream of the village as possible; a lake; a pond. Whatever the source, you treat it. The well and spring must be at least 30 metres from any latrine, rubbish pit or stable and, where possible, higher than them. Avoid water near petrol stations, chemical stores, sprayed farms, factories and places where dead animals lie.

Step 1: clearing

1. Let the water stand in a covered bucket or barrel for at least a few hours, ideally overnight. The silt settles to the bottom.
2. If the water stays cloudy, crush some alum and add a little — a pinch on the tip of a teaspoon to a 10–20-litre bucket. Stir quickly for a minute, then slowly for a few minutes, and leave to settle again. The flakes that form carry the silt down with them. If the water tastes sour and astringent, you added too much.
3. Pour the top water slowly into another vessel, without stirring up the silt at the bottom.
4. Strain it through dense cotton cloth folded 4–8 times. In Bangladesh, simply straining through folded sari cloth cut cholera cases by almost half, because it stops the tiny creatures the germ clings to.
5. If you have one, pass the water through a sand filter. Only then disinfect it.



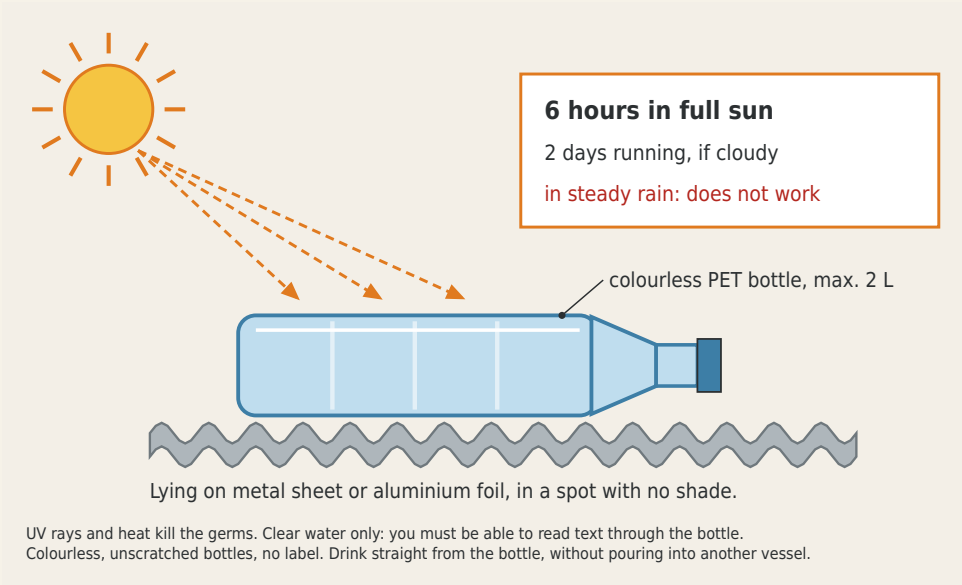
Layered filter: coarse gravel at the bottom, fine gravel, coarse sand, charcoal, fine sand on top. Water goes in at the top and comes out clear at the bottom — but it still needs disinfecting.

A sand filter is made in a bucket or barrel with a tap or a hole at the bottom. From the bottom up: coarse gravel, fine gravel, coarse sand, a layer of crushed and washed charcoal, then a layer of fine sand, as thick as possible. Pour the water over a plate with holes in it, so you do not dig into the sand. The first buckets come out dirty — throw them away. A slow sand filter, always kept wet, with the water a few centimetres above the sand, forms after 2–3 weeks a living film on the surface that eats many germs; it is the filter Europe's cities used in the 19th century. But even the best home-made filter lets some germs through. **The filter clears water; it does not make it safe.**

Step 2: disinfection

Method	How	How long	Watch out
Boiling	rolling boil, big bubbles	1 minute; 3 minutes above 2,000 m	uses wood; cool covered
Sun	clear PET bottles, lying flat	6 hours of sun; 2 days if cloudy	fails in rain or with cloudy water
Chlorine 4–6%	2 drops per litre	30 minutes	cloudy water: 4 drops
Tablets	as on the box	usually 30 minutes	check the date

Boiling is the safest method: it kills everything that matters. A rolling boil means big bubbles rising from the whole pot, not little bubbles at the edge. One minute is enough; in the mountains, above 2,000 metres, where water boils at a lower temperature, boil for 3 minutes. Keep the lid on — it boils faster, with less wood. Let the water cool in the same pot, covered. If it tastes flat, pour it a few times from one clean vessel to another: it takes in air and the taste returns.



Sun disinfection: clear PET bottles, filled with clear water, lying on metal sheet in the sun from morning until afternoon.

The sun costs nothing. Take clear, colourless PET bottles of no more than 2 litres, as unscratched as possible. The clarity test: stand the full bottle upright on a newspaper headline; if you cannot read the large letters looking down through the water, it is too cloudy — clear it first. Fill the bottle three-quarters, shake it for 20 seconds, fill it to the top and close it. Lay it on a metal sheet or a roof, in direct sun, from morning until afternoon: 6 hours when clear, two days running when more than half the sky is overcast. In steady rain the method does not work. Ultraviolet light and heat work together; if the water goes above 50 °C, it works much faster. Drink straight from the bottle so you do not dirty it again.

Chlorination can reduce microbial risk, but it needs the right product and dosing by a known concentration. Do not use a bleach with unsuitable ingredients and do not judge effectiveness by smell alone. Follow the instructions for drinking water and current health guidance; see also the next page. [S8]

For dosing disinfectant, follow current drinking-water instructions and the product’s exact concentration. Do not judge the strength of bleach by smell alone and do not adapt pool granules by eye. Unsuitable products or unknown concentrations are not used to prepare drinking water. [S8]

How to check it worked and how to store water

Do not wait for people to fall ill to check the water. Follow the treatment method suited to the source and the health authority’s guidance; checking parameters and testing, when available, complete the process control. Smell and clarity alone do not prove safety. Several cases of diarrhoea are an alarm signal, not a drinkability test. Store treated water in clean, closed food-grade containers, without putting hands or cups into them. For possible chemical contamination use another source: boiling does not remove all dangerous substances. [S8]

WARNING
Never mix bleach with vinegar, other acids or cleaning products: it gives off fumes that burn the lungs. Do not use for water scented bleaches, toilet gels, pool tablets with stabiliser, or cans that have held diesel, pesticides or chemicals — no washing makes them safe. Boiling, sun and chlorine do not remove lead, nitrates, petrol or pesticides; avoid water with a chemical smell.

TIP
Collect rainwater: gutter, downpipe, a mesh at the inlet and a lidded barrel. Let the first minutes of rain wash the roof and throw that water away. Rainwater is usually cleaner than river water, but you still disinfect it.

FOR ANYONE
Everyone: drink only treated water, and use treated water too for brushing teeth, for vegetables eaten raw and for small children’s food. Boiling with the lid on in the evening gives you cool, safe water in the morning.

FOR THE CRAFTSMAN

The craftsman: build a slow sand filter in a barrel and a rainwater system that diverts the first litres. Keep the filter always wet and never let it dry out; clean only the top layer, carefully, when it runs too slowly.

FOR THE COMMUNITY ORGANISER

The organiser: divide the river into zones — upstream drinking water, midstream washing, downstream animals. Put latrines below the source and far from it. Give one person responsibility for water: daily treatment, cleaning the vessels, the chlorine test. Keep a record of diarrhoea in the community: it is the first sign the water has gone bad.

REMEMBER

First clear, then boiled, sunned or chlorinated — and kept covered.

PRACTISE NOW

- Today, boil a pot of water with the lid on and measure how much wood or gas you need for 5 litres.
- Do the newspaper test with tap water and with pond water, to see the difference.
- Buy a bottle of plain bleach and write on it in marker: “2 drops per litre, 30 minutes”.
- Build a small filter from three cut bottles and watch cloudy water clear.
- Find the nearest spring or well to your home.

I CAN...

☐I know why I clear water before disinfecting it. ☐I know how long to boil water to make it safe. ☐I know how to disinfect water in the sun and when the method fails. ☐I know how many drops of bleach to add per litre and how long to wait. ☐I know that no home-made filter alone makes water safe. ☐I know which water sources to avoid.

TEST YOURSELF

1. Why clear water before chlorine or sun?
Answer: Because silt hides germs from the light and uses up the chlorine.

2. How long do you boil water in the lowlands?
Answer: One minute at a rolling boil; above 2,000 m altitude, 3 minutes.

3. How many hours does a PET bottle of clear water stay in the sun?
Answer: 6 hours when clear; two days running if the sky is mostly overcast.

4. How many drops of 4–6% bleach per litre of clear water?
Answer: 2 drops, then wait 30 minutes; the water should smell faintly of chlorine.

5. What do you do with water that smells of petrol?
Answer: You do not drink it: boiling and chlorine do not remove chemicals. Find another source.