A HANDBOOK FOR SELF-RELIANCE AND SURVIVAL

When the System Fails

Water, food, electricity and warmth when the shops, the grid and the cash machines stop working. Precise instructions, plans and checklists for the Slovenian household.



WATER · FOOD · ENERGY · WARMTH · GARDEN · HEALTH · NATURE · COMMUNITY

When the System Fails

A handbook for self-reliance and survival: water, food, energy, warmth, health, nature and community

First edition, October 2026.

This handbook is a general guide. Electrical installations, gas appliances and work on household wiring should be carried out by a qualified professional. For health problems, consult a doctor or pharmacist. Hunting, setting traps and fishing without a permit are prohibited in normal circumstances. In an emergency, call 112.

Contents

1 Introduction: How to Think in a Crisis 3

2 The First 72 Hours: What to Do 5

3 Water 11

4 Food Stockpiles and Storage 16

5 Food Preservation 19

6 Electricity 26

7 Heat, cooking and light 32

8 Garden and self-sufficiency 39

9 Fishing, Hunting and Traps 43

10 Foraging 62

11 Health and Hygiene 71

12 Security, Communication and Community 77

13 Wilderness Survival 81

14 How People Survived Wars and Sieges 90

15 Checklists 94

16 Appendices: Tables, Conversions, Glossary 97

CHAPTER 1

Introduction: How to Think in a Crisis

A household with water for 14 days, food for 3 months, its own source of electricity and heat, and an agreement with the neighbours will get through almost any crisis without panic. This handbook takes you there step by step, with exact quantities and equipment lists.

Most crises are not the end of the world, but an outage: of electricity, water, shops, payment systems or transport. The most common scenarios in Slovenia are floods, ice storms, earthquakes, a multi-day power grid failure (blackout), a pandemic and economic collapse with inflation. Being prepared for these scenarios also covers the worse ones.



When the power goes out, the most important thing is that the family has light, information and neighbours.

1.1 The Rule of Threes (Priorities)

The human body has clear limits. The Rule of Threes is a rough estimate, but it shows well what has to be sorted out first.

Without	A person survives about	What this means for your preparation
Air	3 minutes	Smoke detector, CO detector, fire extinguisher
Warmth (in the cold)	3 hours	Sleeping bags, backup heat source
Water	3 days	Storage and a way to purify it – first priority
Food	3 weeks	Stockpile, preserving, growing
Hope and community	3 months	Neighbours, routine, skills

So the order of preparation is not food, but: **safety → warmth → water → food → energy → community.** People often buy 50 kg of rice first, yet have no fire extinguisher and not even 3 days of water. That is the wrong order.

1.2 The Four Phases of a Crisis

1. **The first 72 hours** – you live off your stockpile and improvise nothing. Goal: safety, information (radio), water, warmth (see chapter 2).
2. **Up to 2 weeks** – still living off stockpiles, but you start conserving: perishables from the freezer first, rationing water, charging batteries from the sun.
3. **Up to 3 months** – stockpiles are thinning. You bring in rainwater collection, the garden, bartering with neighbours, and preserving everything you can get.
4. **Long term** – self-sufficiency: garden, livestock, seeds, fishing, foraging, a community that shares the work.

1.3 Your Head Is the Most Important Tool

In the first minutes of a crisis, panic does the most damage, not the danger itself. People run to the shop, drive across a flooded road or start a generator in the garage. A habit you rehearse in advance works on its own under stress.

When something happens, use a simple procedure: **STOP – BREATHE – ASSESS – ACT:**

1. **Stop.** For 10 seconds, do nothing. The first impulse is often wrong.
2. **Breathe.** Inhale for 4 seconds, hold for 4 seconds, exhale for 4 seconds. Three times. This lowers your heart rate.

3. **Assess.** What threatens me in the next 10 minutes? Who is injured? What do I know and what don't I know?
4. **Act** in this order: life → health → property.

TIP

Children copy their parents in a crisis. If you speak calmly and give them a task ("you hold the flashlight", "you count the glasses of water"), they calm down faster than they would with reassurance. A sense of usefulness is the best remedy for fear.

1.4 How to Use This Handbook

- Start with chapter 15 (checklists) and build up the basic two-week stockpile – it costs roughly €150–300 per person.
- Then add one module each month: water, electricity, preserving, garden. In a year you have the whole house prepared, and the cost is spread out.
- Practise the skills now, while mistakes cost nothing: home canning, cooking on wood, filtering water, fishing.
- Once a year, do a "weekend without electricity": switch off the main fuse for 24 hours. In one night you will discover more gaps in your preparation than in a year of reading.
- Print this handbook. When there is no electricity, there is no phone either.

WARNING

Legal note: in Slovenia, hunting, setting traps and fishing without a permit are prohibited under normal conditions. Chapter 9 describes techniques for genuine emergencies and the lawful routes (fishing permit, hunting exam) that it makes sense to arrange now.

FROM HISTORY

Until the middle of the 20th century, the Slovenian farmhouse was almost entirely self-sufficient: a bread oven, a well or rainwater cistern, a cellar with potatoes and sauerkraut, a smokehouse above the hearth, hens and a pig. For these people, crisis was something ordinary – a bad harvest, hail, war. They did not regard preparedness as a hobby, but as a way of life. Much of this knowledge still lives on among older neighbours. Ask them while there is still time.

CHAPTER 2

The First 72 Hours: What to Do

In the first 72 hours of a crisis, help often does not arrive, because rescuers are busy elsewhere. Your job in that time is to take care of safety, information, water and warmth from your own supplies – and not to make a mistake that would put you among those who need help.

2.1 The First Hour

The first hour decides everything. Work in order and do not skip steps.

1. **Personal safety.** Are you directly threatened by fire, water, gas or collapse? If so, first move to safety. Only then think about belongings.
2. **First aid.** Check whether anyone is injured. Stop heavy bleeding with pressure. For emergency help call **112** (rescue services, fire brigade); the police are on **113**. You can also send an SMS to 112, which is useful when the network is barely working.
3. **The house.** Smell gas? Do not switch on lights, do not use the phone in the room, open the windows, close the main valve and go outside. Is electricity sparking or water running? Switch off the main fuse and close the main water valve.
4. **Information.** Switch on a battery-powered or hand-crank radio. Radio Slovenija (Program 1) and local stations broadcast announcements from the Administration for Civil Protection and Disaster Relief (URSZR) during emergencies. Do not believe rumours on social media until an official source confirms them.
5. **Family.** Check where all the members are. Send a short SMS to the agreed contact person (see 2.3). Do not call unnecessarily – a congested network is needed by rescuers.
6. **Water.** If there is any chance the water will run out, immediately fill the bathtub, pots and canisters. In 2 hours it may be too late.
7. **Decision.** Do I stay at home (shelter in place) or leave (evacuate)? In most crises, home is the safest place. Leave if civil protection orders it or if the house is no longer safe (see 2.4).

Sirens and Alerts

In Slovenia, sirens are tested **on the first Saturday of every month at 12:00**. If a siren sounds at any other time, it is not a test. The signal for **immediate danger** is a wailing tone (a sound that rises and falls) lasting 1 minute. When you hear it, go straight into an enclosed space or shelter, close the windows and doors, and switch on the radio for instructions.

The official system also has signals for a danger warning, the end of danger, and fire. **Learn all the alert signals on the URSZR website** and print them out to keep with this handbook. General rule: whenever a siren sounds outside of a test, switch on the radio.

2.2 Action Cards by Scenario

Each card has the same structure: what you do immediately, what you do in the first 72 hours, and which mistakes are the most common. Print them and hang them on the inside of the pantry door.

Multi-Day Power Outage (Blackout)

- [ ] **Immediately:** check whether the outage is only at your place (fuses) or on the whole street. Switch off sensitive appliances (computer, TV) so a surge does not damage them when power returns. Leave one bulb on so you know when electricity comes back.
- [ ] **Fridge and freezer:** do not open them. A closed fridge keeps food safe for about 4 hours, a full freezer for 24–48 hours. In winter, put perishable food on the balcony in a closed box.
- [ ] **Water:** on the upper floors of apartment blocks the water can run out within hours, because the pressure pumps stop working. Immediately fill the bathtub and containers.
- [ ] **Phone:** turn on battery saver mode, reduce brightness, switch off data when you don't need it. Base stations have backup power for only a few hours. An SMS gets through more often than a call.
- [ ] **Warmth:** everyone into one room that you can heat (see chapter 7). Seal the windows with blankets.
- [ ] **Money:** ATMs and card terminals do not work. Use cash from your stockpile.
- [ ] **Electricity from your own source:** a photovoltaic system without a battery system capable of off-grid operation shuts down when the grid fails (see chapter 6).

> **WARNING**
>
> In every power outage, more people die from carbon monoxide and fires than from cold. **Never use** a generator, gas grill, charcoal grill or outdoor gas heater **indoors**, in a garage or on an enclosed balcony. Place the generator at least 5 m from windows. Put candles in a jar on a non-combustible surface and never leave them unattended.

Flood

- [ ] **On warning:** carry valuables, documents and medication to an upper floor. Move the car to higher ground. Fill containers with drinking water – the water supply may become contaminated.
- [ ] **When water is entering:** switch off the electricity at the main fuse, but only if you are standing on dry ground. Shut off the gas. Go to an upper floor or the attic and take a radio, flashlight, water, phone and something you can signal with (a red cloth, a whistle).
- [ ] **Do not walk or drive through moving water.** 15 cm of fast water can knock down an adult, 30–60 cm will carry away a car. There may be open manholes under the water.
- [ ] **After the flood:** drink tap water only once the water utility says it is safe – until then, boil it. Throw away all food that has come into contact with floodwater, including cans with rusted edges. Photograph the damage for the insurance company before you start cleaning.
- [ ] Wear rubber gloves and boots when cleaning. Floodwater contains sewage, fuel and chemicals.

FROM HISTORY

In August 2023, Slovenia was hit by the worst floods in decades. In a few hours the water cut off entire valleys, in places for days without electricity, water or road connections. What helped most then were neighbours and volunteer firefighters – before organised help arrived. Families with a stock of water and food were able to stay at home and help others.

Earthquake

- [ ] **During the shaking: DROP – COVER – HOLD ON.** Crouch under a sturdy table, protect your head and neck with your arm, and hold on to a table leg. No table? Crouch against an interior wall, away from windows and cabinets.
- [ ] Do not run outside during the shaking. Most injuries are caused by falling bricks, roof tiles and glass right next to the house.
- [ ] Do not use the lift.
- [ ] **After the shaking:** put on shoes (glass). Check for injured people. Smell gas – close the valve and open the windows. Check for cracks in load-bearing walls and the chimney. If there are large cracks, leave the building.
- [ ] Expect aftershocks. The first night after a strong earthquake, rather sleep in the car or a tent than in a damaged house.
- [ ] Use the phone for SMS, not for calls.

TIP

Prepare now: fasten tall cabinets and shelves to the wall with brackets (€2–5 per cabinet), put heavy items on the lower shelves, and do not hang framed glass pictures above the bed. Keep shoes and a flashlight in a bag tied to the bed leg next to your bed.

Ice Storm and Severe Winter

- [ ] Do not go into the forest or under trees. Branches laden with ice fall without warning.
- [ ] Do not touch broken or sagging power lines and do not come closer than 10 m to them. Call 112.
- [ ] Prepare for a multi-day power outage (see the card above) and for closed roads.
- [ ] Heat one room. Huddle together, sleep dressed in several thin layers and in a sleeping bag.
- [ ] Watch for signs of hypothermia: uncontrollable shivering, confusion, slurred speech. Warm the person gradually, give them a warm sweet drink, not alcohol.
- [ ] Before winter, have at least 1 m^3 of dry firewood or a 2-week fuel supply at home, salt or sand for gritting, and a shovel.

FROM HISTORY

In February 2014, an ice storm hit a large part of Slovenia. The ice broke an enormous number of trees and brought down power lines; many households were without electricity for days, in places for more than a week. The houses that coped best were those with a wood-burning stove, their own well and a generator.

Fire Nearby (Wildfire or Residential Area)

- [ ] Follow the radio and the firefighters' instructions. If they say "evacuate", leave immediately – do not wait until you see the flames.
- [ ] Park the car facing the exit, with a full tank and the windows closed.
- [ ] Clear dry branches, firewood and combustible objects from a strip at least 10 m wide around the house. Close all windows, shutters and doors so sparks cannot get in.
- [ ] In the garden, prepare a hose, buckets of water and wet cloths.
- [ ] Smoke kills before fire does. In dense smoke, retreat into a room, close the windows, and switch off ventilation. If you have to go outside, breathe through a wet cloth and keep low.

FROM HISTORY

In July 2022, the largest fire in the history of independent Slovenia burned in the Karst. It scorched several thousand hectares, threatened villages and forced evacuations. The most at risk were houses with dry shrubs and pine trees growing next to them.

Accident at the Krško Nuclear Power Plant

In a nuclear accident, the main danger is a radioactive cloud carried by the wind. Protection is simple: **stay inside, away from exterior walls, and wait for instructions.**

1. **Shelter.** Go into the house immediately. Close all windows and doors, switch off ventilation, air conditioning and the cooker hood. The best place is a basement or an interior room without windows. A concrete building protects better than a wooden one.
2. **Seal the room.** Tape over the gaps around windows and doors with wide adhesive tape and PVC sheeting (at least 0.1 mm thick). Push a wet towel under the door. Stockpile: 1 roll of sheeting 2 × 10 m and 2 rolls of tape (about €15 in total).
3. **If you were outside:** at the entrance, take off your clothes and put them in a bag that you tie shut. Shower with warm water and soap, wash your hair with shampoo without conditioner.
4. **Food and water:** use only sealed food and water from your stockpile. Do not eat vegetables from the garden and do not drink rainwater until the authorities announce that it is safe. Shut livestock in the barn and feed them covered fodder.
5. **Potassium iodide** protects the thyroid from radioactive iodine, not from other substances. Take the tablets **only when civil protection orders it**, in the dose they specify. Taking them too early or unnecessarily does not help and can do harm. Residents in the vicinity of the plant received tablets in advance – keep them in a known place.
6. **Evacuation** only on explicit instruction. Driving through the cloud is more dangerous than sheltering in a building.

Chemical Accident (Industry, Tanker, Warehouse)

- [ ] When you see a cloud or smell a sharp, unusual odour, move away at right angles to the wind direction, not downwind.
- [ ] Inside a building, close the windows, switch off ventilation and seal the room as in a nuclear accident.
- [ ] **Go to an upper floor**, not the basement. Most toxic gases are heavier than air and collect near the ground. This is exactly the opposite of a nuclear accident.
- [ ] Breathe through a wet cloth. If the substance gets on your skin or in your eyes, rinse with clean water for at least 15 minutes.
- [ ] Do not go to look at what happened.

Pandemic

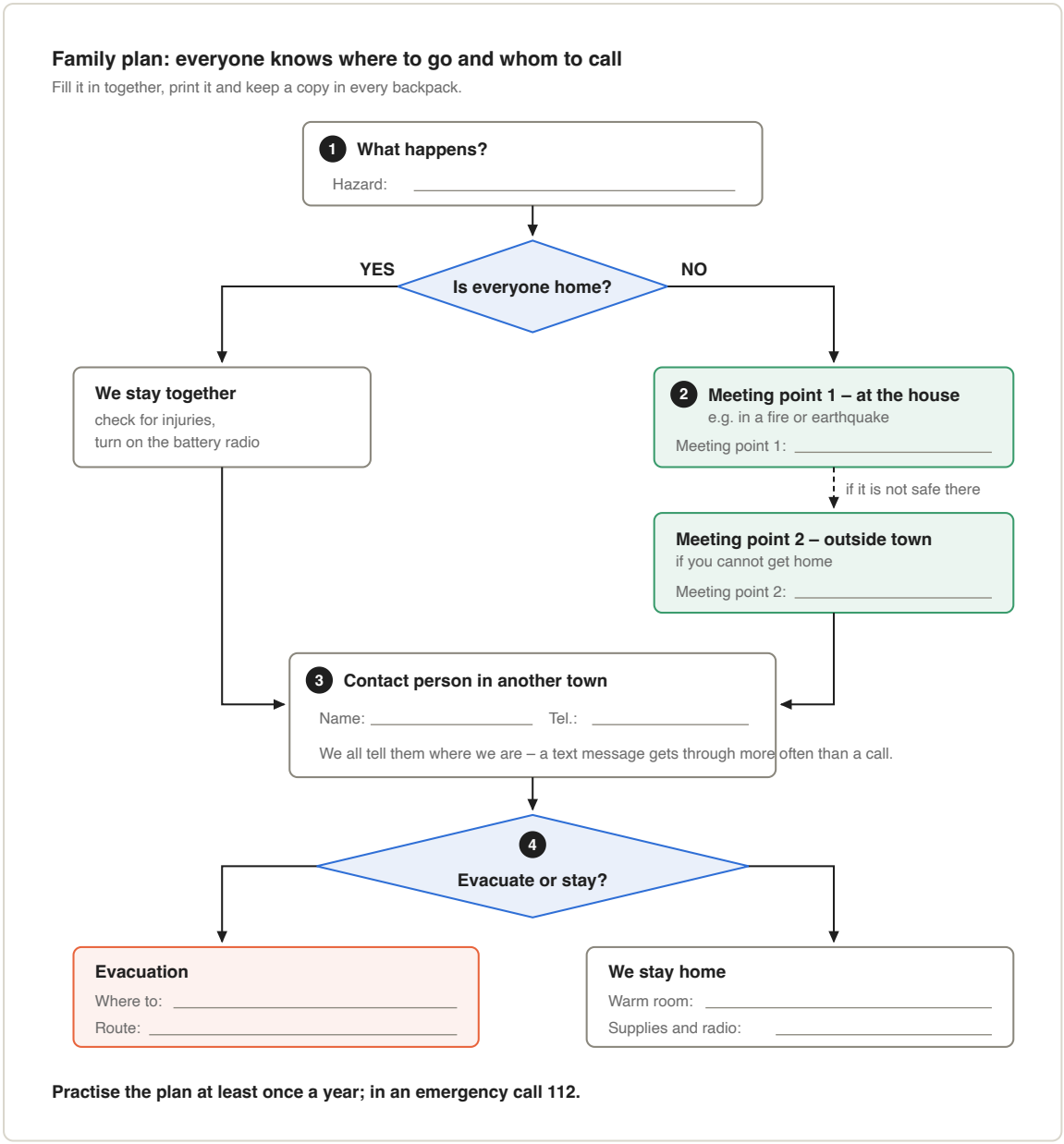
- [ ] A 2-week stockpile with no shopping (chapter 15): food, water, and medication you take regularly, for at least 1 month.
- [ ] FFP2 protective masks (at least 20 per person), hand sanitiser with at least 60% alcohol, a thermometer, gloves.
- [ ] Designate one room in the home for a sick family member, with their own towel and dishes.
- [ ] Follow the guidance of the National Institute of Public Health (NIJZ), not social media.
- [ ] Agree with a neighbour on who brings the other their shopping if one of you falls ill.

Financial Collapse (Banks, ATMs, Inflation)

- [ ] Keep cash at home for at least 2 weeks of basic expenses, in small notes (€5, 10, 20) and coins. In a crisis it is hard to pay for bread with a €100 note.
- [ ] At the first signs (closed banks, withdrawal limits), do not stand in a queue at the ATM for hours. If you have cash at home, you don't have to.
- [ ] A food stockpile is the best protection against inflation: rice bought today is worth more tomorrow.
- [ ] Useful trade goods: coffee, sugar, salt, alcohol, batteries, lighters, seeds, over-the-counter medicines. More than goods, knowledge counts: repairs, sewing, gardening.
- [ ] Keep the cash in two separate places in the house.

2.3 Family Emergency Plan

A crisis rarely comes when the whole family is together. The plan answers the question: **what does each person do if we cannot reach one another?** Write it on a single A4 sheet, print several copies, and give one to each member for their bag or school bag.



Plan. Family action plan: fill it in and hang it on the fridge.

1. **Meeting points.** Set three: (1) in front of the house – for fire or gas, e.g. at the neighbour's fence; (2) in the neighbourhood – if you cannot get to the house, e.g. the church, school or fire station; (3) outside the town – relatives or friends 20–50 km away, where you go in an evacuation.

2. **Contact person.** Choose a relative in another town or even abroad. In a local crisis, long-distance connections are often better than local ones. Every member tells that person where they are and how they are. Everyone should know the phone number by heart – children too.

3. **Roles.** Who picks up the children from school and kindergarten (and who does it if the first person cannot)? Who looks after an elderly neighbour or grandmother? Who takes the backpacks, documents and pets? Who shuts off the gas, water and electricity?

4. **Important details:** the numbers 112 and 113, phone numbers of all members, the doctor, school, kindergarten, workplace and insurance company; a list of medications and allergies; blood types.

5. **Drill.** Twice a year (e.g. when the clocks change), read through the plan together and test one point in practice: where you shut off the main gas valve, how long it takes you to leave the house with the backpacks.

TIP

For children, stick a slip of paper with two phone numbers and the address of the meeting point on the back of their school ID or in their bag. With kindergarten-age children, practise it as a game: "Where do we meet if there's a fire?"

2.4 Evacuation: When to Leave, What to Take, Where to Go

When

- Immediately when civil protection, the police or the fire brigade order an evacuation. Do not negotiate.
- On your own if: the water is rising and the house has no upper floor; fire or smoke is approaching; the building has large cracks after an earthquake; there is no heating at an outside temperature below −10 °C and the house has infants, sick or elderly people.
- Better an hour too early than a minute too late. Roads clog quickly.

What to Take

Every member has a 72-hour evacuation backpack ready. The full list is in chapter 15. The most important items:



Contents of a 72-hour evacuation backpack: water, food, warmth, light, first aid, documents.

- [ ] Personal documents and copies (ID card, passport, health insurance card, insurance policies) in a waterproof bag; copies also on a USB stick.
- [ ] Medication for at least 7 days and prescriptions.
- [ ] Water, 2 l per person, and food for 3 days that does not need cooking.
- [ ] Cash in small notes, a charger and power bank, radio, flashlight, whistle.
- [ ] Warm clothing, a rain poncho, a sleeping bag, spare socks.
- [ ] Food, a leash and a carrier for pets.

Before You Leave

1. Shut off the gas and water, switch off the electricity (unless the freezer is protecting a lot of food and there is no flood).
2. Lock the house.
3. Stick a note on the door or window: when you left, how many of you there are and where you are going. It saves rescuers from searching the house.
4. Notify your contact person.

Where to Go

The first choice is relatives or friends outside the danger zone (meeting point 3). If that is not possible, go to the reception centre designated by the municipality or civil protection; locations are announced on the radio. Take the route set by the authorities, even if it is longer – shortcuts may be closed or dangerous.

CHAPTER 3

Water

Count on **4 litres per person per day** (2 l for drinking, 1 l for cooking, 1 l for hygiene) and keep a supply at home for at least 14 days: for a family of 4 that is 224 litres. Pets: 50 ml per kg of body weight per day.

In summer, during heavy work, and during pregnancy and breastfeeding, count on 5–6 litres. A 30 kg dog needs 1.5 l a day, a 4 kg cat 0.2 l.

3.1 Drinking Water Storage



Water stored in the cellar: 20-litre jerrycans for food-grade water and plastic bottles, in the dark and cool.

- **Store-bought bottled water** – the simplest option. Shelf life is 1–2 years, longer in the dark and cool. Rotate: use the oldest, add the new. A pack of 6 × 1.5 l costs €2–4.
- **Your own jerrycans** – 20-litre food-grade HDPE jerrycans (food-safe marking, blue, €10–15 each). Fill with tap water. Tap water is already chlorinated and keeps for 6 months, then replace it.
- Store the jerrycans on the floor in the dark, away from fuels and chemicals – plastic absorbs odours.
- **Hidden reserves in the house:** the water heater (80–200 l, drain at the bottom – in an outage, first close the inlet so that dirty water does not flow in), toilet cisterns (for hygiene only), the pipes in the flat (open the highest tap to let air in, draw water at the lowest).
- **When a crisis is forecast,** fill the bathtub, all pots and bags. There are bathtub liner bags (e.g. WaterBOB, about 100 l) that keep the water clean.

Filling Jerrycans Step by Step

1. Rinse a new jerrycan with water and a drop of detergent, then three times with clean water.
2. Sanitise it: 1 teaspoon of unscented household bleach per litre of water, shake, leave for 30 seconds, empty.
3. Fill to the brim, with no air. Air encourages algae growth.
4. Write the filling date and the replacement date (+6 months) on the jerrycan.

WARNING

Do not use milk or juice bottles for long-term water storage – residues of protein and sugar in the plastic feed bacteria. Do not use containers that once held a chemical, even if they have been washed thoroughly. Water from the water heater is suitable for drinking only if you boil it: limescale and sediment collect at the bottom.

TIP

Fill empty plastic bottles to 90% and arrange them in the empty spaces in the freezer. The freezer runs more efficiently, and in a power outage these blocks of ice extend cooling by several hours – and when they melt, you have drinking water.

3.2 Rainwater Harvesting

In Slovenia, 1,000–1,600 mm of rain falls on a roof per year, even more in the Soča Valley. The formula: **roof area (m²) × mm of rain × 0.8 = litres.** 100 m² of roof in a 10 mm downpour yields about 800 litres, and over a year 80,000–130,000 litres.

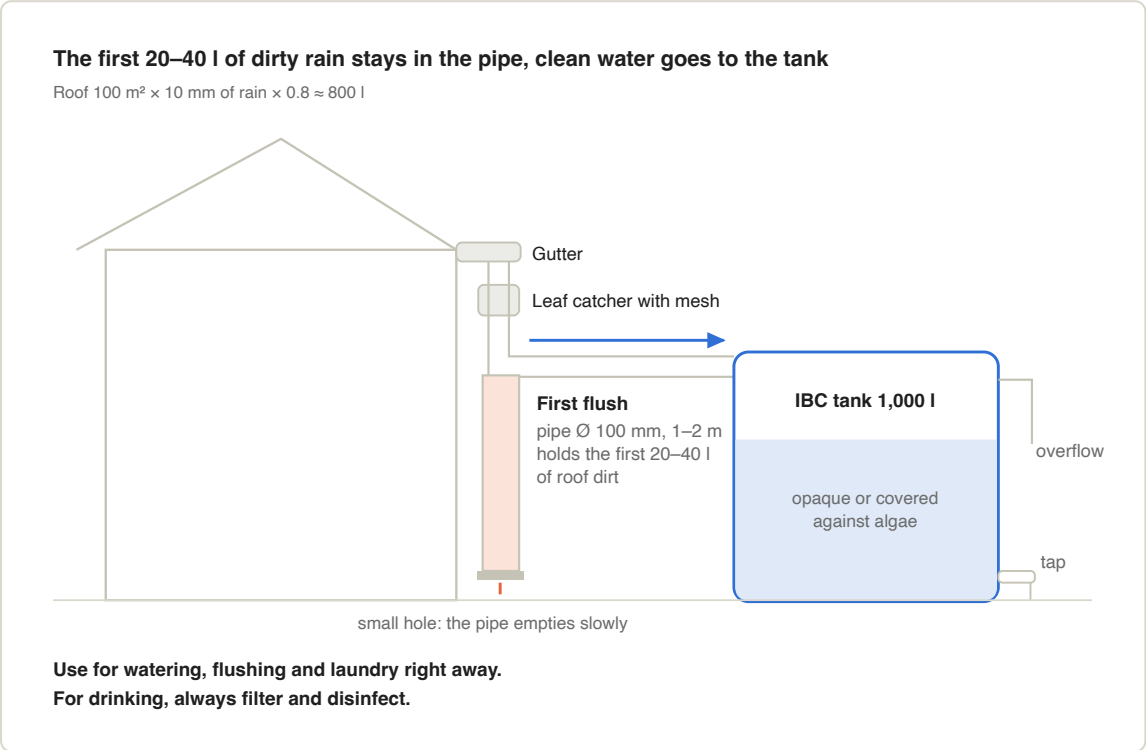


IBC tank with a leaf catcher and a first-flush pipe next to the downpipe.

YOU NEED

- A 1,000 l IBC tank (used, previously food-grade, €50–100) or a 200 l barrel (€15–30)
- A gutter downpipe filter (a mesh filter, €20–40)
- PVC pipe Ø 100 mm, 1–2 m long, with a cap and an elbow (€15–25) for the first flush
- A pallet or concrete blocks for a stand (30–50 cm high gives pressure for the tap)
- An opaque tarp or paint, if the tank is transparent

First flush diverter: a vertical PVC pipe Ø 100 mm, 1–2 m long, with a sealed bottom and a small hole (Ø 2–3 mm) for slow draining. The first 20–40 litres of rain, carrying the dirt from the roof, go into this pipe; the clean remainder flows into the tank. Rule: 1 litre of first flush for every m² of roof feeding the tank. A Ø 100 mm pipe holds about 8 l per metre.



Plan. Rainwater harvesting with a first flush.

Once the first-flush pipe fills up, the water flows past it into the tank; the small hole at the bottom empties it before the next rain.

- Use an opaque tank or cover it – light causes algae.
- Fit a mosquito mesh over the overflow. An open barrel is a mosquito nursery in summer and a danger to children – always cover it.
- In winter, empty the tank to half or insulate it; ice can burst an IBC tank.
- Clean leaves out of the gutters every spring and autumn.

Rainwater is excellent for watering, washing and toilet flushing. **For drinking, always filter and disinfect it.**

WARNING

Roofs made of asbestos-cement (Eternit) sheets and copper gutters: do not drink such water. Be careful too with roofs with bituminous shingles and old paints, which may contain lead. After a long dry spell, always let the first water go into the first flush pipe or discard it.

FROM HISTORY

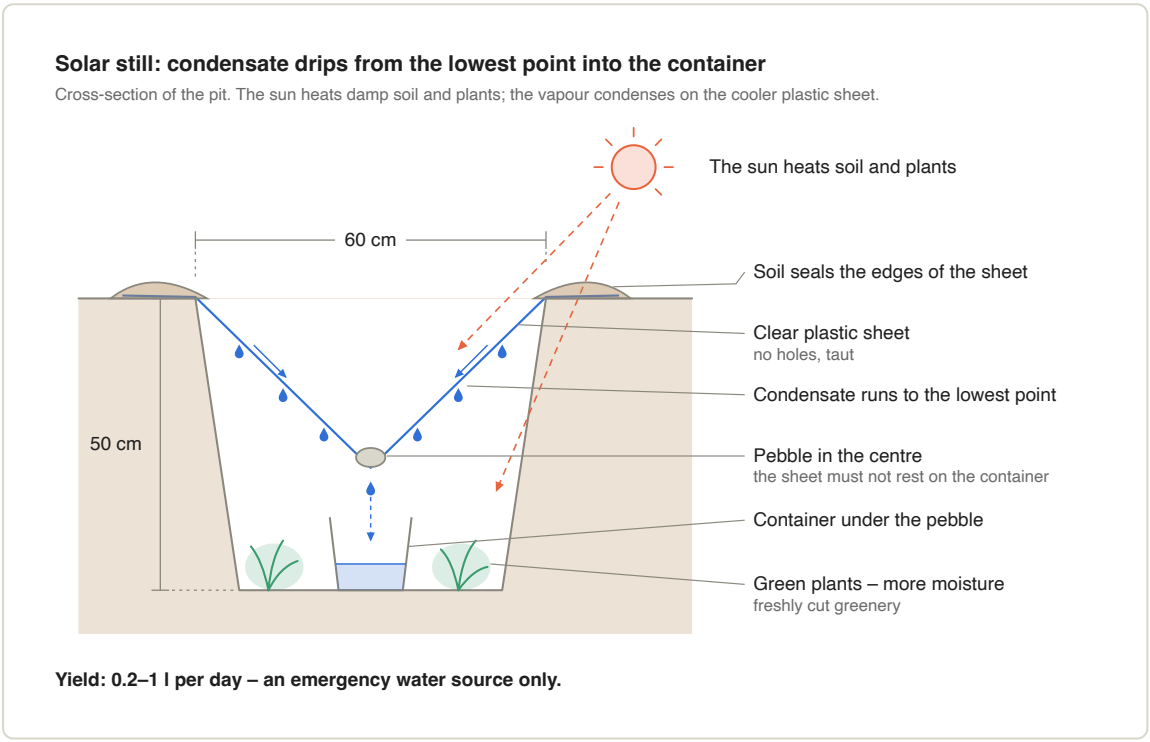
On the Karst, where there is no surface water, people lived for centuries from kapnica – masonry underground cisterns into which rainwater ran from the roof. Village wells were common property, and water was shared by strict rules. Fish or ducklings were often kept at the well, to eat mosquito larvae. Many of these cisterns are still usable today.

3.3 Natural Sources

The best are captured springs, then streams near their source, then rivers. The rules:

- Collect water upstream of settlements, farmland and roads.
- Running water is better than standing; clear is better than cloudy.
- In floods, all surface water is contaminated with sewage and chemicals – drink only from your stockpile.
- Mark all springs within a 5 km radius on a map in advance (many are on public maps and OpenStreetMap, tagged “spring”). Visit them in summer in a drought: a spring that dries up in August is not a reliable source.
- Even spring water that looks clean should be disinfected before drinking. There may be pastures or a dead animal above the spring.

Condensation from the ground (solar still): dig a hole 60 cm wide and 50 cm deep, place a pot at the bottom, green plants around it, cover with clear plastic sheeting, and put a small stone in the middle of the sheet above the pot. Bury the edges of the sheet with soil so the vapour does not escape. It yields 0.2–1 l a day – as an emergency measure, not a source. The same principle works with a bag that you tie around a leafy branch in the sun.



Plan. Solar still in a pit.

3.4 Water Purification – Methods

Always in two steps: first **remove turbidity** (filtering), then **kill microbes** (boiling, chemistry or UV). Turbidity shields microbes from chlorine and UV, so the first step is not optional.

1. **Settling:** let the water stand for 12–24 hours, then carefully pour off the top part.
2. **Pre-filter:** pour through a cotton cloth or a coffee filter.
3. **Disinfection – choose one:**
   - **Boiling:** 1 minute of a rolling boil (3 minutes above 2,000 m). The most reliable. It does not remove chemicals. For 10 l of water you use about 1 kWh or 1–2 kg of dry firewood – so cook with the lid on.
   - **Unscented household bleach (sodium hypochlorite):** at 5% concentration, 2 drops per litre of clear water, 4 drops per litre of cloudy water. Wait 30 minutes – the water should smell faintly of chlorine. If not, repeat and wait another 15 minutes. For a 20 l jerrycan: 1/2 teaspoon (2.5 ml). Read the label: at 2.5% bleach, double the dose.
   - **Chlorine dioxide tablets** (e.g. Micropur Forte, Katadyn): they also kill parasites (Cryptosporidium) that chlorine cannot reach. Read the contact time on the instructions, usually 30 minutes to 4 hours.
   - **SODIS (solar disinfection):** pour clear water into a transparent PET bottle of up to 2 l, lay it on a metal sheet or a roof in the sun for 6 hours (2 days in cloudy weather). UV kills most bacteria and viruses.



Solar disinfection (SODIS): clear plastic bottles in the sun for 6 hours.

TIP

A test for SODIS: place the bottle on a newspaper. If you can read the headline through the water, the water is clear enough. The bottles must not be scratched or tinted. You can remove the chlorine taste by pouring the water back and forth between containers a few times or leaving it open for 1 hour.

WARNING

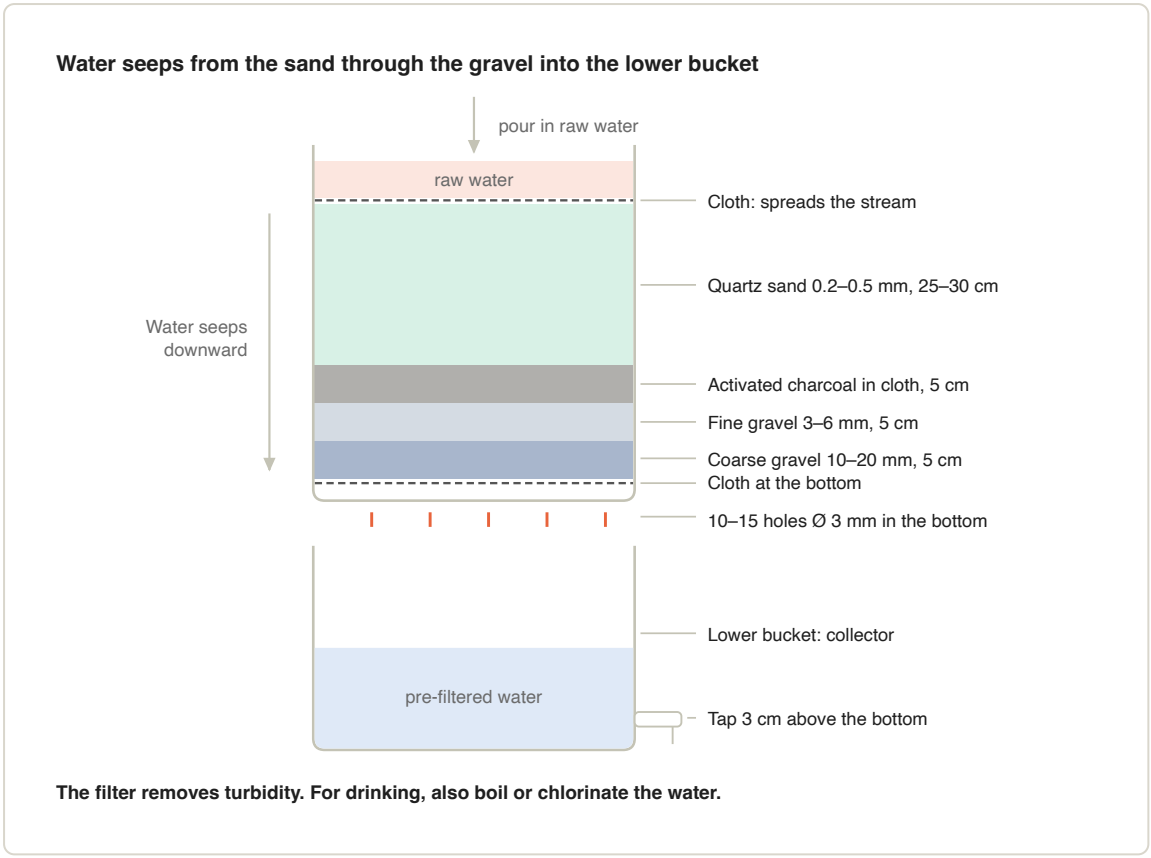
Scented bleach, "gel" bleach or products with additives (detergent, thickeners) are not for water. None of these methods removes heavy metals, fuel or pesticides. Do not drink water that smells of petrol or chemicals, even if you have boiled it.

3.5 Homemade Bucket Filter (Biosand Filter)

It removes turbidity, taste and some of the microbes. For drinking, still disinfect the water after the filter.

YOU NEED

- 2 food-grade 20 l buckets with lids (2 × €5)
- A barrel tap (€5–8) and a Ø 3 mm drill bit
- Washed quartz sand 0.2–0.5 mm, 15 l (€5–10)
- Fine gravel 3–6 mm, 3 l, and coarse gravel 10–20 mm, 3 l
- Activated carbon for aquariums, 1 kg (€10–15)
- A cotton cloth



Plan. Cross-section of a two-bucket filter.

1. Drill 10–15 holes of Ø 3 mm in the bottom of the upper bucket.
2. Put the cloth on the bottom, then in this order: 5 cm of coarse gravel, 5 cm of fine gravel, 5 cm of activated carbon wrapped in cloth, 25–30 cm of sand, and a cloth on top as a diffuser so the stream does not dig up the sand.
3. The lower bucket is the collection tank, with a tap 3 cm from the bottom.
4. Rinse the sand and gravel before use until the water runs clear (it can take 30–50 l of water).
5. Discard the first 20 l of filtered water.
6. When the flow drops sharply, scrape off the top 1 cm of sand. Replace the carbon every 2–3 months.



Homemade two-bucket filter: sand, gravel and charcoal remove turbidity.

The thickest layer is the sand: within a few weeks a biological layer develops in it that traps the most impurities. So use the filter regularly, every day, and do not leave it dry – the biological layer dies. The flow rate is about 10–20 l per hour.

A better option to buy: a gravity filter with ceramic (e.g. Berkey, Doulton, Katadyn Gravity) or a Sawyer Squeeze / LifeStraw hand filter (€30–50, up to 100,000 l). A filter with 0.1 micron pores stops bacteria and parasites, but not viruses – so still add chlorine if the source is near a settlement.

> **WARNING**
>
> Ceramic and membrane filters must not freeze. Ice cracks the membrane, and the filter appears to keep working while letting bacteria through. In winter, keep them indoors or in your pocket.

CHAPTER 4

Food Stockpiles and Storage

An adult needs about **2,000–2,500 kcal per day**. A 3-month supply for one person is about 60 kg of dry food, which takes up less than one kitchen cabinet unit. The golden rule: **store what you already eat, and eat what you store.**

Children up to 10 years need about 60% of the adult amount, teenagers the same as or more than adults. For heavy physical work and in the cold, count on 3,000 kcal and more.

4.1 Basic Stockpile for 1 Adult for 3 Months

Food	Quantity	Shelf life (stored correctly)	Note
Rice (white)	12 kg	10–30 years	Brown rice lasts only 6–12 months (oil)
Pasta	6 kg	2–5 years, 20+ in Mylar	
Rolled oats	5 kg	2 years, 20+ in Mylar	Breakfast with no cooking
Wheat berries or flour	8 kg	Grain 20+ years, flour 1 year	Grain + hand mill = fresh flour
Beans, lentils, chickpeas (dried)	6 kg	10+ years	Protein; soak for 12 hours
Cans (meat, fish, beans)	30 pieces	2–5 years	Tuna, sardines, pâté, goulash
Oil and fat	4 l	1–2 years	Calories: 1 l = 8,000 kcal
Sugar and honey	3 kg	Honey indefinitely	Honey also for wounds
Salt	2 kg	Indefinitely	Plus 5 kg for preserving
Powdered milk	2 kg	1–2 years	Whole-fat spoils faster
Peanut butter	2 kg	1–2 years	Calories and protein
Vegetables in jars and cans	20 pieces	2+ years	
Coffee, tea, spices, baking soda, yeast	as needed	Yeast in the freezer 2 years	Morale and flavour matter
Multivitamins	90 tablets	2 years	Prevents C and D deficiency

This stockpile provides about 2,200 kcal per day. The approximate cost for 3 months is €250–350, depending on the choice of canned goods. Do not buy it all at once: each week when you shop, add €10–15 worth of long-life food.

WARNING

A common mistake is a stockpile that cannot be prepared without electricity. 12 kg of rice and 6 kg of beans need water and a lot of energy to cook. So also have a cooker (see chapter 7) and a part of the stockpile that needs no cooking: cans, oats, peanut butter, rusks. After soaking, always boil beans hard for at least 10 minutes – raw or undercooked beans are poisonous.

4.2 Long-Term Packaging (20+ Years)

The enemies of food are **oxygen, moisture, light, heat and pests.** The Mylar + oxygen absorber method eliminates them all.

YOU NEED

- Mylar bags (aluminised, 5 mil, 3–20 l), a set of 20 bags €20–40
- Oxygen absorbers (300–2,000 cc), 50 pieces €15–25
- An iron or a heat sealer
- 20 l food-grade buckets with a gasket (€5–10 each)
- A marker, a jar with a sealed lid for unused absorbers



Sealing a Mylar bag with an iron; the oxygen absorber goes in last.

1. Pour dry food into the bag (moisture below 10%: rice, wheat, beans, pasta, rolled oats, sugar). Not for brown rice, nuts or high-fat flour.
2. Shake the bag to settle the contents, leaving 5 cm of space at the top.
3. Add the absorber LAST, right before sealing (in air it is used up in 15–30 minutes). Amount: 300 cc for a 4 l bag, 2,000 cc for a 20 l bag.
4. Press out the air and seal with the iron on its highest setting (no steam) across the edge, on a board or ruler. Seal twice, 1 cm apart.
5. After 24 hours the bag should be shrunken and hard like a vacuum-packed brick.
6. Label the contents and date, and place the bag in a bucket (protection against mice).

TIP

Do not pack everything in big 20 l bags. An opened bag is exposed again to air and insects after a few weeks. It is better to have 4–5 bags of 4 l in one bucket – each is a supply for a week or two. Do not pack sugar and salt with an absorber: they set like stone. A sealed container is enough.

Without Mylar: **PET bottles** (from juice, not milk) are excellent for rice, sugar and beans. Add a small absorber and screw on the cap.

Against weevils without chemicals: before packing, freeze the grain for 72 hours at –18 °C. Then leave it in a closed bag for 24 hours to warm up to room temperature, otherwise condensation collects on it.

4.3 Storage and Rotation



A tidy pantry: oldest food at the front, buckets and Mylar bags at the bottom.

- Ideal: 10–15 °C, dark, dry. Every 5 °C lower doubles the shelf life.
- A cellar, pantry or cupboard on a north wall. Not the attic, and not the garage in summer.
- Shelves should be 10 cm off the floor and away from the outside wall – this keeps moisture from creeping in and makes it harder for mice to get at it.
- **FIFO:** new at the back, old at the front. Stick a list with dates on the cupboard door.
- Once a month, check the stockpile: discard bulging or rusty cans, and use up whatever expires within 3 months.
- Freezer food is first in line in an outage: a closed freezer lasts 24–48 hours. Whatever has thawed, either cook it or preserve it (chapter 5).

FROM HISTORY

In the Slovenian countryside, the pantry was often in a “kašča” – a separate wooden or masonry building next to the house, where grain, flour, dried meat and beans were kept in chests. The kašča stood on stone pillars to keep out damp and mice. The grain supply had to last until the new harvest, and there was often a reserve for a bad year as well.

4.4 Creative Tricks

- **Everlasting flour:** wheat berries + a hand grain mill (€60–200). Wheat berries last 30 years, and from them you get flour, sprouts and a coffee substitute (roasted wheat).
- **Sprouts:** 1 kg of mung bean, alfalfa or lentil seeds yields 6–8 kg of fresh vegetables with vitamin C, with no soil and no sun (chapter 8).
- **A calorie bomb in your pocket:** pemmican – dried meat powder mixed 1:1 with rendered tallow. It keeps for months without a fridge.
- **Bread without yeast:** make a sourdough starter from flour and water – 7 days of feeding, then it lives forever if you keep feeding it.
- **Rusks and twice-baked bread:** cut stale bread into 1 cm slices and dry in the oven at 100 °C for 1–2 hours.

In a closed container it keeps for several months.

- **Cooking with little energy:** bring rice or beans to a boil for 5 minutes, then wrap the pot in a blanket or put it in a hay box (retained-heat cooker) (chapter 7). It finishes cooking on its own in 1–3 hours and saves up to 70% of the fuel.

CHAPTER 5

Food Preservation

The choice of method depends on the **acidity** of the food: acidic foods (pH below 4.6 – fruit, pickles, tomatoes with lemon) are safe in a water bath at 100 °C, while low-acid foods (meat, beans, mushrooms, carrots, potatoes) need **116–121 °C in a pressure cooker (autoclave)** because of botulism.

WARNING

Botulinum toxin has neither smell nor taste, and even a small amount can be fatal. The spores survive boiling at 100 °C and in a sealed jar without oxygen they produce the poison. So **never** can low-acid foods (meat, beans, mushrooms, carrots, potatoes, soups) in a water bath or in the oven. Always add acid to tomatoes: 1 tablespoon of lemon juice or 1/4 teaspoon of citric acid per 0.5 l.

5.1 Home Canning in Jars – Water Bath (Fruit, Compotes, Jams, Pickled Vegetables)

YOU NEED

- A large pot (15–20 l) with a rack on the bottom or a folded cloth
- Jars with new lids (twist-off), 12 jars of 0.7 l about €10–15
- A wide-mouth funnel, a jar lifter (€10 together)
- A thermometer, clean cloths, a ladle



Water-bath canning: jars must be 3 cm below the water surface.

1. Wash the jars and lids and warm them (in the oven for 10 min at 120 °C or in hot water).
2. Fill hot, leaving 1–2 cm of space below the rim. Wipe the rim dry.
3. Close the lids, place the jars in the pot, with the water reaching 3 cm above the lids.
4. Time counts from the moment the water boils: jams 10 min, compotes 20–25 min, pickled vegetables 15–20 min (for 1 l jars).
5. Take the jars out and leave for 24 hours. The lid must curve inward (it clicks). If it can be pressed down in the middle, the jar is not sealed – eat it within 3 days or process it again.

Pickling brine: 1 part 9% vinegar, 2 parts water, 1 tablespoon of salt and 2 tablespoons of sugar per litre. Never reduce the vinegar below 1:3 – that is the safety limit.

The Most Common Mistakes

- Cold jars in hot water crack. The jar and its contents should be at a similar temperature.
- Used twist-off lids seal poorly. The jar is forever, but the lid is single-use.
- Overfilled jars leak during processing, and underfilled jars have too much air and the contents darken.
- Jars turned upside down instead of processing in a bath – this is not a safe method for anything except high-sugar jams.

TIP

Jam without gelling sugar: add grated apple with the peel and core (it contains pectin) to the fruit. Put a drop of hot jam on a cold plate – if it wrinkles after 1 minute when you push it with a finger, it is cooked enough.

5.2 Sterilising Meat and Vegetables in a Pressure Cooker

This is the only safe way for canned meat, beans and soups. An ordinary pressure cooker (6–10 l) takes 3–4 jars of 0.5 l. Check in the instructions that your cooker reaches about 1 bar of overpressure. Cookers with lower pressure (0.6–0.8 bar) do not reach 116 °C.



Meat, beans and soups need pressure canning.

1. Cut the meat into cubes, pack it raw into the jars (raw pack), add 1/2 teaspoon of salt per 0.5 l. No water – the meat releases its own juice.
2. Leave 3 cm of space, wipe the rim (fat prevents sealing). Wipe the rim with a cloth dipped in vinegar.
3. Pour 5–7 cm of water into the pot, place the jars on the rack.
4. Close it, heat with the valve open for 10 minutes (to vent the air), then close the valve.
5. Hold the pressure at 1 bar (15 psi) – **meat 75 min for 0.5 l, 90 min for 1 l.** Beans 75/90 min. Soups by the longest-cooking ingredient.
6. Let the pressure drop on its own. Do not force it open.
7. Leave the jars for 24 hours on a cloth, check the lids, label the contents and date.

If the pressure drops below 1 bar during processing, raise it again and start counting the time from the beginning. Correctly sterilised meat keeps for 2–3 years in a dark cellar.

WARNING

Safety rule: a bulging lid, hissing when opened, foamy liquid or a strange smell = discard, do not taste. Dispose of the contents so that no animal can reach them. If in doubt: boil the contents of the jar for 10 minutes before eating – this destroys botulinum toxin. Never open a pressure cooker under pressure, and replace the rubber gasket regularly.

5.3 Fermentation (No Energy, No Jars with Lids)

The oldest and most economical method. Lactic acid bacteria create an environment in which spoilage organisms cannot survive, and they add vitamins.



Sauerkraut in a stoneware crock: leaves, a board and a stone keep the cabbage under the brine.

Sauerkraut / sour turnip: shred 10 kg of cabbage, add **200 g of salt (2%)**, knead by hand until it releases its juice. Pack it into a ceramic or plastic (food-grade) barrel, cover with cabbage leaves, a board and a weight (a stone in a bag), so the cabbage is below the brine. 3–6 weeks at 15–20 °C, then in the cool. It keeps the whole winter.

1. Remove the outer leaves and save them for covering. Halve the heads and cut out the core.
2. Shred into 1–2 mm strips. Weigh the salt exactly: 20 g per kg of cabbage.
3. Layer in 10 cm layers and pound each layer with a fist or a wooden tamper until the juice rises to the surface.
4. For the first few days, pierce the cabbage to the bottom with a stick every day to let the gases escape.
5. Skim off the foam and the white layer on top (kahm yeast) with a skimmer. Top up the brine if it falls below the cabbage: 20 g of salt per litre of water.

Brine for vegetables (cucumbers, peppers, carrots, cauliflower, garlic): 30–50 g of salt per litre of water, the vegetables must be below the surface. After 1–3 weeks, move to a cool place.

WARNING

A thin white layer on the surface (kahm yeast) is harmless – skim it off. Fuzzy pink, black or green mould, slimy cabbage and a stench of rot, however, mean that the fermentation has failed. Discard it.

FROM HISTORY

Almost every Slovenian farmhouse had a tub of sauerkraut and a tub of sour turnip in the cellar. The cabbage was shredded on a large board with blades and pressed down barefoot, with washed feet. Sour turnip is the base of dishes such as the Prekmurje bujta repa. In winter, sauerkraut and turnip prevented scurvy because they contain vitamin C, when no other fresh vegetables were available.

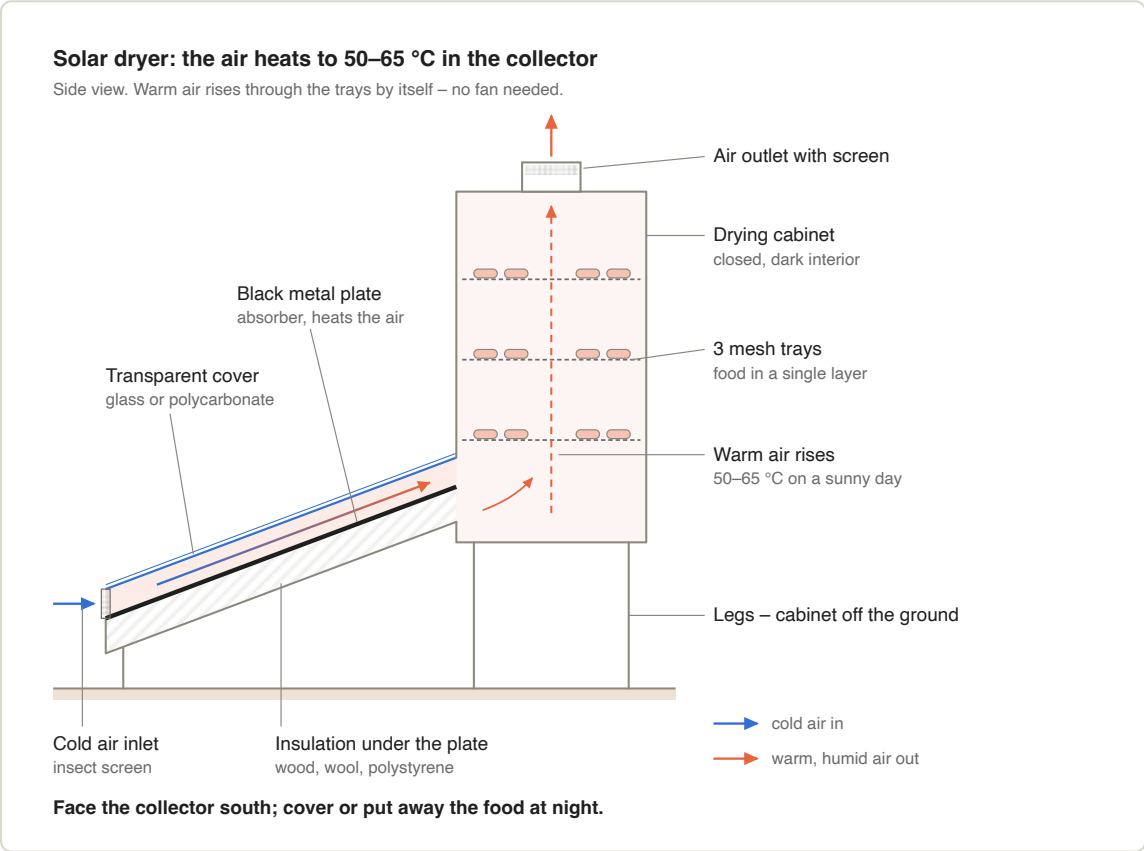
5.4 Drying

Drying removes 80–95% of the water – the food becomes light and keeps for 1–2 years. 10 kg of fresh apples yields about 1–1.5 kg of dried slices.



Solar dryer: the collector heats the air, which rises through racks of fruit.

- **Wooden solar dryer:** a box covered with glass or polycarbonate, black sheet metal on the bottom, food racks on 2–3 levels, an air opening at the bottom and top (with insect mesh). It reaches 50–65 °C on a sunny day.
- **Oven / dehydrator:** 50–60 °C for fruit and vegetables, 70 °C for meat, with the oven door ajar.
- Fruit (apple slices, plums, pears): 4–5 mm slices, dip in lemon water, dry for 8–12 hours until leathery.
- **Jerky (dried meat):** lean meat in 5 mm strips, marinate for 12 hours in salt, spices and soy sauce, dry at 70 °C for 4–8 hours. It keeps for 1–2 months, longer in a vacuum.
- Hang herbs in bunches in the shade in a draught.



Plan. Solar dryer for fruit, vegetables and meat.

Solar Dryer – Dimensions

A box 100 × 60 cm, 20 cm high at the front and 40 cm at the back, so the lid slopes towards the sun (in Slovenia about 30–45°). Cut slots of 5 × 50 cm at the bottom front and top back, covered with insect mesh. Warm air rises and itself draws fresh air through the dryer. Materials cost €40–80.

When it is dry enough: fruit is leathery and gives off no juice when squeezed; vegetables are brittle; meat bends and cracks but does not snap. Put the dried food in jars and shake them every day for a week. If condensation forms on the glass, dry the food further.

FROM HISTORY

In Slovenian villages in autumn, fruit was dried in "sušilnice" (pajštve) – small masonry buildings with racks above a fire pit. Dried pears and plums were a winter sweet and the basis for compotes and festive pastries. In places they are still preserved, mostly in Lower Carniola and Carinthia.

5.5 Salting, Smoking and Fat

- **Dry-salting meat (prosciutto, bacon):** 50 g of salt per kg of meat + pepper, garlic. Rub in, layer in a container, turn every 2 days, 1 day per kg. Then rinse,

dry in a cool, draughty place below 12 °C, then smoke.

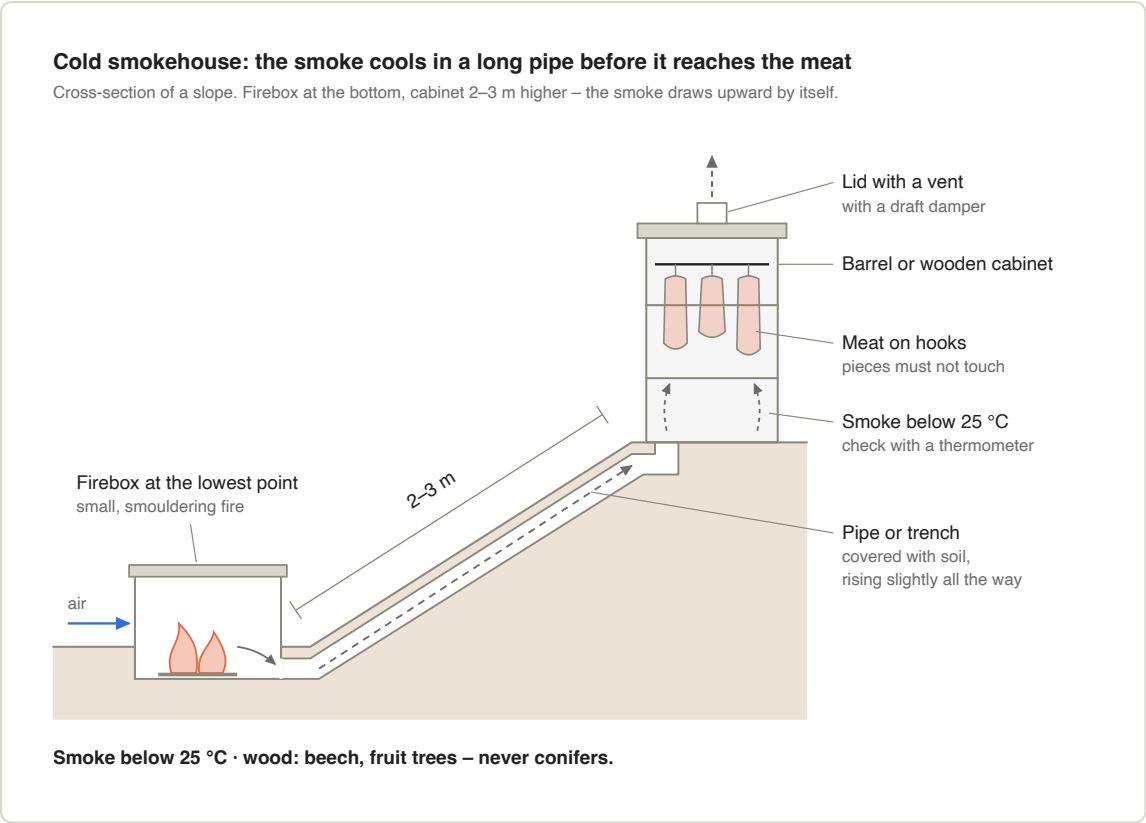
- **Cold smoking:** smoke below 25 °C, 3–14 days for a few hours each day. Beech, maple, fruit trees – never conifers. An improvised smokehouse: a fire pit, a pipe or a trench 2–3 m uphill to a barrel or cabinet with the meat.
- **Preserving in fat (confit):** meat roasted or stewed in fat, packed in ceramic pots and covered with 3 cm of fat. In a cool cellar it keeps for 3–6 months – this is how our grandmothers kept zaseka (minced salted pork fat) and meat after pig slaughter.
- **Eggs:** submerge unwashed fresh eggs in a solution of slaked lime (30 g of calcium hydroxide per litre of water). In a cool place they keep for 8–12 months.



Traditional smokehouse: cold beech smoke preserves meat for months.

Improvised Smokehouse Step by Step

1. On a slope, dig a fire pit 30 cm deep.
2. Uphill from the fire pit, dig a trench 2–3 m long and 20 cm deep, and cover it with sheet metal or boards and soil. A metal pipe Ø 100–150 mm is a good alternative to the trench.
3. At the top of the trench, set a metal barrel with no bottom or an old wooden cabinet. Put bars across the top for hanging the meat, and cover with wet burlap so the smoke escapes slowly.
4. Burn dry beech wood and put damp sawdust or wood chips on it so that it smoulders and smokes rather than burns.
5. Check the temperature in the smokehouse with your palm: the air should be at most lukewarm (below 25 °C). If it is hot, the fire is too strong or too close.



Plan. Cold smokehouse with a firebox and a smoke duct.

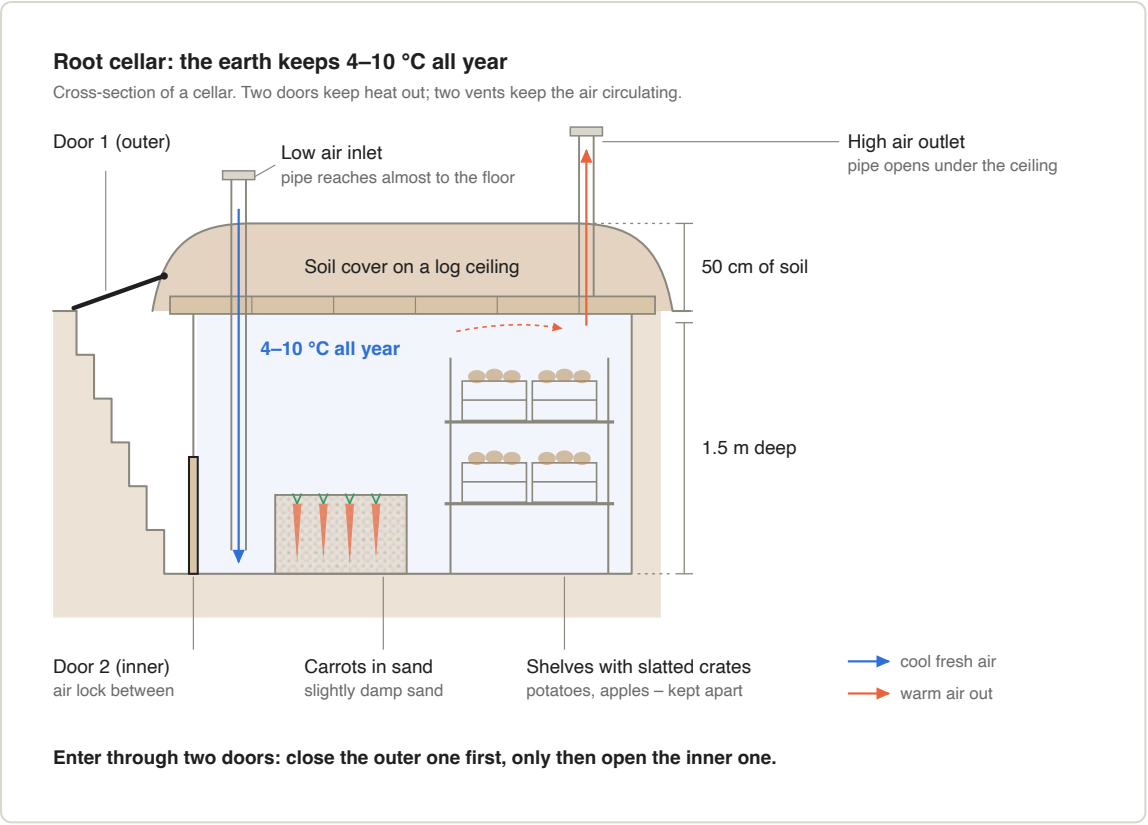
> **WARNING**
>
> The meat you smoke must be well salted beforehand. Smoke alone does not preserve. Before eating, have pork, game and bear meat checked for Trichinella (veterinarian), because salting and cold smoke do not destroy them. Keep the smokehouse away from wooden buildings; in dry periods, open fires may be prohibited.

5.6 A Cellar Without Electricity



Root cellar: potatoes, apples and cabbage in crates, carrots and beetroot in damp sand.

- **Buried cellar (root cellar):** a pit 1.5 m deep, width as needed, covered with timber and 50 cm of soil. The temperature is 4–10 °C all year round.
- **Buried barrel or chest freezer:** a broken chest freezer buried up to its lid, with a vent and straw – excellent for potatoes, carrots, beetroot, apples. Remove the compressor from the chest beforehand, and have the refrigerant gas removed by a technician.
- **Vegetables in sand:** pack carrots, beetroot and parsnips in a crate with damp sand, layer by layer. They keep until spring.
- **Zeer (clay-pot cooler):** a large clay pot with a smaller one inside, 5 cm of wet sand between them, covered with a wet cloth. Evaporation cools the inside by 10–15 °C.



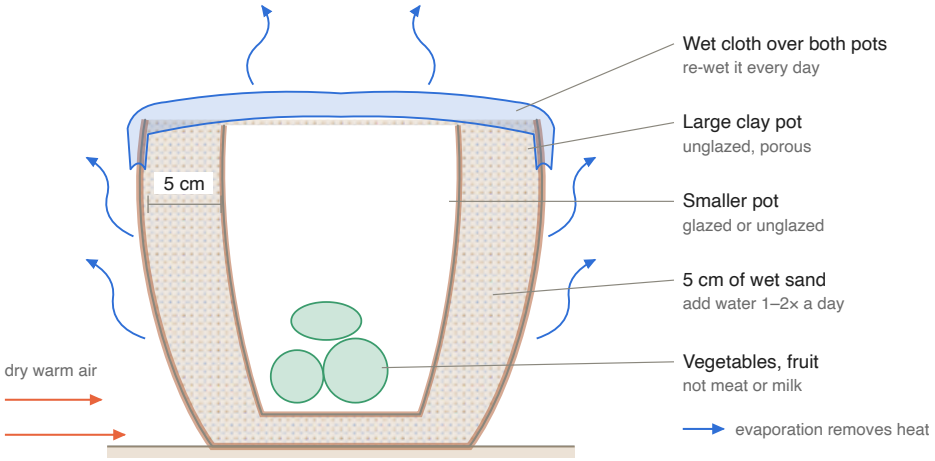
Plan. Cross-section of a root cellar (an underground cellar).

What You Store Together and What You Don't

Crop	Temperature	Humidity	Note
Potatoes	4–8 °C	high	In the dark, otherwise they turn green (toxic solanine)
Carrots, beetroot, parsnips	0–4 °C	very high	In damp sand
Apples, pears	0–4 °C	high	Separate from potatoes and vegetables – they give off ethylene
Cabbage	0–4 °C	high	Hung by the core or wrapped in newspaper
Onions, garlic	0–4 °C	low	Braided into plaits, in a dry, airy place
Squash and pumpkins	10–15 °C	low	In the living space under a bed, not in the cellar

Pot in pot: water evaporating from the sand cools the inside

Cross-section of a “zeer” cooler. Works best in dry, warm air and in a breeze in the shade.



The inside is 10–15 °C cooler than the surroundings.

Plan. Pot-in-pot cooler (zeer).

TIP

A zeer works best in dry, warm air in a draught, in the shade. Water the sand 2 times a day. In humid weather it cools less. In it, vegetables and cheese keep for 3–5 days instead of one day.

FROM HISTORY

Before refrigerators, Slovenian farms relied on cellars dug into a hillside and on pits for potatoes and turnips in the field: the heap of produce was covered with straw and soil, with a tuft of straw left as an air vent. In places, ice was cut from ponds in winter and stored with sawdust in ice houses until summer. Such a potato pit lasts until spring even today.

CHAPTER 6

Electricity

An ordinary rooftop solar system switches itself off automatically when the grid goes down, even in the middle of a sunny day. You only get electricity from the roof with a hybrid inverter with a battery and a backup output, or with a separate off-grid system. Power only the essentials: the fridge, lights, communication and the heating pump.



A hybrid inverter with a battery powers backup circuits even during a grid outage.

6.1 Why photovoltaics doesn't work during an outage

A grid-tied inverter constantly measures the grid's voltage and frequency. When the grid disappears, it disconnects within a fraction of a second. This protection is called anti-islanding (protection against island operation). It is required by European standards and by the rules of the Slovenian distribution operator.

The reason is safety. An electrician repairing a power line must be certain that the line is dead. If your roof pushed current back into the grid, it could kill them. So never bypass this protection, and never ask anyone to "switch it off".

A grid-tied inverter also cannot work on its own without the grid. It needs an external voltage as a reference to synchronize with. Without a battery and without a special output, it therefore stays silent, no matter how much sun there is.

6.2 Find out what you have on the roof

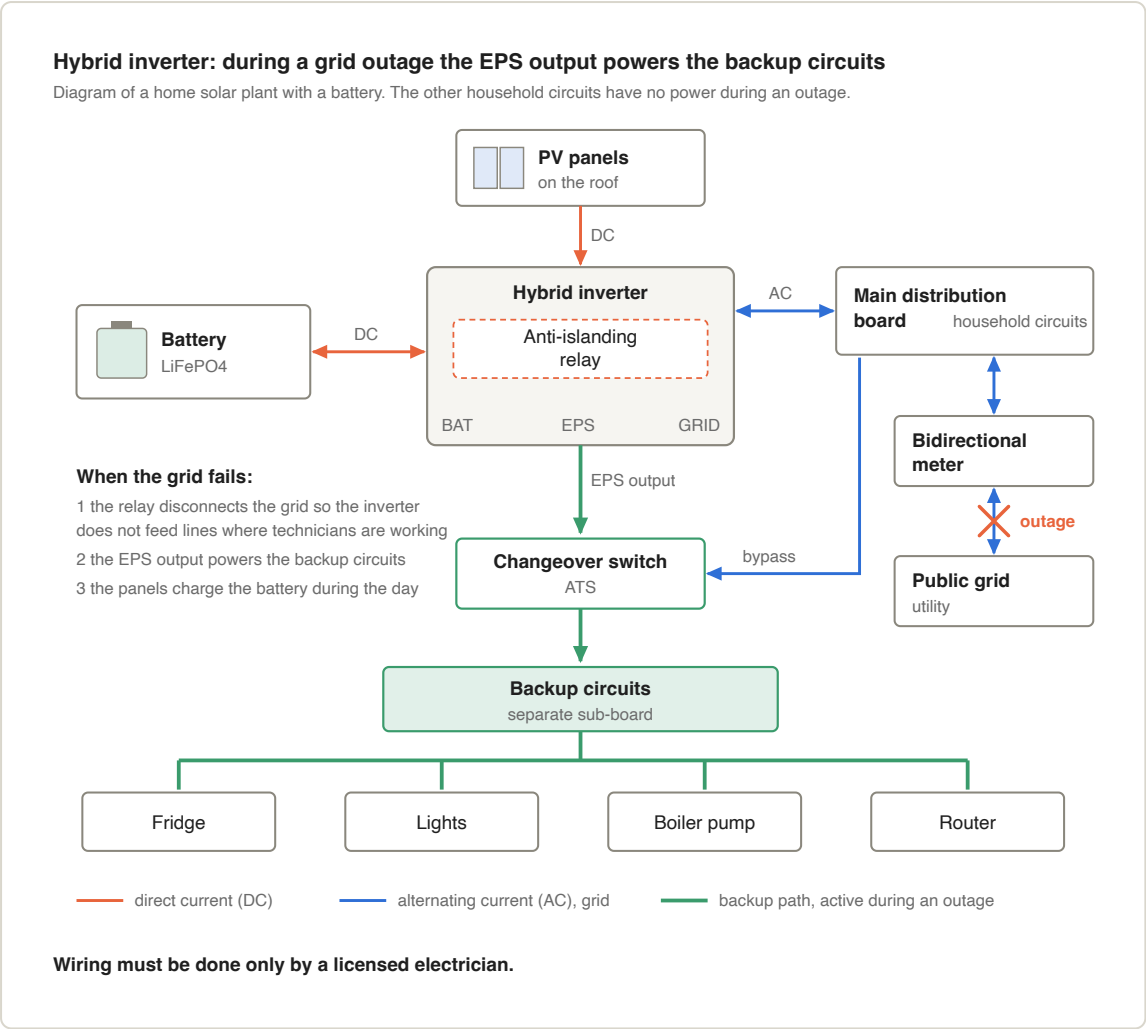
Look at the inverter's nameplate (usually in the basement, garage or attic) or open the manufacturer's app. Write down the manufacturer, model and power rating. Then check:

- [ ] Do you have a battery? If not, you almost certainly have no backup power.
- [ ] Does the inverter have terminals labelled "EPS", "Backup", "Load" or "Off-grid"?
- [ ] Is there an extra changeover switch in the distribution board, or a separate "backup" sub-board?
- [ ] Are there sockets in the house marked differently (a different colour, a "backup" label)?
- [ ] Does the app show a "Backup" mode or "battery reserve in %"?

System type	Does it work during an outage?	What to do
Grid-tied inverter without a battery (the most common)	No	Upgrade to a hybrid inverter or build a separate off-grid system (6.5)
Hybrid inverter with a battery, without an EPS/backup output	Mostly not	Ask the installer whether a backup output can be added
Hybrid inverter with EPS (Emergency Power Supply)	Yes, only selected sockets or circuits	Label the backup sockets, test once a year
Hybrid with full backup (ATS changeover switches)	Yes, the whole house (up to the inverter's power)	Manage consumption so the battery lasts
Off-grid (island) system	Yes	The most resilient

Terms to look for in models: "EPS", "backup", "off-grid function", "emergency power". Many hybrid inverters (Huawei, Fronius, GoodWe, Victron, Sungrow, Deye) support this, often with an extra module or changeover unit. Some provide only a single backup socket with a few hundred watts, while others power the entire house with 5–10 kW.

Another important question is whether the system can charge from the sun at all during an outage. Some inverters only drain the battery in backup mode. Once the battery is empty, you are left without electricity until the grid returns. A good system restarts itself from the sun in the morning, even if the battery was drained overnight.



Plan. A house with photovoltaics, a hybrid inverter and backup circuits.

Questions for the installer

1. Does my inverter support backup power (EPS/backup)? What do I need for it (module, changeover unit, firmware update)?
2. What is the maximum continuous power of the backup output in watts? How much starting current can it handle (fridge, pump)?
3. Is the changeover automatic (ATS) and how long does it take? Do the computer and router shut down during the changeover?
4. Does the battery charge from the panels during an outage? Can the system restart by itself from an empty battery?
5. Is the backup output single-phase or three-phase? Which phases does it supply?
6. What percentage of the battery can I reserve for outages only (e.g. 30%)?
7. Which circuits do you recommend putting on backup power, and how much does the installation cost?

Put on the backup circuit: the fridge and freezer, the circulation pump and boiler controls, a few lights, the router and a socket for charging phones. Do not put on it: the water heater, cooker, oven, heat pump, tumble dryer and electric heaters. These drain any home battery within a few hours.

> **WARNING**
>
> Installing a backup output, changeover switches and any intervention in the house's wiring may be done only by a licensed electrician. A mistake can kill you, your neighbours or a lineman working on the grid. The same applies to the inverter, battery and generator you want to connect to the house circuits.

6.3 How much electricity you need in a crisis

You are not powering the whole house, only the essentials. An example of daily consumption in a frugal regime:

Appliance	Power	Hours per day	Wh per day
Fridge (A++)	100 W (cycling)	24	600–900
Chest freezer	80 W (cycling)	24	500–800
LED lighting, 5 lights	5 × 8 W	5	200
Charging phones, radio, router	30 W	4	120
Central heating pump (circulation)	60 W	12	720
Laptop	60 W	3	180
Total			**approximately 2,300–2,900 Wh**

A 5 kWh battery and 2–3 kW of solar panels are enough for this. Do not use heaters, hobs, a water heater or a dryer – cook on gas or wood. You can switch the fridge and freezer on and off: a fully stocked freezer keeps 1–2 days when closed, so run it only 6–8 hours a day, when the sun is out.

Worksheet: calculate your system

1. **List your appliances.** For each, write down its power in watts (nameplate or manual). You can measure more accurately with a plug-in power meter (€10–20).
2. **Calculate Wh per day.** Power × hours of use. For the fridge and freezer, take the measured daily consumption or the figure from the energy label (kWh/year ÷ 365).
3. **Add it up and add 20%** for losses and forgotten appliances. Example: 2,500 Wh × 1.2 = 3,000 Wh.
4. **Choose the number of days without sun.** In winter, count on 2 days. Battery = daily consumption × days ÷ 0.9 (inverter efficiency). Example: 3,000 × 2 ÷ 0.9 = approximately 6.7 kWh. With 1 day, 3.3 kWh is enough.
5. **Calculate the panels.** Power in kWp = daily consumption ÷ daily yield per kWp ÷ 0.8 (losses). In central Slovenia, 1 kWp of panels yields roughly 1–1.5 kWh per day in December and January (almost nothing in fog and snow) and roughly 4–5 kWh per day in summer.
6. **Winter example:** 3,000 Wh ÷ 1.2 ÷ 0.8 = about 3.1 kWp. **Summer:** 3,000 ÷ 4.5 ÷ 0.8 = about 0.8 kWp. Winter is the benchmark: what suffices in December amply exceeds your needs in summer.
7. **Choose the inverter.** Its continuous power must cover the most appliances running at the same time, with a 30% reserve. A fridge draws 3–5 times its rated power at startup; the inverter must be able to handle that briefly.

> **TIP**
>
> In winter, mount the panels at a steeper angle (60–70°) facing south. Remove snow from the panels with a soft broom. You can place portable panels against a south-facing wall, where snow doesn't cover them.

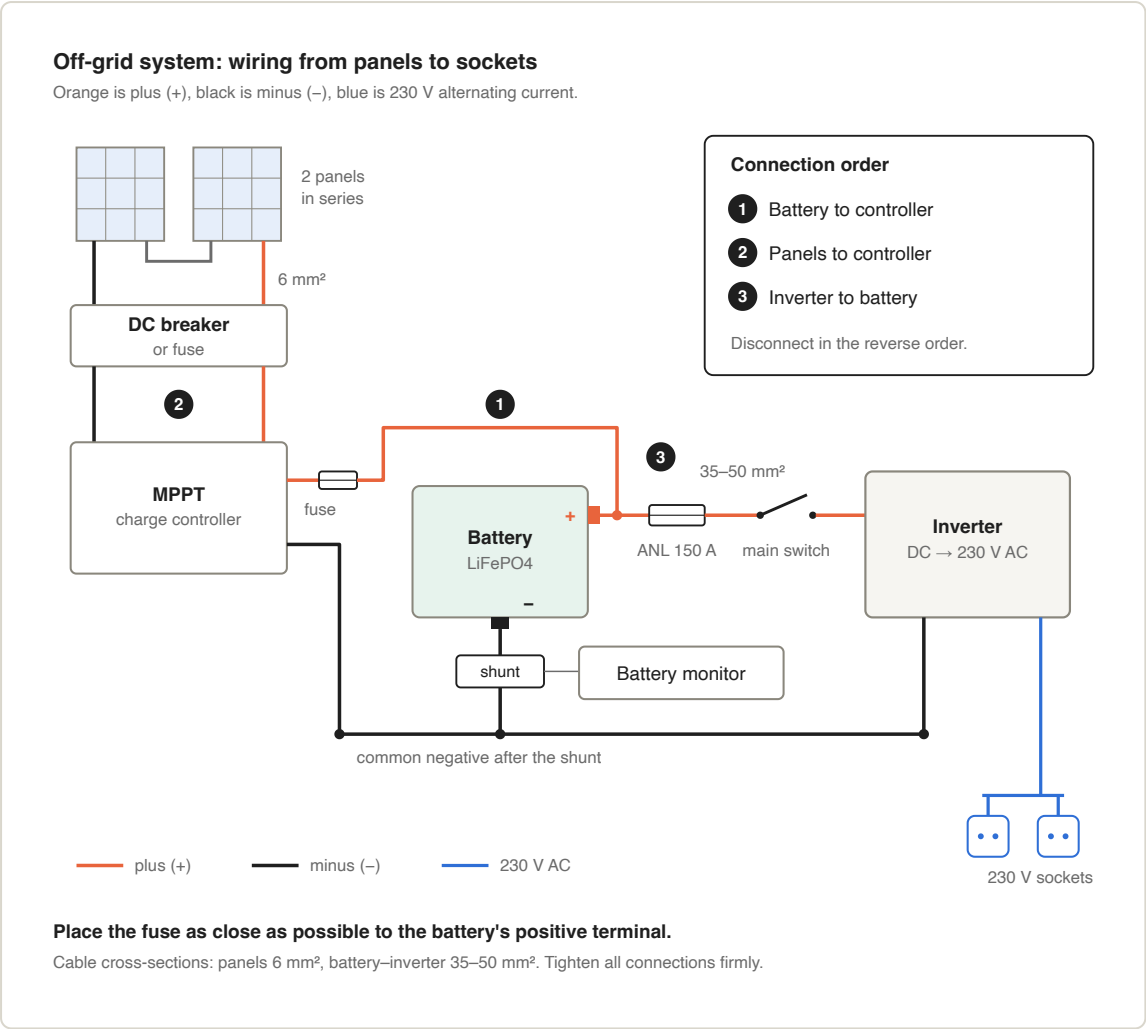
6.4 A portable power station – the simplest route

A portable power station (EcoFlow, Bluetti, Anker, Jackery) of 1–3 kWh with a folding 200–400 W panel is ready in a minute. It costs €700–2,500. It has a built-in battery, charge controller, inverter and sockets. You can charge it from the sun, from the grid or from a car.

When buying, check for: LiFePO4 chemistry (more cycles, safer), a pure sine wave, continuous power of at least 1,200 W and a panel input of at least 400 W. Some models work as a UPS: the router and pump don't shut down during an outage.

6.5 A separate off-grid system – the "crisis suitcase"

The most independent approach is a system that is never connected to the grid. That means anti-islanding doesn't apply to it, and you can set it up in the garden or on a balcony in a few minutes. You connect appliances with an extension cord straight to the inverter's socket.



Plan. Wiring an off-grid system: fuses, cable cross-sections and the connection order.

YOU NEED (APPROXIMATELY €1,200–2,500)

- 2–4 solar panels of 400–450 W each (used €40–80 apiece, new €80–150)
- An MPPT solar charge controller, e.g. 150/35 A (Victron, EPEver) – €150–300
- A LiFePO4 battery, 12 V 200 Ah (2.5 kWh) or 24 V 100–200 Ah, with a built-in BMS – €400–1,000
- A pure sine wave inverter, 1,500–3,000 W – €200–700
- A main fuse at the battery (ANL, MEGA, or for lithium best a class T) – €20–60
- A 300 A main battery switch – €20–40
- A 40–50 A fuse between the controller and the battery – €10
- A DC isolator switch for the panels (rated 1,000 V DC, 16–25 A) – €25–50
- Cables: 6 mm² solar cable (panels), 10 mm² (controller–battery), 35–50 mm² (battery–inverter), MC4 connectors – €80–150
- Cable lugs and a manual crimping tool for thick cables – €30–50
- A copper busbar for + and – – €20–40
- A battery monitor with a shunt or a Bluetooth BMS – €0–150
- A crate or trolley with handles, a wooden board for mounting – €30–80

Choosing voltage, cables and fuses

At 12 V, large currents flow, so you need thick cables. Above a 1,500 W inverter or above 600 W of panels, choose 24 V. Cables between the battery and the inverter should be as short as possible, up to 1.5 m. The fuse goes on the positive, at most 20 cm from the battery.

Connection	12 V, inverter up to 1,200 W	24 V, inverter up to 3,000 W
Battery – inverter	35 mm², 150 A fuse	50 mm², 175–200 A fuse
Controller – battery	10 mm², 40–50 A fuse	10 mm², 40–50 A fuse
Panels – controller	6 mm², DC isolator switch	6 mm², DC isolator switch
12/24 V loads (LED, USB)	2.5–4 mm², 15–20 A fuse	2.5 mm², 10–15 A fuse
Maximum panels per 150/35 controller	about 500 W	about 1,000 W

Connect two 400 W panels in series. Their combined open-circuit voltage (Voc) is around 75–80 V, up to 15% more in cold weather. This must stay safely below the controller's limit (150 V). You only need fuses on the panels once you connect 3 or more strings in parallel.



Off-grid system on a balcony: panels, charge controller, battery and inverter.

Assembly and connection order

1. Screw all the parts onto the wooden board in the crate: the battery at the bottom, the controller and inverter above, with 10 cm of space for air.
2. The main switch is OFF and the fuses are REMOVED. Cover the panels with a blanket or turn them face down.
3. Screw the main fuse onto the battery's positive, then the main switch, then the busbar. Run the battery's negative straight to the negative busbar (via the shunt, if you have one).
4. **Battery to the controller first.** Insert the 40–50 A fuse. The controller switches on and detects the voltage. In the settings choose LiFePO4: charging 14.2 V (28.4 V), float 13.5 V (27.0 V), no equalization charge.
5. **Then the panels to the controller.** Check polarity with a multimeter, connect through the DC switch and uncover the panels. The controller should start charging.
6. **Then the inverter to the battery.** The inverter's switch is off. On connection there may be a spark because the capacitors are charging; some inverters therefore have a button or resistor for pre-charging.
7. Connect the inverter's casing to earth (a yellow-green conductor to an earth spike, or to a protective conductor checked by an electrician).
8. Switch on the inverter and test with a small load first (a lamp), then the fridge.
9. **Disconnect in reverse:** loads, inverter, panels (DC switch), battery last.

Connect appliances with an extension cord to the inverter's socket – never to the house wiring without a changeover switch installed by an electrician.

Caring for a LiFePO4 battery

- **It must not be charged below 0 °C.** Charging in the cold permanently damages the cells. A good BMS stops it automatically. In winter keep the battery in a heated room or buy a model with a built-in heater.
- Discharging is allowed down to about –20 °C, but capacity drops.
- For a long life, use it between 20 and 90% every day. It lasts 3,000–6,000 cycles.
- For storage, charge it to 50–60% and check it every 3 months.
- Do not use a lead-acid battery charger with a "desulfation" or "equalization" mode.
- Tighten the terminal bolts according to the instructions. A loose bolt heats up and can cause a fire.

> **WARNING**
>
> A short circuit of a 12 V 200 Ah battery delivers several thousand amperes: a tool melts, a cable burns. When working, take off rings and watches, use insulated tools and always remove the main fuse first. Set the system up on a non-flammable surface, away from children.

6.6 An electric car and a car as a generator

- **An electric car with V2L** (Hyundai Ioniq 5/6, Kia EV6/EV9, MG4, BYD, some others): an adapter in the charging socket provides 230 V up to 3.6 kW. A 60–80 kWh battery powers essential appliances for 2–3 weeks. Set a lower discharge limit (e.g. 20–30%) so you can still drive away.

- Run the cable from the V2L adapter through a window to an extension cord. Do not connect it to the house wiring. Full power supply to the house from the car (V2H) requires a special charger and installation by an electrician.
- **An ordinary car:** a 300–1,000 W inverter on the battery (from the terminals, not the cigarette lighter; the lighter handles only about 150 W). Let the engine idle for 20–30 minutes every few hours. Outdoors only, because of exhaust fumes. A car idling uses about 0.6–1 l of fuel per hour.

6.7 A fuel generator



Always run the generator outdoors, at least 5 m from windows; store fuel separately.

- An inverter generator of 2–3 kW (Honda, Yamaha or a cheaper brand) is quiet and safe for electronics. Consumption is about 1 l of petrol per hour at half load.
- Don't run it all day. 1–2 hours in the morning and evening is enough: you chill the fridge and freezer, charge batteries, heat water. That way 20 l of petrol lasts for about 1 week.
- Petrol with a stabilizer keeps for 1–2 years. Store it in metal or approved canisters in a separate room. Rotate your stock: pour old petrol into the car and buy fresh.
- Start it once every 3 months for 15 minutes under load. Keep spare oil, a spark plug and an air filter.
- **Never in an enclosed space or garage** – carbon monoxide kills within minutes. At least 5 m from windows, doors and ventilation openings, with the exhaust pointing away from the house.
- **Never plug a generator into a socket in the house** (the "suicide cable" with two plugs). The current flows into the grid and can kill a lineman, and when the grid returns it destroys the generator. The correct solution is a manual grid–generator changeover switch installed by a licensed electrician.

6.8 Creative small sources

- **A pico-hydro plant on a stream:** a 100–500 W microturbine on a stream with a drop of 2+ m provides electricity 24 hours a day. For permanent use you need a water right.
- **A bicycle generator:** a bicycle on a trainer with a drive that turns a DC motor or alternator – 1 hour of pedalling gives 50–100 Wh: enough for phones and lights. Put a controller and a diode between the generator and the battery.
- **Small wind:** a 400–1,000 W turbine makes sense only in exposed locations (the Primorska region, the Karst, hills); mostly not in valleys.
- **USB solar chargers** of 20–60 W and 20,000 mAh power banks for each family member – the cheapest starting point. A 20,000 mAh power bank charges a smartphone 3–4 times.
- **An old car battery** with a charger and a 12 V LED strip makes cheap emergency lighting for several evenings.

6.9 Protection against electromagnetic pulse and surges

Keep a spare radio, charger and lights in a metal container with a tight lid (a galvanized trash can), the inside lined with cardboard – this is a simple Faraday cage. The devices must not touch the metal. The distribution board should have surge protection installed by an electrician. During a thunderstorm and when the grid returns, unplug sensitive devices from the sockets.

> **FROM HISTORY**
>
> During the siege of Sarajevo, people generated electricity with improvised turbines in the Miljacka river and with car batteries. They made emergency oil lamps from light bulbs and powered radio receivers from batteries, which they charged wherever they could.

CHAPTER 7

Heat, cooking and light

In a Slovenian winter, losing heating is a bigger danger than a shortage of food. Heat one room, not the whole house, and have a heat source that doesn't need electricity.

7.1 Heating without electricity



One warm room: a wood stove, blankets over the windows and the whole family together.

- **A wood stove or wood-burning cooker** with its own chimney is the best investment in resilience. Most modern wood, pellet and gas boilers don't work without electricity (pump, controls) – check yours. A wood boiler without a circulation pump can overheat: never fire it without water circulating.
- **Powering the boiler pump** through a UPS or battery system (chapter 6): the circulation pump needs only 30–60 W, the boiler controls 50–150 W. The connection must be done by an electrician.
- **A gas heater on a gas cylinder** (catalytic, e.g. a camping type) – only with a built-in oxygen depletion sensor (ODS) and with ventilation. A 10 kg cylinder lasts about 3–5 days of continuous heating at 2 kW.
- An open fireplace sends most of its heat up the chimney. If you have one, consider installing a closed insert.

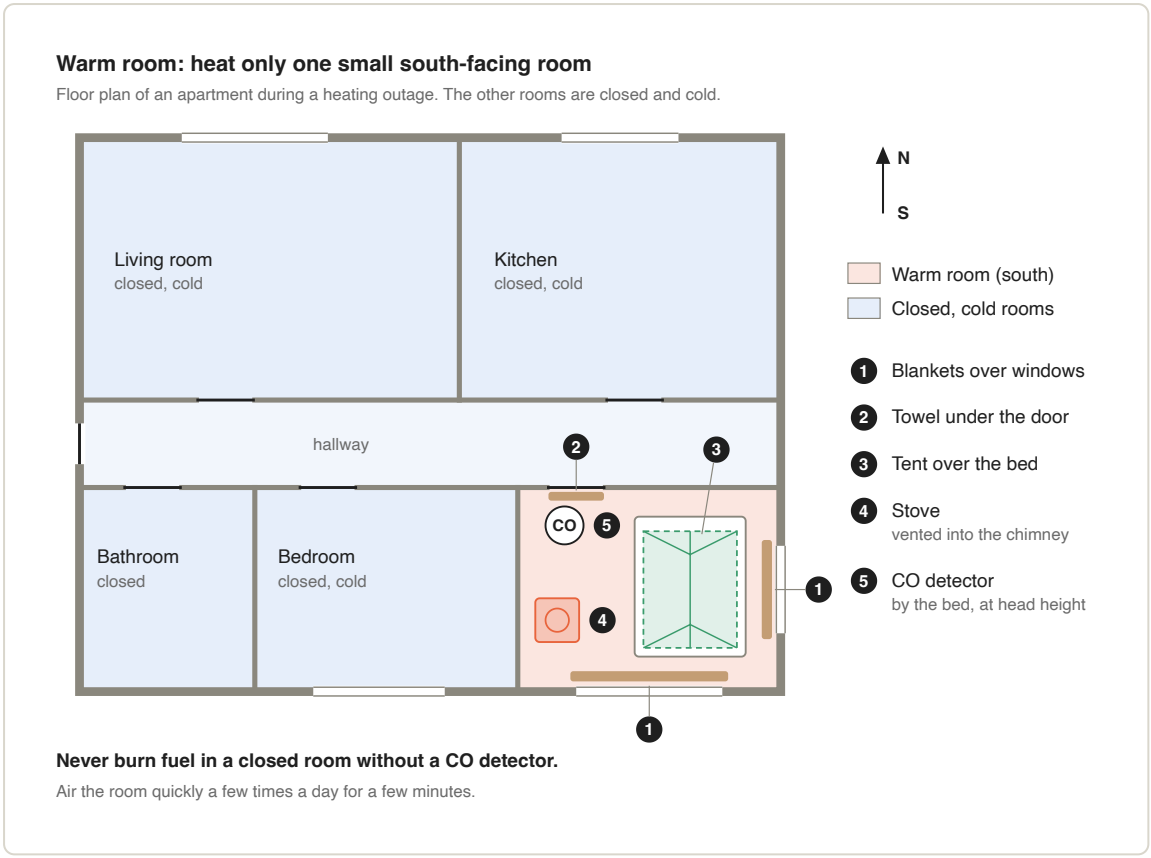
Firewood supply and drying

To heat a single 20 m^2 room in winter, count on 3–5 m^3 of dry wood. For a whole house you need 10–20 m^3. Firewood should season for 1–2 years under a roof in a draught, until moisture falls below 20%. Wet wood gives up to half the heat and clogs the chimney with soot.

1. Buy wood in spring, when it is cheapest. A stacked cubic metre (prm) of beech costs around €80–120.
2. Cut it to 25–33 cm and split it into logs 8–12 cm thick. Split wood dries faster.
3. Stack it on pallets, 10 cm off the ground, bark side up. Leave 5 cm between rows for air.
4. Cover only the top and leave the sides open. A south or west exposure with wind is best.
5. Check moisture with a meter (€15–25) on a freshly split log. Below 20%, the wood is suitable.
6. Always keep a week's worth of wood in the house, so it is warm and dry.

Beech, hornbeam, oak and ash give the most heat per volume. Spruce and pine ignite quickly and are good for kindling, but burn faster. For kindling keep a container of dry splinters, cones and newspaper.

7.2 The warm room – how to keep heat in



Plan. Plan for a warm room in a house or apartment.

1. Choose the smallest room on the south side, preferably one with a stove.
2. Cover the windows with blankets or bubble wrap (on the glass, with a water spray – it holds without adhesive). At night close the shutters and curtains.
3. Lay a rolled towel under the doors. Close the doors to cold rooms.
4. Put rugs or cardboard on the floor. Sleep together in one room.
5. **A tent in the room:** pitch a camping tent on the bed or floor – the body heat of 3–4 people warms it 5–10 °C above the room.
6. Sleeping bags with a comfort limit down to –5 °C for each person, and thermos flasks with hot water in the bag.
7. Dress in layers: wool or synthetics next to the skin, never cotton (it holds moisture). Wear a hat, because you lose a lot of heat through the head.
8. Eat warm food and enough of it: in the cold the body uses 20–30% more energy. Drink warm tea.
9. Once or twice a day, ventilate for 3–5 minutes with the windows wide open. Humid air feels colder and causes mould.

A tealight pot heater (two inverted clay pots over 3–4 tealights) gives only 50–100 W – usable for a small table, not for a room.

7.3 Cooking without electricity

Method	Fuel	Advantage	Warning
Gas stove on a 10 kg cylinder	Propane-butane	One cylinder = 1–2 months of cooking	Only with a window open
Camping stove on cartridges	Butane	Cheap, portable	Butane burns poorly below 0 °C
Wood-burning cooker	Wood	Heats and cooks at the same time	Needs a chimney
Rocket stove	Twigs, cones	Uses 4–5 × less wood than an open fire	Outdoors only
Solar oven	Sun	No fuel	Summer only, 3–4 hours
Grate / open fire	Wood	Always available	Smoke, fire hazard

A 227 g butane cartridge lasts about 1–1.5 hours of cooking at full flame. For winter, buy a propane-butane or isobutane mix, which also burns in the cold. Cook with a lid on: you save a third of the fuel.

The rocket stove



Brick rocket stove: you push twigs into the horizontal opening and the flame burns upward.

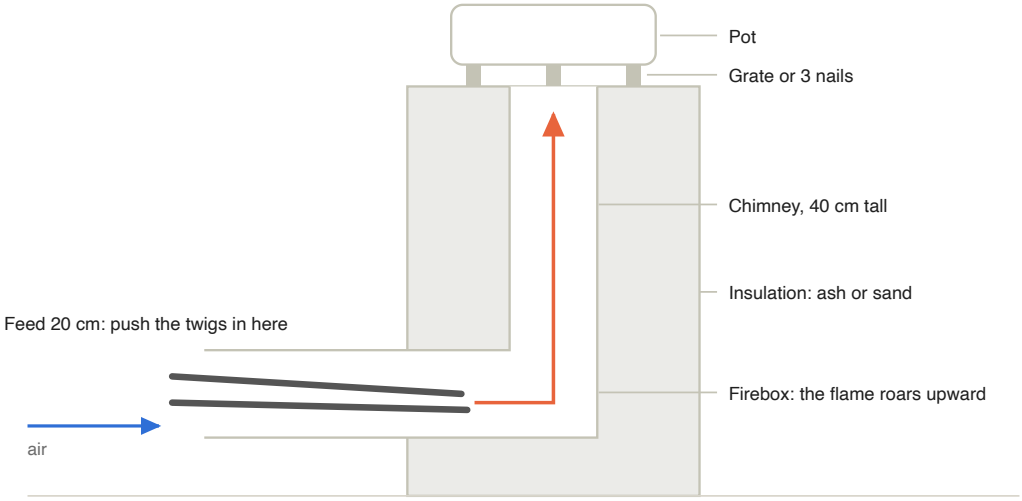
A rocket stove is an L-shaped tube with insulation. The hot chimney draws air through the horizontal inlet, the flame roars upward and the wood burns almost without smoke. The simplest version: an L made of tube (the chimney 40 cm high, the horizontal inlet 20 cm), with the space around the tube filled with ash or sand for insulation.

YOU NEED

- 16–20 solid bricks or concrete blocks (€5–15) – or two metal cans
- A large can or a 20 l bucket as the casing, smaller cans for the tube (a paint can, a 1–3 l tin)
- 2–3 kg of ash, sand or perlite for insulation
- A piece of mesh or 3 large nails to support the pot, tin snips, gloves

1. On a level non-flammable surface, lay the first row of bricks so that a horizontal channel forms: an inner width and height of about 10 × 10 cm, a length of 20 cm.
2. At the end of the channel, build a vertical shaft with the same inner cross-section, 40 cm high. This is the chimney.
3. Divide the inlet into two levels with a piece of sheet metal or mesh: the wood goes on top, and air flows in below.
4. With cans: place an L-shaped tube in the casing (horizontal 20 cm, vertical 40 cm, diameter 10–12 cm), and pour ash or sand into the space around it.
5. On top of the chimney place 3 nails or a grate, so there is a 1.5–2 cm gap for smoke between the pot and the rim.
6. Light it with paper and splinters in the inlet. Once the chimney draws, add dry twigs the thickness of your thumb and push them forward as they burn.

Rocket stove: air pulls the flame up through the elbow

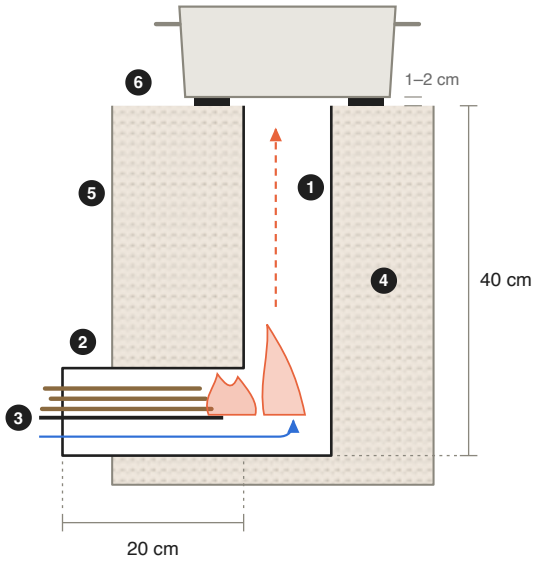


Uses 4–5 × less wood than an open fire and is almost smokeless. Outdoors only.

Plan. How a rocket stove works.

Rocket stove: an insulated L-tube burns hot and almost smokeless

Cross-section with dimensions. Sticks burn at the end of the shelf; air flows in beneath them.



Parts and materials

1. Chimney – metal tube, 40 cm
   tin can or flue pipe
2. Feed – horizontal tube, 20 cm
   joined tightly to the chimney in an L
3. Shelf – a piece of sheet metal
   sticks on top, air below
4. Insulation – ash, sand or perlite
   fill all the space around the tube
5. Housing – bucket or large tin can
   or a brick box
6. Pot support – 3 nails or a grate
   1–2 cm gap so smoke can escape

air under the shelf
hot gases in the chimney

Burn only outdoors and only with dry, thin sticks.

Plan. Dimensions and materials for a rocket stove.

The insulation around the chimney keeps the flame hot, so the wood burns almost completely. A litre of water boils in about 5–8 minutes with a few handfuls of twigs.

Hay box cooking



Hay box: retained heat finishes cooking a dish brought to the boil in a pot.

Bring the dish to a boil for 5–10 minutes, then wrap the pot with its lid on in a blanket or put it in a crate filled with hay, polystyrene or pillows. The heat stays in the pot and the dish cooks by itself for 2–6 hours. Rice, beans, barley stew (ričet) and hearty stews cook on their own – you save 70% of the fuel.

1. Prepare a crate, an old cooler bag or a basket. Line the bottom and sides with 8–10 cm of hay, straw or blankets.
2. Use a full pot: more water holds the heat longer. Fill it at least two-thirds.
3. Bring to a boil, cook for the time in the table, cover immediately and move it into the basket without opening it.
4. Cover the top with a cushion or a bag of hay. Do not open it during cooking.
5. If the dish is undercooked when the time is up, bring it to a boil again and return it to the basket.

Dish	Boiling on the fire	In the basket
Rice (1 : 2 water)	5 min	1–1.5 hours
Rolled oats, porridge	2 min	1 hour or overnight
Polenta, buckwheat groats	5 min	1 hour
Potatoes in chunks	5 min	1–1.5 hours
Lentils	5 min	1.5–2 hours
Pearl barley, ričet	15 min	3–4 hours
Beans, soaked overnight	15 min (hard boil)	3–5 hours
Chickpeas, soaked	15 min	4–6 hours
Meat stew, bone broth	20 min	3–4 hours

> **WARNING**
>
> Beans must boil hard for at least 10 minutes before going into the basket, otherwise toxic lectins remain in them. A dish in the basket must not fall below 60 °C for several hours; after 6 hours, bring it to a boil again before eating. Always cook meat thoroughly.

A solar oven made of cardboard

A box in a box with newspaper between them, the inside painted black, a lid with reflective aluminium foil at an angle, and glass or plastic film on top. In summer it reaches 100–140 °C.

1. Take two cardboard boxes with 5–8 cm of space between them. Pack crumpled newspaper in between.
2. Line the inside with black paper or coat it with non-toxic black paint.
3. Over the opening place a sheet of glass or two layers of clear film with 1 cm of air between them.
4. Cut a reflector from cardboard, cover it with aluminium foil and fix it at a 45° angle.
5. Use dark pots with lids. Turn the oven toward the sun every 30–60 minutes.

In it you can cook rice, potatoes, eggs and vegetables in 2–4 hours, dry fruit or pasteurize water. It works from April to September between 10 a.m. and 3 p.m.

7.4 Carbon monoxide – a deadly danger

Every year during outages people die from stoves, generators and grills used in enclosed spaces. You can't smell or see CO. It forms in every incomplete combustion.

- Buy a **battery-powered CO detector** (€20–40) for every room with a fire and for the bedroom. Test it once a month.
- Never use a grill, charcoal or a gas hob for heating in an enclosed space.
- Have the chimney inspected once a year by a chimney sweep. A blocked chimney sends smoke back into the room.
- Headache, nausea and drowsiness in several people at once = get out into fresh air immediately and call 112.

7.5 Light



Blackout lighting: a headlamp, an LED lantern, a solar garden light and an oil lamp.

- **LED headlamps** for each family member + spare AA/AAA batteries (lithium ones last 10–20 years).
- **Solar garden lights:** on the windowsill by day, indoors in the evening – free night light for hallways and the toilet.
- **12 V LED strips** from the battery system – 5 W lights a whole room.
- **A kerosene lamp or oil** – a reserve. An emergency oil lamp: a jar, cooking oil, a wick of cotton string threaded through aluminium foil at the surface. It burns 6–8 hours on 100 ml.
- **Candles** only under supervision, on a non-flammable base – candles are the most common cause of fires during outages.

Light source	Consumption or source	Approximate run time
LED headlamp, 3 × AAA	low power	20–50 hours
LED camping lantern, 4 × AA	medium power	15–30 hours
5 W LED strip on 12 V	100 Ah battery (1,200 Wh)	about 200 hours
Solar garden light	a day on the windowsill	4–8 hours per night
Oil lamp	100 ml of cooking oil	6–8 hours
Kerosene lamp	1 l of kerosene	about 30–40 hours
Tealight	1 piece	4 hours
Ordinary candle 2 × 20 cm	1 piece	8–10 hours

TIP

Point the lamp at a white wall or put a bottle of water behind it: the light scatters across the whole room. A single 5 W lamp is then enough for a dinner for four.

CHAPTER 8

Garden and self-sufficiency

A well-tended 100 m² garden yields 200–400 kg of vegetables a year – that is vegetables for 2 people. For most of your calories, though, you need potatoes, beans and grain: for one person, around 200–400 m² more. Start now, because in the first year you learn the most and harvest little.



A crisis garden: potatoes, beans, cabbage, squash and leafy greens with mulch.

8.1 Sprouts and microgreens (right away, even in an apartment)

Sprouts are the fastest source of fresh vitamins – from seed to plate in 3–10 days. You need no soil, no sun and no electricity.



Sprouts and microgreens: fresh vitamins in 3–10 days, even in an apartment.

1. Soak 2 tablespoons of seeds (mung bean, lentil, alfalfa, rapeseed, radish, broccoli) in a jar for 8–12 hours.
2. Cover the jar with gauze and a rubber band, pour off the water and tilt it at a 45° angle so it drains.
3. Rinse 2× a day with clean, cold water. At room temperature, mung bean sprouts are ready in 3–4 days.
4. On the last day, put them in the light so they turn green. Keep them in the fridge or a cool room for up to 3 days.
5. **Microgreens:** sow seeds thickly on 2 cm of soil in a tray, on a windowsill, and cut them after 7–14 days.

A stock of 2–3 kg of sprouting seeds costs €30–50 and supplies a family with vitamin C all winter. Buy seeds labelled for sprouting. Do not sprout tomato, pepper, potato or bean seeds for raw eating: they are toxic or must be cooked.

> **WARNING**
>
> Sprouts grow in warm, moist conditions, where bacteria multiply too. Use drinking water and wash the jars with hot water. Throw away sprouts that smell bad or are slimy. Children, pregnant women and the elderly should eat them cooked.

8.2 The highest-yielding crops for a crisis

Crop	Why	From sowing to harvest	Storage
Potatoes	Most calories per m²	90–120 days	Cellar, 6 months
Beans (pole, bush)	Protein, improves the soil	60–100 days	Dried, years
Squash (butternut, hokkaido)	Huge yield, long shelf life	100–120 days	6–12 months at room temp.
Cabbage, savoy cabbage	Fermentation for winter	70–120 days	Sauerkraut, all winter
Carrots, beetroot, parsnips	Overwinter in the ground or in sand	60–100 days	Cellar, in sand
Kale, chard	Withstand down to –10 °C, harvest all year	50–60 days	Fresh
Radish, lettuce, rocket	Fastest	25–45 days	Fresh

Crop	Why	From sowing to harvest	Storage
Garlic, onion	Seasoning, medicine	8–9 months (garlic in autumn)	6–12 months
Jerusalem artichoke	Grows by itself, perennial	Autumn after the first frost	In the ground all winter

A kilogram of seed potatoes yields 8–12 kg of harvest in a good year. On 10 m² you grow around 30–40 kg of potatoes.

8.3 A 100 m² garden for a family

Divide the 100 m² into 6 beds of 1.2 × 10 m (72 m²) and paths 40–50 cm wide. You work the bed from both sides and never step on it. Each year move the crops one bed forward (crop rotation), so the soil is not exhausted and diseases do not accumulate.

Bed	Main crop	Before or after it
1	Potatoes (early)	After it, in autumn, corn salad or green manure
2	Beans and peas	After the peas in July, carrots or endive
3	Cabbage, savoy cabbage, broccoli, kale	Before them in spring, radish and lettuce
4	Carrots, beetroot, parsnips, onion	Radish between the rows
5	Tomatoes, peppers, courgettes	Basil and marigold along the edge
6	Garlic (autumn), chard, lettuce, rocket	After the garlic in July, winter chicory

Use the remaining 28 m² for compost (2 m²), herbs, strawberries, and squash along the edge or on the compost heap. Squash sprawl over up to 5 m², so plant them on the edge of the garden. Tall beans and peas should grow on the north side so they don't cast shade.

Sowing calendar for central Slovenia

The last frost is usually over by mid-May (the "Ice Saints" around 12–15 May), and the first autumn frost comes in mid-October. In the Primorska region you start 2–3 weeks earlier, in the hills 2–3 weeks later.

Month	What you do
February	Sow peppers and tomatoes on the windowsill. Order seeds. Chit potatoes in the light.
March	Outdoors: peas, onion sets, radish, spinach. In pots: cabbage, broccoli, lettuce.
April	Potatoes, carrots, beetroot, parsnips, lettuce. Cabbage seedlings outdoors.
May	After 15 May: beans, courgettes, squash, cucumbers, tomatoes, peppers. Chard.
June	Second sowing of beans, carrots for winter. Mulching, watering, harvesting early potatoes.
July	Winter cabbage, endive, winter chicory, kale, beetroot for winter.
August	Corn salad, spinach, radish. Harvesting and collecting seeds.
September	Harvesting squash and potatoes for the cellar. Corn salad, winter lettuce.
October	Planting garlic and winter onions. Root vegetables into the cellar or sand.
November–January	Compost, manure on the beds, mulch. Harvesting kale, savoy cabbage, corn salad, leeks.

8.4 Seeds – what to store and how to collect them

- Buy **non-hybrid (heirloom, open-pollinated) seeds** – from hybrids (F1) you won't get the same plants next year.
- Store them in a jar with silica gel in the fridge or cellar – they last 3–10 years. Write the variety and year on each jar.
- Use part of the seed each year and renew it. Germination test: put 10 seeds on damp paper and count the sprouted ones after a week.
- Slovenian seed companies and seed-saving associations (e.g. community seed libraries) offer local

varieties.

Seed saving step by step

1. **Beans and peas:** leave a few of the finest plants so the pods turn brown and rattle on the plant. Pick the pods, dry them for 2 weeks, shell them. Freeze the seeds for 2 days to kill bean weevils.
2. **Tomatoes:** squeeze the seeds with their juice from a ripe fruit into a jar. Ferment for 3 days in water, stirring every day. Rinse in a sieve and dry on a plate.
3. **Squash:** let the squash ripen another 3–4 weeks after picking. Scoop out the seeds, wash them and air-dry for 2–3 weeks. Different squashes cross with each other: for pure seed, plant only one variety of the same species.
4. **Peppers:** choose a fully ripe red pepper. Scrape the seeds from the core and dry for 1–2 weeks. Plant varieties at least 10 m apart or put a tulle bag over the flower.
5. **Lettuce:** leave 2–3 plants to send up a flower stalk. When the flowers look like fluffy dandelions, cut the stalk and shake it into a bag.

The seed must be dry enough to snap when struck rather than bend. Only then seal it in a jar.

8.5 Fertility without artificial fertilizers

- **Compost:** 3 parts brown (leaves, straw, cardboard) to 1 part green (kitchen scraps, grass). Turn every 2–4 weeks; ready in 3–6 months.
- **Nettle fertilizer:** 1 kg of fresh nettles in 10 l of water, 2 weeks, stirring every day. Dilute 1:10 for watering.
- **Urine** diluted 1:10 with water is an excellent nitrogen fertilizer (not on leaves you eat raw, and not within 2 weeks of harvest).
- **Wood ash** (not from coated wood or plastic) – potassium and lime, sprinkled thinly.
- **Mulch** of straw or cut grass halves the watering and suppresses weeds.

Compost step by step

1. Build a 1 × 1 × 1 m bin from pallets in a shady spot, directly on the soil.
2. Put 20 cm of coarse branches at the bottom for air.
3. Add layers: 15 cm of brown, 5 cm of green, a handful of soil or old compost.
4. Keep the heap as moist as a wrung-out sponge. If it stinks, add brown; if it doesn't heat up, add green.
5. Do not add meat, bones, oil, dog faeces or diseased plants.
6. Ripe compost is dark, crumbly and smells of forest soil. Apply 3–5 l per m² of bed.

Nettle: gather it before it flowers, wearing gloves. Use a plastic or wooden container, not a metal one. Cover it with a net, because it stinks. The fertilizer is ready when it no longer foams.

8.6 Small livestock



Five laying hens give 25–30 eggs a week; the fence must be fox-proof.

Chickens

3–5 laying hens give 15–30 eggs a week. They need a coop of 1 m² per 3 hens and a run protected from foxes. They feed on scraps, grain and whatever they find; they turn waste into fertilizer.

- **Feed:** about 120 g of feed mix or grain per hen per day, plus greens and scraps. For hard shells add crushed eggshells or limestone grit.
- **Space:** a run of at least 3–5 m² per hen, a 1.8 m fence buried 30 cm deep. A perch of 20–25 cm per hen, one nest box per 4–5 hens.
- **Winter:** a coop without draughts but with a vent under the roof. Heating is not necessary. The water must not freeze: change it 2× a day. They lay less in winter.
- A hen lays well for 2–3 years. Buy pullets at 16–20 weeks, around €10–15 each.

Rabbits

Rabbits are the most efficient source of meat in a small space – 1 doe produces 30–40 kits a year. They eat hay, grass and garden scraps.

- **Feed:** unlimited hay, 100–150 g of grain or pellets a day for an adult, fresh vegetables introduced gradually. Water 0.5 l a day.
- **Space:** at least 1 m² per adult animal, more for a doe with kits. Rabbits tolerate cold better than heat.
- **Winter:** protection from draughts and damp, plenty of straw for bedding, unfrozen water.
- Gestation lasts about 31 days. The young reach slaughter weight of 2.5–3 kg at 10–12 weeks.

Other options

- **Bees:** honey (unlimited shelf life), beeswax for candles, pollination of the garden. Take a beginner's course with the beekeepers' association.

- **Fish in a pond or aquaponics:** carp or trout in a pond, with the water fertilizing the garden.

Keeping animals in a settlement is subject to local regulations – check with your municipality. An apiary and poultry must be reported to the register.

8.7 A plan for the first year

1. **Autumn and winter:** choose a sunny spot (at least 6 hours of sun), cover the grass with cardboard and 10 cm of compost or manure. Set up a compost bin. Plant garlic.
2. **January–February:** buy non-hybrid seeds, jars for sprouts and 2 kg of sprouting seeds. Draw a plan of the beds.
3. **March–April:** prepare 2–3 beds. Sow peas, radish, lettuce, potatoes. Raise a few seedlings on the windowsill.
4. **May–June:** plant beans, squash and tomatoes. Mulch. Start the nettle fertilizer. Collect rainwater (chapter 3).
5. **July–August:** sow winter vegetables. Keep a notebook: what worked, how much you harvested, when.
6. **September–October:** store the harvest in the cellar (chapter 5), collect seeds, expand the garden for next year. Consider chickens.

> **FROM HISTORY**
>
> During the Second World War, Britain and the USA promoted "victory gardens" in parks, playgrounds and yards. In besieged Sarajevo, people grew vegetables on balconies and in parks. A small garden was the difference between hunger and survival.

CHAPTER 9

Fishing, Hunting and Traps

Fish are the most accessible source of wild protein in Slovenia: there are more than 27,000 km of watercourses. Hunting larger game without experience burns more energy than it brings in. So in a crisis, count on fish first, then on small animals caught with traps, and only then on hunting.

9.1 Legally – sort it out now

- **Fishing:** buy a daily or annual permit from a fishing club (ribiška družina) or online (the Slovenian Fishing Association, Ribiška zveza Slovenije). A daily permit costs about €20–60, depending on the fishing district. Join a fishing club – you will learn the local waters and meet people who know them.
- **Hunting:** a hunting exam and membership in a hunting club, then a firearms licence. The process takes 1–2 years. It gives you experience you cannot get from a book: tracking, shooting, skinning, handling the meat.
- **Traps, nets, fish traps and electrofishing** are prohibited for private individuals in normal circumstances. The techniques below are for an emergency, when survival depends on them, and for practice on your own land with permitted species (e.g. rats and mice).

WARNING

Fishing without a permit, during a closed season or in a closed fishing district is an offence with a heavy fine. Even in a crisis: do not fish the water out to the last fish. Release spawners and young fish, or next year there will be nothing.

9.2 A fishing kit for a crisis (in a lunch box)

YOU NEED

- Nylon line 0.25 mm and 0.35 mm, 100 m of each (€8–15)
- Hooks size 6–14 (50 pieces), sinkers, 10 floats, swivels (€15–25)
- Telescopic rod 3–4 m with a reel (€40–80) or just a hand line reel (yo-yo, €5)
- A few artificial lures: spoons, plugs, flies (€20–30)
- Fish knife, a sheet for cleaning, 1 kg of salt for salting
- Line scissors, hook remover pliers, a small landing net

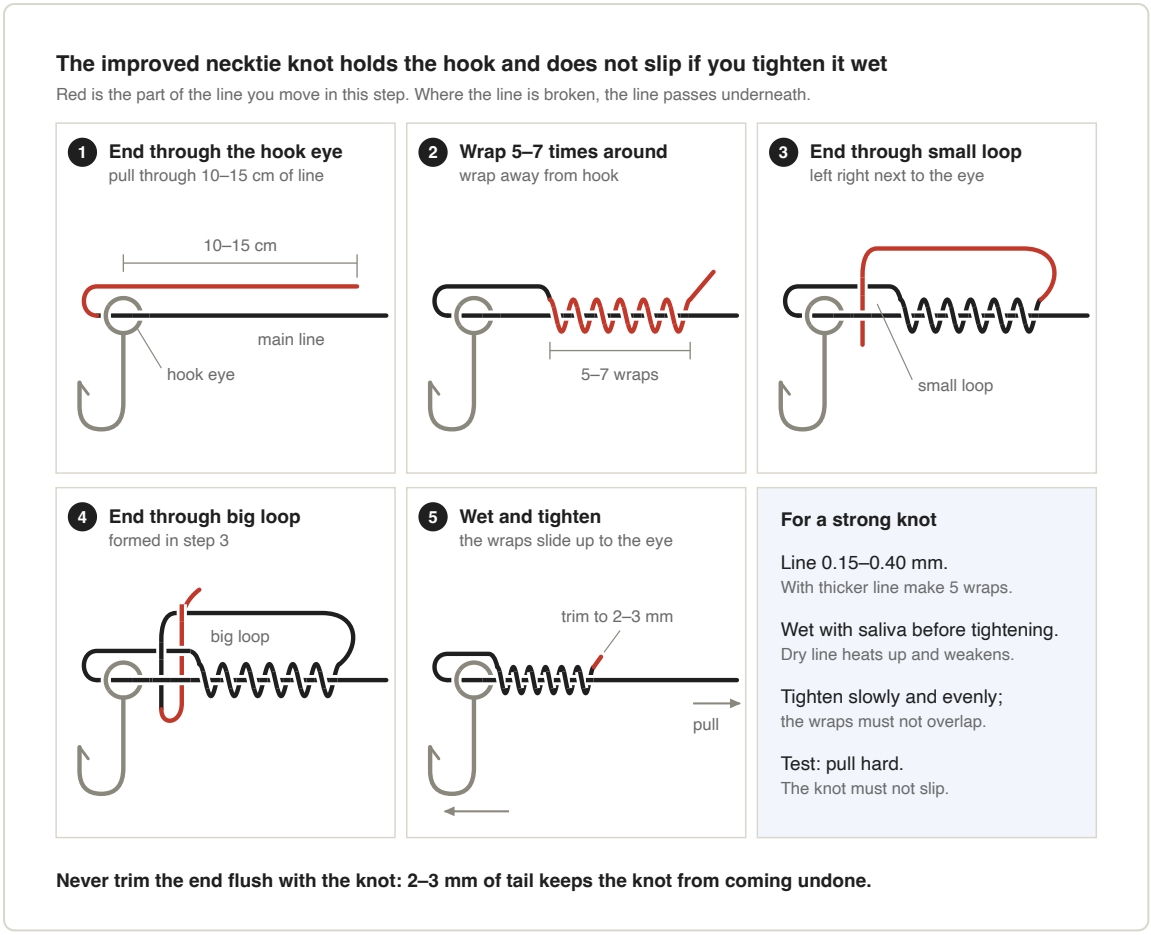


Fishing with a simple rod and basic tackle.

9.3 The hook knot: the improved clinch knot

This knot holds on line of 0.15–0.40 mm and takes 30 seconds to tie, even with cold fingers. Practise it at home until you can tie it with your eyes closed.

1. Push the free end of the line through the eye of the hook. Pull it 10–15 cm through.
2. Wrap the free end around the main line 5–7 times. Thinner line = more turns, thicker = fewer.
3. Bring the free end back and push it through the small loop right next to the hook eye.
4. This creates a new, large loop beside the wraps. Push the free end through that as well – this is the "improved" part.
5. Moisten the knot with saliva. Dry nylon heats up and weakens as it tightens.
6. Tighten slowly by pulling the main line and the hook apart. The wraps must slide neatly down to the eye.
7. Trim the free end 2–3 mm from the knot. Test it with a firm pull.



Plan. An improved necktie knot in five steps.

Use the same knot for swivels and sinkers. To tie the line to a hand-line reel, a simple loop with two half hitches is enough (more knots in chapter 16).

9.4 Where the fish are through the year

Season	Where to look	When
Spring (Mar–May)	Shallows warmed by the sun, tributary mouths, weedy bays	Midday and afternoon, when the water warms up
Summer (Jun–Aug)	Shade under trees, deeper pools, riffles with more oxygen, below weirs	Early morning, late evening and at night
Autumn (Sep–Nov)	Fish feed intensively before winter: pool edges, beside fallen trees	All day, best in the morning
Winter (Dec–Feb)	The deepest, slowest parts of the river, deep holes in lakes	Midday; fish are sluggish, so keep the bait small and slow

General rule: a fish stays where it spends little energy and the current brings it food. That means pools behind rocks, under overhanging banks and at confluences where the current slows. Fish often bite better before a storm and when the air pressure is falling.

9.5 Fishing with improvised gear

- **Hook:** from a safety pin, a small nail, a bent paper clip or a thorn (hawthorn, sloe) tied to a small stick. Sharpen the point on a stone.
- **Line:** from thread, unravelled rope or the inner strands of paracord. One length of paracord has 7 inner strands.
- **Float:** a piece of dry elder stem, cork, a bottle stopper, a bird feather.
- **Sinker:** a nut, a screw, a small pebble in a knot.

Bait

- **Earthworms:** in the evening, water the grass or leave a wet board on the ground overnight; collect them from under it in the morning. Keep them in damp soil with leaves.
- **Larvae** from stones in a stream (turn over a stone, collect caddisfly larvae), grubs from rotting wood, grasshoppers in summer.

- **Plant baits:** bread kneaded with a drop of oil, tinned sweetcorn, boiled potato. Good for carp, chub and tench.
- **Pieces of offal** and fish: for pike, wels catfish, eel and crayfish.

Set lines ("postavke")

Lines with hooks on branches along the bank or across a stream fish while you do something else. Section 9.13 describes how to make one with a branch as a spring and a bell. Remove all lines when you finish – an abandoned hook kills birds and otters.

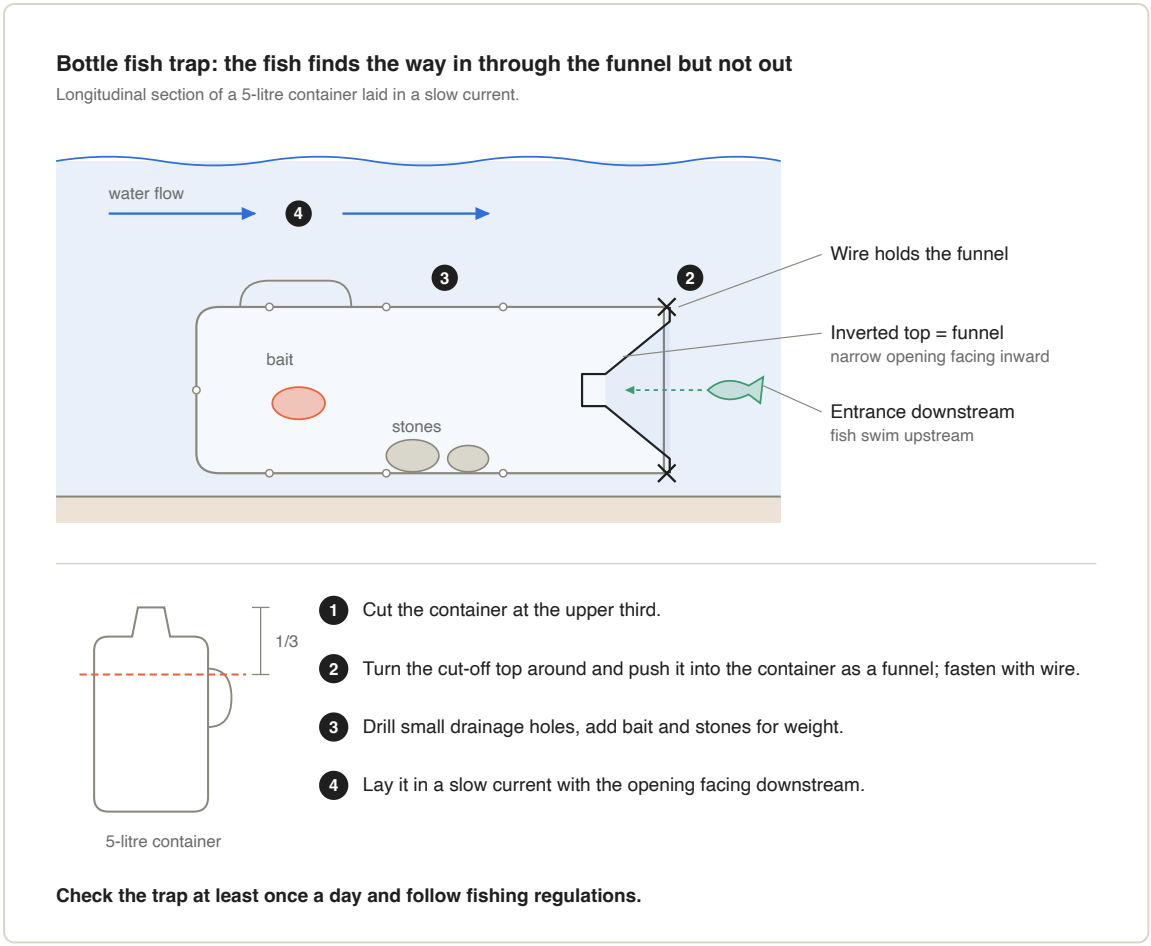
9.6 A fish trap from a plastic bottle (small fish and crayfish)

1. Cut a 5-litre plastic jerrycan or a 2-litre bottle in two at a third of the way down from the neck.
2. Turn the top part around and push it into the bottom part like a funnel; fasten it with string or wire.
3. Make small holes in the walls to let the water drain, and put a few stones inside for weight.
4. Bait with bread, offal or cat food. Place it at the bank in a slow current, with the opening facing downstream.
5. Check it in the morning. You will catch chub, minnows, gudgeon and signal crayfish (invasive – you can eat them).

A larger trap made of woven wood or fence mesh works on the same principle. Tie the cord to a tree so that high water does not carry it away.



A fish trap made from a 5-litre jerrycan: fish swim in through the funnel and cannot find the way out.



Plan. A fish trap from a plastic jerrycan, step by step.

9.7 Traps for small animals: where and how (only in an emergency)

Traps work for you 24 hours a day. Out of 10 traps set, expect 1–2 catches a day if you set them correctly. A badly set trap will catch nothing even in a whole month. Remind yourself: in normal circumstances traps are prohibited for private individuals (see 9.1). Everything that follows is for a genuine emergency, or for practice without catching anything.

> **WARNING**
>
> Do not trap protected species: hedgehog, otter, beaver, lynx, bear, wolf, wildcat and all songbirds are protected even in a crisis. Do not set traps along paths where people, children and dogs walk. Do not build traps that could injure a person (pits with stakes, set arrows and the like) – that is a criminal offence and dangerous for you too.

The most suitable targets are common and invasive species: rat, coypu and muskrat by the water, and in extremis hare and edible dormouse. A coypu weighs 5–9 kg, a muskrat about 1–1.5 kg, a hare 3–5 kg, a rat 0.2–0.5 kg, an edible dormouse about 0.1–0.2 kg.

Reading the terrain

Animals save energy just like fish do. They use the same paths, the same gaps, the same routes to water. Set the trap where the animal already walks, not where you would like it to walk.

- **Trails:** beaten paths in grass and brush, 10–20 cm wide. A fresh trail has flattened blades of grass, bare soil and no cobwebs across it.
- **Gaps under fences:** dug hollows under a wire fence, smooth soil, hair on the bottom wire. This is the best place for a snare.
- **Bottlenecks:** between two bushes, between a rock and a tree, under a fallen trunk. The animal cannot go around the trap here.
- **By the water:** paths to the drinking place, slippery exit spots on the bank ("slides"), holes in the bank just above the waterline (coypu, muskrat, rat).
- **Near feeding places:** field edges, orchards with fallen fruit, compost, chicken coop. That is where rats and dormice are.

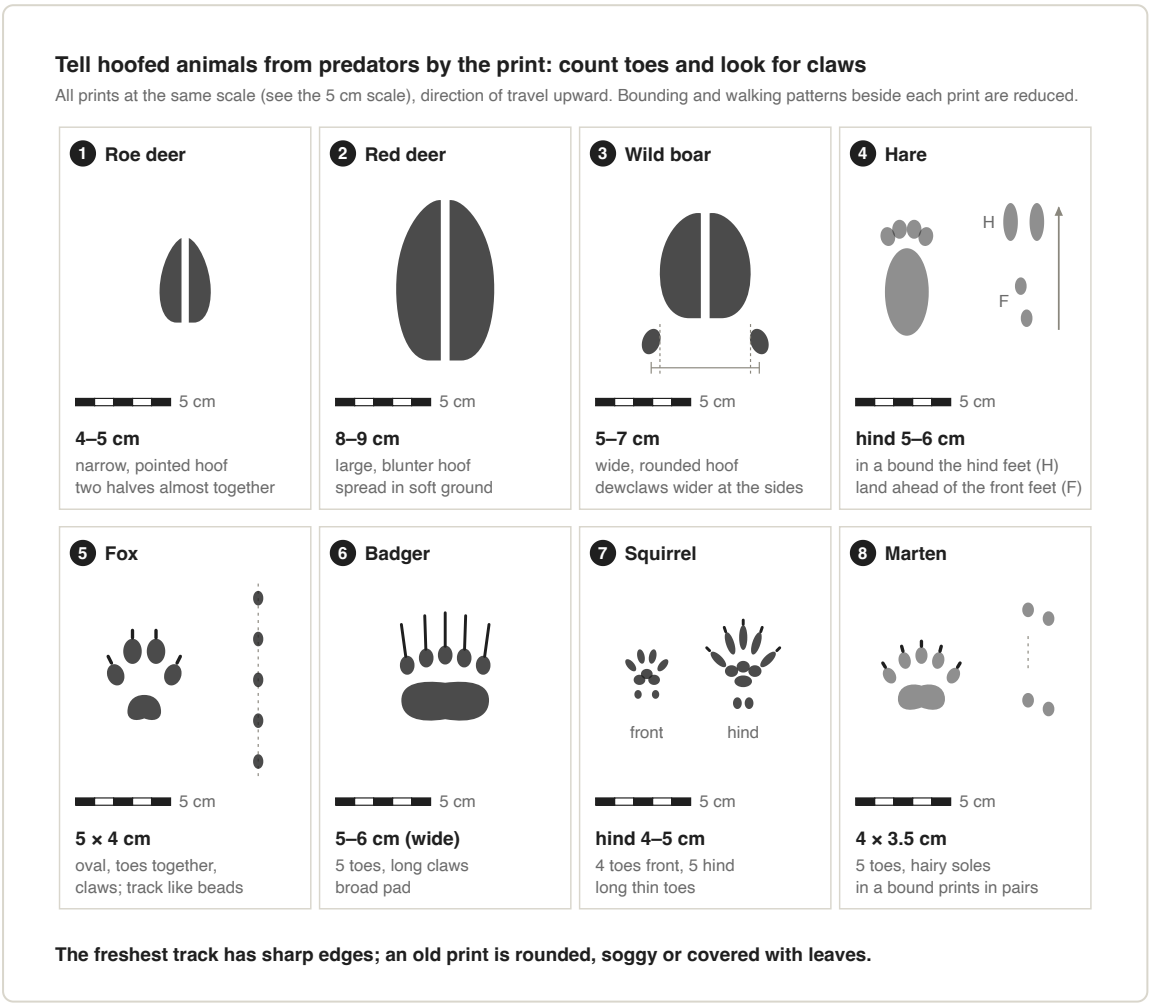
Do not set a trap right where the animal lives or sleeps. It is wary there. Place traps on a trail 5–20 m from the den or feeding place, where the animal moves relaxed.

9.8 Reading animal tracks and signs

Before you set a single trap, just observe for 1–2 days. The best time to look for tracks is the morning after rain or after fresh snow. Then all the tracks are from the last night.



Fresh roe deer tracks in thin snow: narrow split hooves in an almost straight line.



Plan. Tracks of eight Slovenian animals at the same scale, with length and an identifying mark.

Animal	Track	Droppings	Other signs
Hare	Long hind prints (10–15 cm) ahead of round front prints; in a bound the pattern looks like the letter Y	Round, slightly flattened pellets about 1 cm across, made of plant fibres	Smooth slanting cut on twigs at 45°, as if made with a knife; gnawed bark in winter
Roe deer	Two narrow hooves, 4–5 cm long, heart-shaped	A pile of dark shiny pointed pellets	Torn, ragged edges on shoots (no upper incisors); rubbed saplings
Wild boar	Wider hooves, with dewclaws pressed in behind them	Large piles, similar to pig droppings	Rooted-up ground, wallows, mud on trunks up to 70 cm high. **Do not hunt – dangerous**
Fox	Oval print 4–5 cm, 4 toes with claws, prints in a straight line as if on a string	Elongated, twisted, with a point, often on a stone or in the middle of a path	Sharp smell. Do not hunt: it carries tapeworm and rabies

Animal	Track	Droppings	Other signs
Rat	4 toes in front, 5 toes behind, 2–3 cm; tail drag mark in between	Spindle-shaped, 1–2 cm, often in groups	Beaten paths along walls, greasy marks on edges, holes 6–8 cm
Coypu, muskrat	By the water; webbing between the toes on the hind foot	Elongated, green, on stones and trunks by the water	Holes in the bank, paths from the water into the reeds, gnawed stem sections
Edible dormouse	Rarely visible (it climbs)	Tiny, dark, on beams and in attics	Gnawed walnuts and hazelnuts, noise at night, nest in a tree hollow
Bear	5 toes, 12–15 cm wide, hind print like a human foot	Large piles, often with seeds and fruit	Overturned stones, broken-up anthills. **Withdraw immediately**

- **Hair:** on barbed wire, thorns and the bottom wire of a fence. Grey and brown hair low down = hare or fox, bristly hair = wild boar.
- **Gnawed remains:** gnawed cones, walnuts with a small hole, bitten-off twigs. Fresh gnawings are light, old ones darken in 1–2 days.
- **Dens:** holes in banks, under roots and in piles of stones. A used den has freshly dug earth in front of the entrance and no cobwebs.

WARNING: BEAR AND WOLF

Bears live in the Kočevje region, in Notranjska and in much of southern Slovenia. In these forests do not use meat bait and do not leave offal lying around. The smell draws the bear to your traps and to your camp. Never hunt bears or wolves.

Masking your scent

A wild animal can smell a human on a trap for several days. So:

- Wear gloves that you use for nothing else when making and setting traps. Keep them in a bag with leaves and soil from the setting site.
- Smoke the wire and sticks over a fire of green leaves for 5–10 minutes. The smoke covers the smell of hands and oil.
- Smear new wire with mud or bury it in damp soil for 1–2 days. It must not shine.
- Do not spit, smoke or eat on the trail. Approach the trap from one side and always along the same edge.
- Cuts on fresh wood are light-coloured and fragrant. Rub them with soil.

How many traps and how often to check

- Set 10–20 traps at once. One or two traps is a game of chance.
- On one trail set 2–3 snares 10–30 m apart.
- Check traps every morning – this is ethics and the law. A caught animal must not suffer. Check live traps twice a day, in the morning and before dusk.
- If a trap catches nothing for 3 days, move it. If it is sprung and empty, adjust the height or the funnel.
- In winter and in hot weather check more often. The meat spoils, and foxes and crows eat the catch.

A map of the traps

Traps you cannot find go on catching and tormenting animals. Record every location.

1. Draw a simple sketch of the route from home or camp: stream, trees, rocks, fences.
2. Mark each trap with a number and type (S = snare, D = deadfall, B = box trap, F = fish trap).
3. On the terrain, 1–2 m from the trap and not on the trap itself, tie a piece of coloured tape or cut a mark in the bark.
4. At each check, write down the date and the result. After a few weeks you can see which sites work.
5. When the crisis is over or you are leaving, remove all traps according to the list. Cross out each number.

Ethics and a quick kill

Catch only as much as you eat. Release females with young, unwanted species and domestic animals (cats, dogs) from a live trap immediately. Kill a small animal that is still alive in the trap at once: with one hard blow of a stick to the back of the head, just behind the ears. Do not hesitate and do not try several half-hearted blows. Kill a fish on catching it with a blow to the head behind the eyes. Wear gloves when handling a caught animal: rodents and hares can carry diseases (tularaemia, hantavirus, leptospirosis).

- Birds: in an emergency, pigeons from a roof or yard with a cage on a trigger stick and grain. Do not trap songbirds.

TIP

Domestic small animals (rabbits, chickens, chapter 8) are a far more reliable source of meat than traps. A pair of rabbits gives 30–40 young in a year, 5 hens about 1,000 eggs. Traps are a supplement, not a plan.

9.9 A snare on a trail with a funnel

The snare is the simplest and lightest trap: 10 snares weigh less than 100 g. The animal tightens it itself as it pushes its head through and continues on its way. A funnel of twigs forces it to go exactly through the loop.



A thin-wire snare on a hare run, with a funnel of twigs on both sides.

YOU NEED

- Thin soft wire 0.5–0.8 mm (galvanised, brass or copper), 60–80 cm per snare (a 50 m coil, €5–10)
- A sturdy wooden stake, 40–50 cm long and 3–4 cm thick, or a tree trunk by the trail
- 10–20 dry twigs, 40–60 cm long, for the funnel
- Knife, pliers, gloves

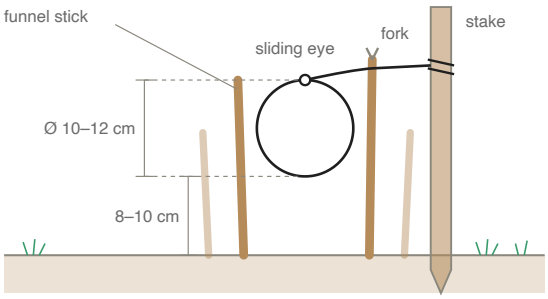
Animal	Loop diameter	Bottom edge above ground
Hare	10–12 cm	8–10 cm
Coypu	12–15 cm	5–8 cm, at the exit from the water
Muskrat	8–10 cm	3–5 cm
Rat	5–6 cm	2–3 cm

1. At one end of the wire make an eye: wrap the end twice around a nail or small stick and twist it. Eye diameter 4–5 mm.
2. Push the other end through the eye. This forms a sliding noose. Check that it slides smoothly without catching.
3. Bend the wire slightly just behind the eye. The snare then closes easily but opens with difficulty.
4. Tie the free end to the stake with a double wrap and a twist. Drive the stake in beside the trail 20–30 cm deep, leaning away from the trail.
5. Hang the snare at right angles to the trail, at the measured height. Support it with a forked twig or a blade of grass that holds it lightly.
6. On both sides of the snare push twigs into the ground in a V shape: the narrow part (the width of the loop) at the snare, the wide part (50–80 cm) towards the approaching animal.
7. Lay one thin twig across above the snare, 20–25 cm high. The animal will not jump over it but will go underneath.
8. Tidy the surroundings: do not break up the brush, leave no fresh cuts or litter. Leave along the same edge you came by.

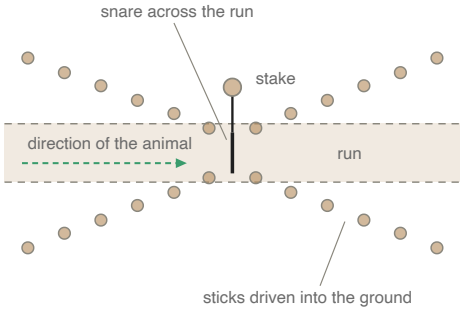
Snare on a run: the animal puts its head into a sliding loop that tightens

Soft wire on a well-worn hare run; sticks at the sides lead it straight into the snare.

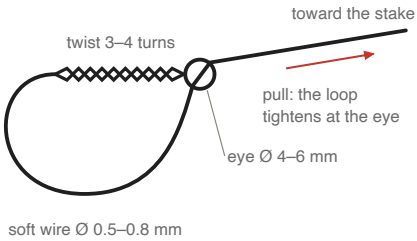
View along the run



Plan view: sticks lead into the snare



Enlargement: sliding eye



1. Place the snare on a well-worn run where it narrows.
   Signs: droppings, trampled grass, a gap in the bushes.
2. Make a small eye at the end of the wire and twist it.
   Pull the other end through the eye: this forms a sliding loop.
3. Hang the Ø 10–12 cm loop 8–10 cm above the ground.
   Tie the free end firmly to a driven stake or a trunk.
4. At the sides, drive sticks into a funnel leading to the snare.
   The animal must not be able to go around the snare.

Check the snare every morning. Snares are prohibited in Slovenia – use only in extreme emergency.

Plan. A sliding snare of soft wire on a hare run with a funnel of sticks and an enlarged view of the sliding eye.

The most common mistakes

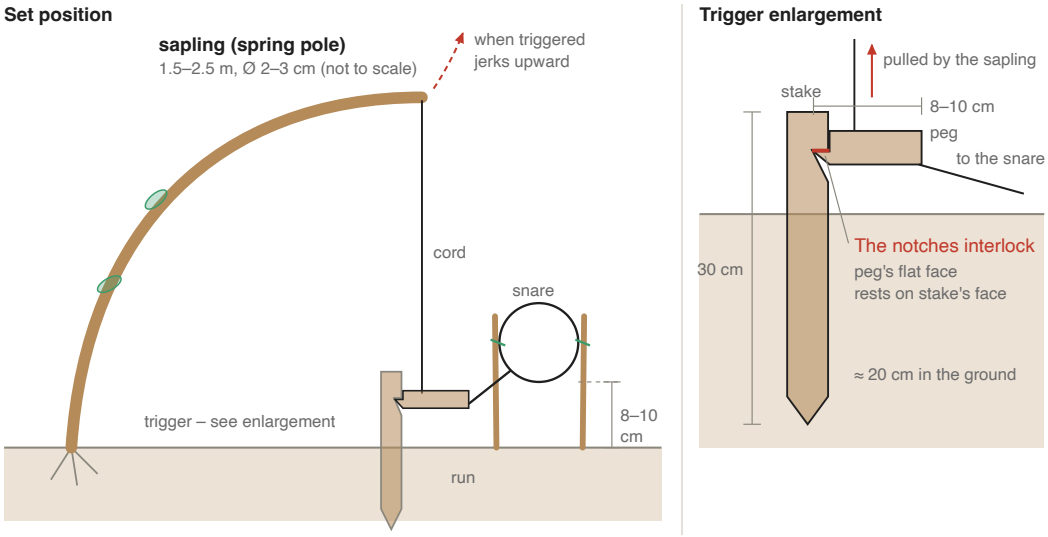
- **A loop that is too big or too low:** the animal goes through with its whole body or steps into it with a foot. A trapped leg means long suffering – measure precisely.
- **Bright, fresh wire** smelling of hands: the animal avoids it.
- **A weak anchor:** a hare pulls with a force of several kilograms. The stake must be deep or tied to a trunk.
- **A snare in the open:** without a funnel the animal goes around it by 10 cm.
- **Checking too rarely:** a fox eats the catch and the snare is destroyed.

9.10 A spring snare with a sapling and a two-part trigger

In a spring snare a bent sapling pulls the animal upward when triggered. The animal is tightened faster, predators cannot reach it, and the snare does not end up hanging on the ground. Set it on a trail or a gap under a fence where a springy young tree grows.

Spring snare: when the animal pulls the peg out of the notch, the bent sapling jerks it upward

Set position. The trigger is held only by the tension of the sapling pressing the peg against the notch in the stake.



1. Beside the run choose a flexible young tree (sapling) 2–3 cm thick.
2. Drive a stake (30 cm) 20 cm deep; cut a notch in it with a flat face on top.
3. Cut a matching notch in the peg (8–10 cm) so the two flat faces fit exactly.
4. Bend the sapling, tie the cord to the peg and hook it under the notch of the stake.
5. Tie the snare to the free end of the peg and support it with two twigs 8–10 cm above the ground.

The sapling strikes with great force: stand to the side while setting. Check every morning.

Plan. A spring snare with a bent sapling and a two-part trigger of notched pegs.

YOU NEED

- A wire snare as in 9.9
- A springy sapling (hazel, young beech, willow), 1.5–2.5 m long, 2–3 cm thick at the base – or a live young tree beside the trail
- A cord of 1–1.5 m (paracord, linen thread)
- 2 pieces of hard wood for the trigger: a 30 cm stake and a 10 cm crossbar, both 2–3 cm thick

1. **The stake with a hook:** on the 30 cm stake cut a hook-shaped notch 8–10 cm from the top end. The notch should be 1/3 of the thickness deep, with a flat upper edge.
2. **The crossbar:** on the 10 cm crossbar cut an identical notch, facing up. When you engage the two notches, they must catch like two hooks.
3. Drive the stake in beside the trail 15–20 cm deep, with the hook facing the sapling.
4. Tie the cord to the top of the sapling. Tie the crossbar to the other end of the cord at its middle.
5. Tie the snare to the crossbar so that it hangs over the trail at the correct height (table in 9.9).
6. Bend the sapling down and hook the crossbar behind the hook on the stake. The force of the sapling holds the trigger together.
7. Set the trigger lightly: when the animal pulls the snare by 1–2 cm, the crossbar must slip off the hook.
8. Add a funnel of twigs as for the snare on a trail.

WARNING: PROTECT YOUR EYES AND HANDS

A tensioned sapling strikes with considerable force. When tensioning, stand to the side, never with your face over the sapling. Wear glasses if you have them. Do not set spring snares along paths where people, children or dogs walk.

9.11 Deadfall traps: figure-4 and Paiute

A deadfall is a heavy stone or log propped up by a trigger made of sticks. When the animal moves the bait, the weight falls and kills it instantly. It suits mice, rats and dormice, and a larger one also a muskrat. You build it from sticks, a knife and a stone alone.

The weight of the slab

- The slab (a flat stone, a log or a weighted board) should weigh **about 5–10 times as much as the animal**. For a rat (0.3 kg) that means 2–3 kg, for a muskrat (1.5 kg) 8–15 kg.
- The surface under the slab must be hard: a flat stone or hard ground. On a soft surface the animal survives under the slab.
- The slab should be at least twice as long as the animal so that it does not miss.



A figure-4 trap made of three notched hazel sticks holding up a stone slab; the bait is at the end of the trigger.

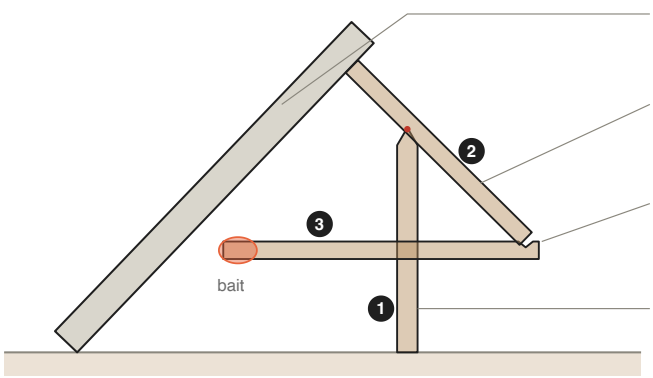
Figure-4: cutting the notches step by step

You need 3 straight dry sticks 1.5–2 cm thick: an upright (A), a diagonal (B) and a bait stick (C). For a rat: A and B 25–30 cm each, C 35–40 cm.

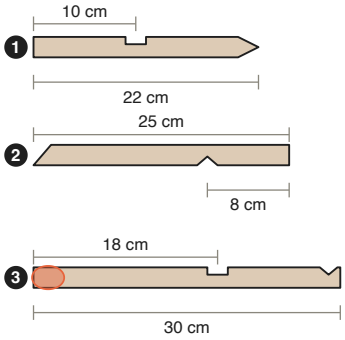
1. **The upright (A):** sharpen the top end to a flat chisel (two slanted faces). In the middle of the stick, on the side that will face the bait, cut a square notch 1/3 of the thickness deep.
2. **The diagonal (B):** 5–6 cm from one end cut a notch into which the chisel of stick A fits. Sharpen the other end to a chisel.
3. **The bait stick (C):** 2 cm from one end cut a notch into which the chisel of stick B fits. Where C crosses stick A, cut a square notch that catches in the notch on A. Sharpen the other end for the bait.
4. Assemble the sticks on a dry surface without the weight. When you hold them together they must form the shape of the number 4.
5. Put the bait on the bait end of stick C before you set the trap.
6. Stand stick A vertically on the hard surface. Place the notch of B on its top, with the short end of B under the edge of the slab. Hook the bait stick C under A and into the chisel of B.
7. Slowly lower the slab onto the short end of B. The slab should stand at an angle of about 30–45°.
8. Test it with a long stick: touch the bait. The slab must fall immediately. If it catches, smooth the notches.

Figure-4 trap: the slab rests on three notched sticks and falls when the animal moves the bait

Side view, sized for a mouse, rat or dormouse. Dimensions are approximate; the sticks are about 2 cm in diameter.



Sticks taken apart (same scale as above)



Upright
Cut to a peg at the top. Square notch 10 cm from the ground, 5 mm deep.

Slanted stick
V-notch 8 cm from the top end sits on the peg. The bottom end is cut at an angle to catch in the trigger notch. The slab rests on the top end.

Trigger with bait
The square notch 18 cm from the bait catches on the notch of the upright. A shallow notch at the other end receives the slanted stick.

First assemble the sticks without the slab and test: a light touch on the bait must make everything collapse.

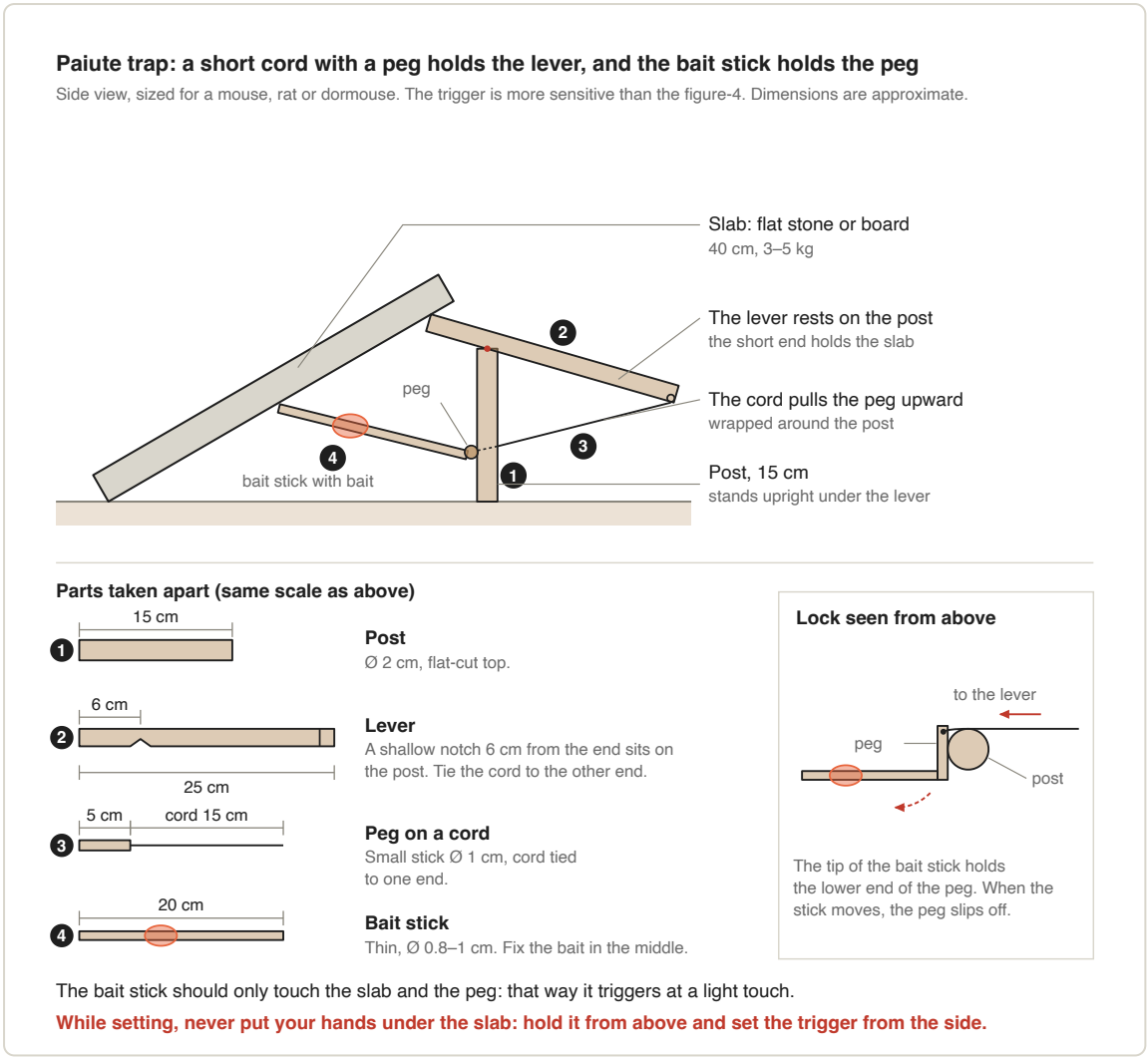
While setting, never put your hands under the slab: hold it from above and the side; set the bait beforehand.

Plan. Figure-4 trap: the slab rests on three notched sticks and falls when the animal moves the bait; never put your hands under the slab while setting it.

Paiute: a more sensitive trigger

The Paiute (named after a Native American people) is triggered by even a small mouse. You need an upright stick (20 cm), a lever (20–25 cm), a short toggle (5–6 cm), a thin bait stick (25–30 cm) and 15–20 cm of cord.

1. Flatten the top of the upright. In the middle of the lever cut a shallow notch that sits on this top.
2. Tie the cord to one end of the lever and the toggle to its other end.
3. Stand the upright on the surface. Lay the lever on top, with one end under the edge of the slab.
4. Wrap the cord with the toggle around the upright for half a turn.
5. Wedge the bait stick with the bait between the free end of the toggle and the bottom edge of the slab. The tension holds the toggle in place.
6. When the animal moves the bait stick, the toggle springs away, the lever slides off and the slab falls.



Plan. Paiute trap: a lever on a short post holds the slab, and a string with a peg locks it against a thin bait stick.

WARNING: PROTECT YOUR HANDS

A set deadfall does not tell your hand from an animal. Put the bait on before you set the trap. When setting it, always keep your hands outside the slab's area, and hold the slab with your other hand or your knee until the trigger seats. Spring empty traps with a stick, never with your hand. Do not set slabs heavier than 15 kg.



A wooden box trap with a raised door and mesh at the back.

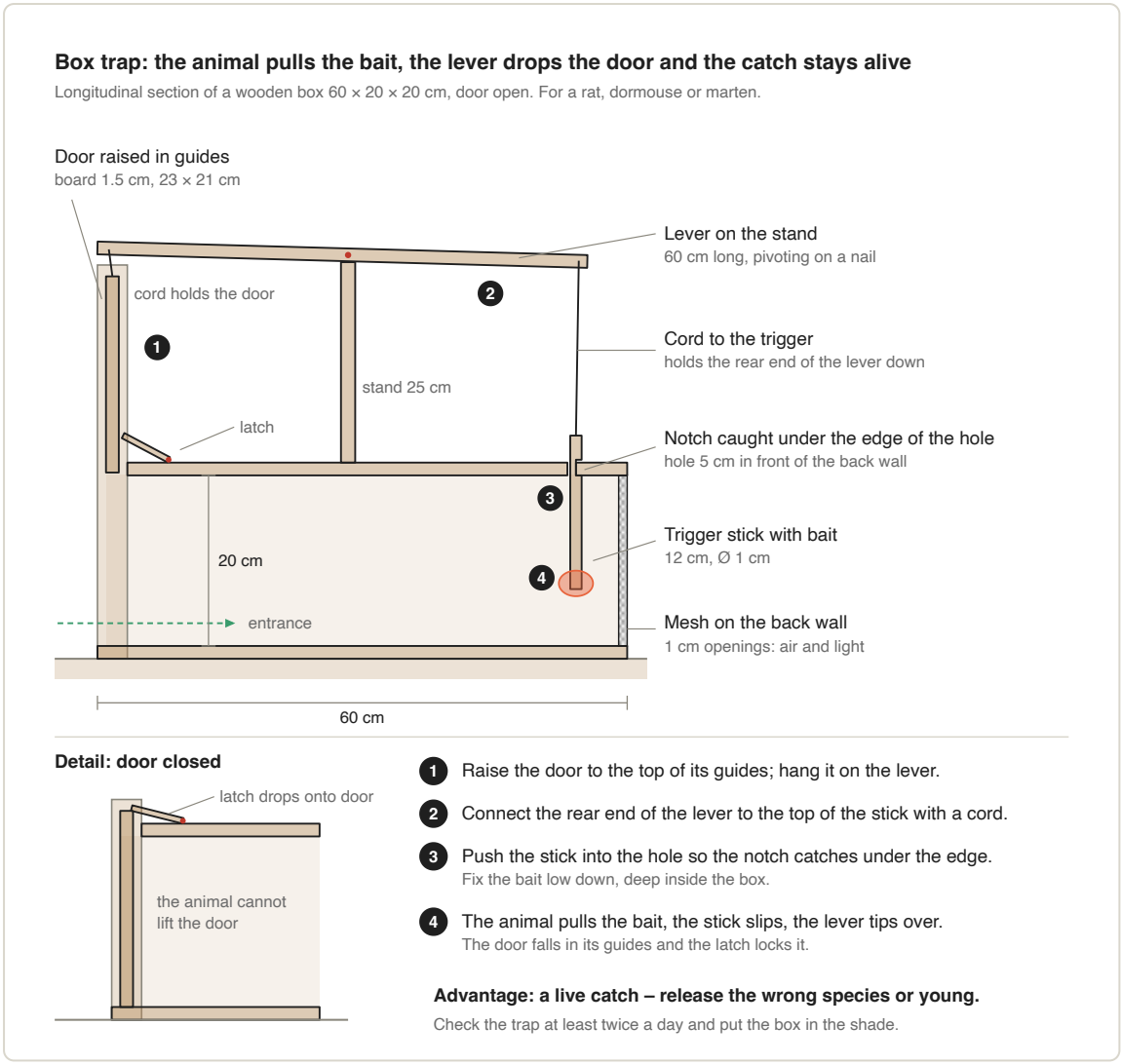
9.12 A box live trap

A live trap catches the animal alive and unharmed. Unwanted species, cats and females with young you release. It suits the area by the house, chicken coop or compost, where you can check it several times a day.

YOU NEED

- A wooden box or boards 1.5–2 cm thick. Inside dimensions: for hare and coypu about 75 × 20 × 20 cm, for rat and dormouse about 40 × 12 × 12 cm
- A piece of wire mesh with 1–2 cm openings for the back (about 25 × 25 cm)
- 2 slats 2 × 2 cm for the door guides, a small board for the door (it slides freely in the guides)
- A 40–50 cm stick for the lever on the lid, 1 m of cord, a piece of thick 2–3 mm wire for the bait hook
- Nails or screws, a saw, a drill

1. Build an oblong box without the front wall. At the back, instead of a board, fix the mesh: the animal can see light through it and goes in without fear.
2. On the front edge fix two vertical guides between which the door slides smoothly. The door should be 2 cm taller than the opening.
3. In the middle of the lid fix a support (a block of wood or a fork) and on it the lever, like a seesaw.
4. Connect the front end of the lever to the door with a cord. When you lift the door, the front end of the lever goes up and the rear end goes down.
5. Through a small hole in the lid, 10–15 cm in front of the back wall, lower a wire hook. Put the bait on its bottom end. Hook the top end of the hook over the rear end of the lever so that it holds it down.
6. When the animal pulls the bait, the hook releases the lever and the door falls.
7. On the front above the door fix a latch: a piece of slat on a nail that swings over the door's top edge after it falls. Without a latch, the animal lifts it with its snout.
8. Drill 4–6 holes of 1 cm diameter in the walls for air. Cover the floor with soil and leaves so that the animal does not feel the wood.



Plan. Box trap: when the animal pulls the bait, the lever tips and the door drops in its guides, so the catch stays alive.

Animal	Best bait
Hare	Apple, carrot, cabbage, fresh clover; in winter the bark of fruit trees
Rat	Peanut butter, bacon, grain, rolled oats with oil
Coypu, muskrat	Carrot, sweetcorn, apple, sugar beet
Edible dormouse	Apple, dried fruit, walnuts, hazelnuts

For the first 2–3 days leave the door secured open and just feed. When the animal regularly takes the bait, set the trap. Cover a caught animal with a cloth – it is calmer in the dark.

9.13 Fish traps from forest materials

A woven fish trap from willow withies

A woven fish trap is an old form of trap that you make without a single bought part. The fish enters through the funnel and cannot find the way back. It works the same way as the bottle trap (9.6), but is larger and also catches chub, nase and crayfish.

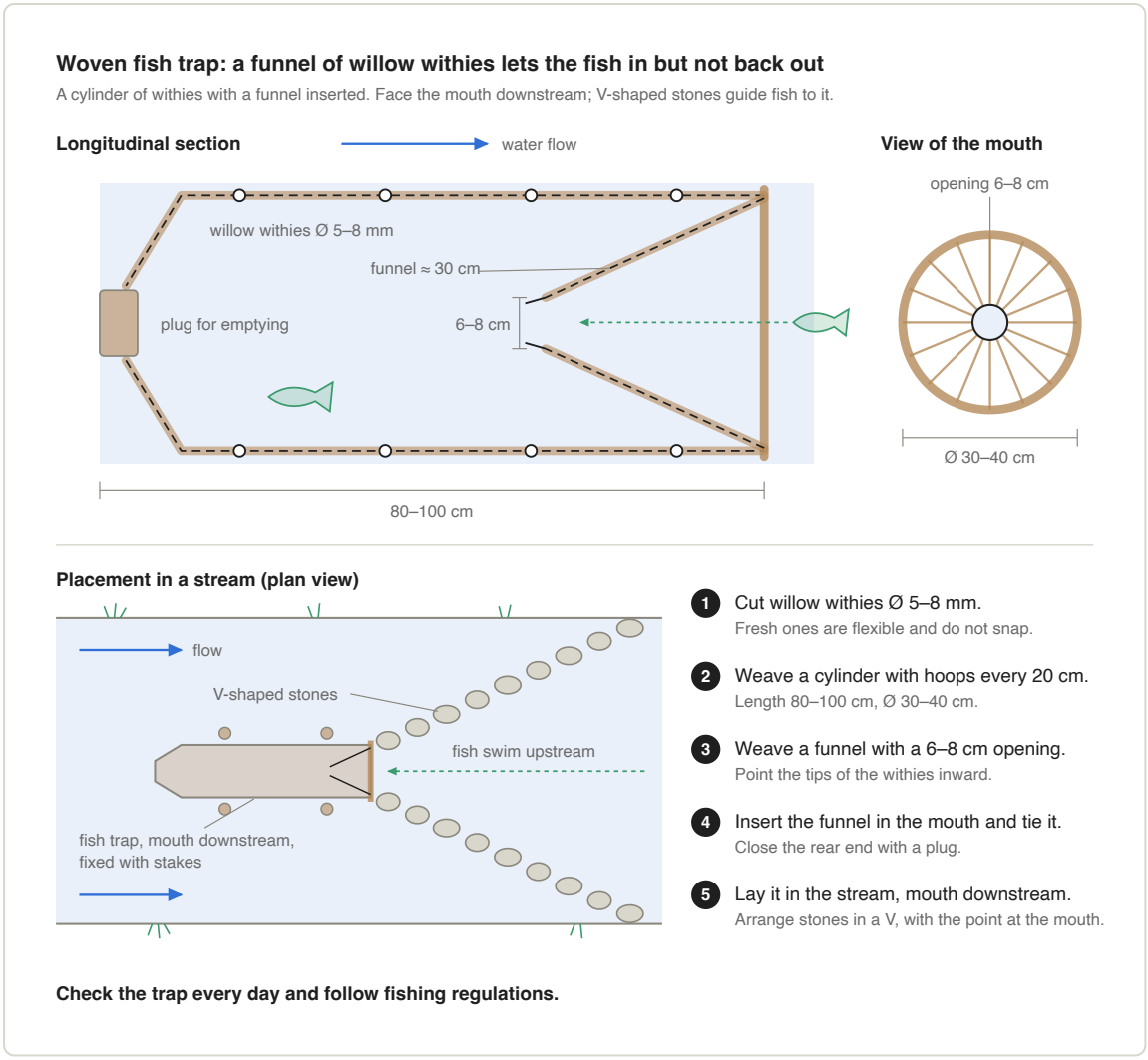


A woven fish trap made of willow withies, weighted with stones in a stream, with the mouth facing downstream.

YOU NEED

- 25–35 willow withies, 1–1.2 m long and 5–8 mm thick (for the frame)
- 3 thicker withies (1 cm) for hoops with a diameter of about 30, 25 and 20 cm
- Many thin withies (3–4 mm) for weaving, or cord, bast, linden bast
- Knife, 3–5 m of rope for tying down

1. Cut the withies in late winter or early spring, when they are supple. Soak dry withies in water for 1–2 days before working.
2. Bend 3 hoops from the thick withies and tie them.
3. **The body:** tie 15–20 frame withies to the largest hoop, 4–5 cm apart. Tie the smaller hoops at 30 cm and 60 cm. Tie the ends of the withies together at the back as a bundle.
4. Weave the body with thin withies in a spiral, with 2–3 cm between the wraps. For small fish and crayfish, 1.5 cm at most.
5. **The funnel (throat):** from 10–15 shorter withies (40–50 cm) make a cone. Tie the wide part to the entrance hoop and leave the narrow part open: diameter 5–8 cm.
6. Push the funnel into the body. The ends of the withies in the throat should be free and slightly springy – the fish pushes them apart as it enters but cannot get out.
7. Tie the final bundle with a cord in a loop. That is where you open the trap and empty it.
8. Put bait in a gauze bag into the trap and 1–2 stones for weight. Turn the opening downstream and tie the trap to a tree or a stake.
9. From stones or twigs build a low V-shaped barrier that leads fish towards the opening.

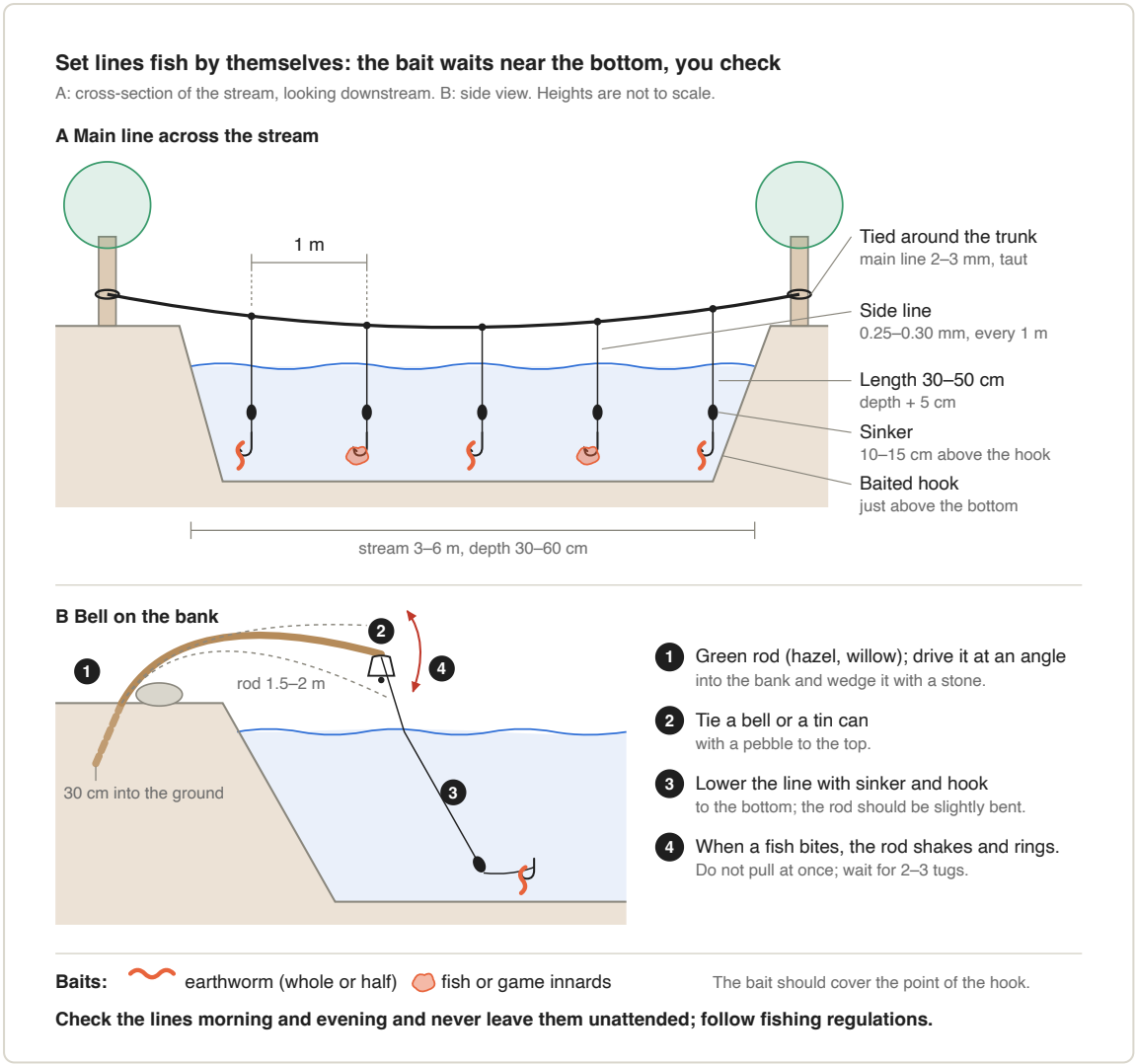


Plan. A fish trap of willow withies with a funnel, and its placement in a stream with a V-shaped stone fence.

Set lines and a bell

Set lines ("postavke") fish while you do something else. A rope across a stream or several lines on branches along the bank, each with a hook and bait. On the main rope, every 1 m tie a 30–50 cm side line of nylon with a hook.

1. Along the bank find a springy branch, or push a 1–1.5 m withy into the bank at a slant over the water, 30–50 cm deep.
2. Tie a line to the tip of the branch, long enough that the bait reaches 20–50 cm above the bottom.
3. To the tip of the branch tie a bell or an empty tin can with 2–3 pebbles. When a fish bites, the branch bobs and the bell rings.
4. Use the branch as a spring: it bends but does not break. The fish hooks itself and does not snap the line.
5. Set them in the evening – wels catfish, eel and carp feed at night. Use earthworms, offal and pieces of fish as bait.
6. Check twice a day, early in the morning and in the evening. At night it is enough to listen for the bell.



Plan. A main line across a stream with side lines and a bell on the bank that signals a bite.

9.14 Trap overview

Mark every site on the trap map and remove all lines when you finish – an abandoned hook kills birds and otters.

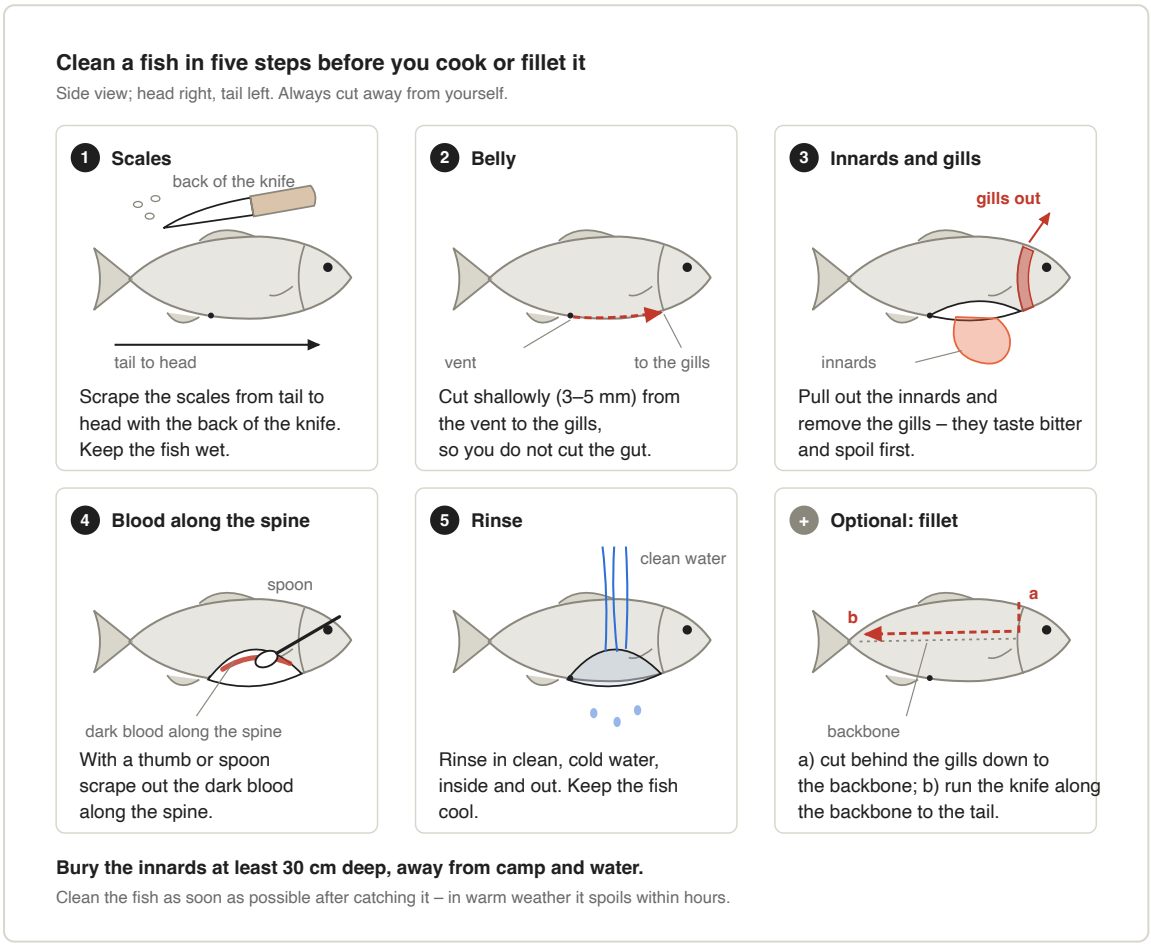
Trap	Target animal	Size, dimensions	Bait	Where to set it
Snare on a trail with a funnel	Hare, coypu, rat	Wire 0.5–0.8 mm; loop 5–15 cm; edge 2–10 cm above ground	No bait	Trail, gap under a fence, bottleneck between bushes
Spring snare	Hare, coypu	Sapling 1.5–2.5 m, 2–3 cm thick; trigger 30 + 10 cm	No bait	Trail beside a springy sapling, exit from the water
Figure-4	Mouse, rat, dormouse, muskrat	Sticks 25–40 cm; slab 5–10 × the animal's weight	Grain, bacon, apple	Along a wall, at a feeding place, on a hard surface
Paiute	Mouse, rat, dormouse	Sticks 5–30 cm, cord 15–20 cm	Grain, nuts	As for the figure-4; for smaller and wary animals
Box live trap	Hare, coypu, rat, dormouse	75 × 20 × 20 cm or 40 × 12 × 12 cm	See the bait table in 9.12	By the compost, chicken coop, field edge
Bottle fish trap	Small fish, crayfish	2–5 l	Bread, offal, cat food	Slow current along the bank
Woven fish trap	Chub, nase, crayfish	Length 80–100 cm, entrance 30 cm, throat 5–8 cm	Offal, bread in gauze	Current along the bank, with a V barrier
Set lines	Wels catfish, eel, carp	Side line 30–50 cm per 1 m	Earthworms, offal	Pools, slow water, at night

FROM HISTORY

In Notranjska and the Kočevje region, edible dormice were hunted for centuries with wooden traps set in trees in beech forests. Dormouse hunting (polharjenje) is part of folk tradition; today it is regulated by hunting rules. Dormouse meat was dried and smoked, and the fat was used for cooking and as a remedy.

9.15 Cleaning and preparation

- **Fish:** scale from tail towards head, cut the belly from the vent to the gills, remove the entrails and the dark blood along the backbone. Remove the gills – they spoil quickly. Without a refrigerator, eat fish the same day or salt, dry or smoke them.
- **Hare, rabbit:** cut the skin around the hind legs and pull it down like a stocking. Open the belly, taking care not to puncture the intestine and bladder. Liver with white spots = discard the animal (tularaemia). Work with gloves.
- **Always cook game thoroughly** (core temperature 75 °C) – wild boar and bear can carry trichinella, and fish carry parasites.
- Use offal and bones for bait or compost, and salt and dry the skin for later tanning.



Plan. Cleaning a fish in five steps and filleting.

9.16 Storing fish without a refrigerator

Dry salting

1. Clean the fish, remove the head, and open out or fillet the larger ones.
2. For 1 kg of fish, prepare 250–300 g of coarse salt.
3. In a (non-metal) container pour a layer of salt, then a layer of fish skin side down, then salt again. The last layer is salt.
4. Weigh it down with a board and a stone. The fish release liquid – leave it.
5. After 5–7 days in a cool place (below 10 °C) the fish keep for several weeks. Before cooking, soak them for 12–24 hours and change the water 2–3 times.

Drying

Cut fillets into strips 1 cm thick. Soak them for 1 hour in brine (100 g of salt per 1 l of water). Hang them in a windy, sunny place, protected from flies (gauze, a thin curtain). In dry weather they are dry in 3–5 days. The fish is ready when a strip snaps rather than bends. Store them in a cloth bag in a dry place.

Smoking

- **Hot smoking** (70–90 °C, 2–4 hours): the fish is cooked and smoked, and keeps 1–2 weeks in the cold.
- **Cold smoking** (below 30 °C, 2–5 days with breaks): salt the fish well first; it keeps for several weeks.
- Use hardwood: beech, alder, fruit trees. Conifers give a bitter, resinous taste.

Building a smokehouse is described in chapter 5.

FROM HISTORY

Along the Sava, Mura and Drava, fishermen dried fish for centuries on wooden racks beside their houses and traded them in winter for grain. On the Karst and in Istria, sardines and anchovies were salted in wooden barrels – this process has essentially not changed to this day.

CHAPTER 10

Foraging

Hundreds of edible plants grow in Slovenia's forests and meadows, but do not eat any of them unless you are 100% sure you have identified it. Learn 15–20 plants very well rather than 100 poorly. For mushrooms the rule is even stricter.



The forest's spring harvest: wild garlic, nettle, dandelion and spruce tips.

10.1 Calendar of edible plants

Season	Plant	What you eat	How
Spring (Mar–May)	Dandelion	Young leaves, root, flower	Salad; coffee from roasted root
Spring	Stinging nettle	Tips	Cooked like spinach, tea; very rich in iron and protein
Spring	Wild garlic (ramsons)	Leaves	Raw, pesto. Warning: it can be mistaken for the deadly poisonous lily of the valley and autumn crocus
Spring	Plantain, chickweed, corn salad	Leaves	Salad
Spring	Spruce tips	Young tips	Syrup, tea with vitamin C
Summer (Jun–Aug)	Elder	Flowers, then ripe berries	Syrup; berries only cooked
Summer	Wild strawberries, raspberries, bilberries, blackberries	Fruits	Fresh, dried, jam
Summer	Linden, chamomile, St John's wort, wild thyme	Flower, leaf	Tea and home medicine cabinet
Autumn (Sep–Nov)	Sweet chestnut	Nuts	Roasted, boiled, flour
Autumn	Hazelnuts, walnuts, beechnuts	Nuts	Beechnuts only roasted and in small quantities
Autumn	Rose hip, hawthorn, sloe, Cornelian cherry	Fruits	Tea, marmalade; rose hip: the most vitamin C
Autumn	Acorn	Nuts	Soak in water for several days (removes tannins), then flour
Winter	Spruce needles, birch and maple sap (Feb–Mar)	Needles, sap	Tea; sap fresh or concentrated
All year	Inner bark of pine, spruce, birch	Cambium	Emergency food, dried and ground into flour

10.2 15 plants to learn first

These plants are common throughout Slovenia, have clear identifying features and few dangerous look-alikes. Look at each one in the wild in every season be-

fore you forage it.

Plant	Key features	Warning
Dandelion (*Taraxacum officinale*)	Basal rosette of toothed, hairless leaves; hollow stem with white milky sap; one yellow flower per stem	Similar plants are mostly edible, but more bitter
Stinging nettle (*Urtica dioica*)	Opposite toothed leaves, stinging hairs, square stem, hanging green flower clusters	Pick with gloves; after flowering, only the tips
Wild garlic (*Allium ursinum*)	Each leaf on its own stalk from the ground; strong smell of garlic; white star-shaped flowers in an umbel	See 10.4 – a mix-up is deadly
Ribwort plantain (*Plantago lanceolata*)	Lance-shaped leaves with 3–5 parallel veins that remain like threads when torn	No dangerous look-alikes
Common chickweed (*Stellaria media*)	Creeping, tiny opposite leaves, small white flowers with 5 deeply divided petals; one line of hairs on the stem	Do not confuse with scarlet pimpernel (orange flowers)
Corn salad (*Valerianella locusta*)	Rosette of spoon-shaped smooth leaves in fields in early spring	Pick before flowering
Black elder (*Sambucus nigra*)	Shrub with bark covered in corky warts; pinnate leaves with 5–7 leaflets; flat white flower heads; black berries	Dwarf elder is an herb, not a shrub; red elder has red berries and upright flower heads
Blackberry (*Rubus fruticosus*)	Prickly creeping canes, leaves of 3–5 leaflets, black compound fruits	No dangerous look-alikes
Raspberry (*Rubus idaeus*)	Upright canes with small prickles, leaves white underneath; the fruit separates from the receptacle and is hollow	No dangerous look-alikes
Rose hip (dog rose, *Rosa canina*)	Hooked thorns, pink flowers with 5 petals, red oblong fruits in autumn	The hairs inside the fruit irritate – remove them
Common hawthorn (*Crataegus monogyna*)	Thorny shrub, deeply lobed leaves, white flowers in May, red fruits with 1–2 stones	If you take heart medication, consult a doctor
Cornelian cherry (*Cornus mas*)	Yellow flowers in March before the leaves; opposite leaves with arching veins; bright red oblong fruits Aug–Sep	Eat only fully ripe, soft ones
Linden (*Tilia*)	Heart-shaped asymmetric leaves; fragrant yellowish flowers in June, hanging with a winged bract	Pick the flowers straight after they open
Sweet chestnut (*Castanea sativa*)	Oblong leaves with sharp teeth; burr with dense thin spines; nut with a pointed tip and a "tuft"	Horse chestnut (poisonous) has palmate leaves, sparse thick spines and a round nut
German chamomile (*Matricaria chamomilla*)	White ray florets, a yellow raised flower head that is **hollow** when cut open; strong sweet smell	Stinking mayweed has a solid flower head and an unpleasant smell

10.3 Atlas of fruits: edible and poisonous

Fruits are the most treacherous group: a poisonous berry is often prettier and sweeter than an edible one. Children eat them because of the colour. Below are the most common edible fruits of Slovenia's forests and their poisonous look-alikes. Learn them in pairs: when you know the bilberry, also learn the deadly nightshade.

WARNING

The photographs are an aid to visualise the plant, not to identify it. Before you eat anything, verify the plant in a field guide or with someone who knows it. Always compare several features at once: leaf, growth form (herb, shrub, tree, climber), fruit, flower and ripening time. If even a single feature does not match, do not eat the fruit. Teach children the rule: no berry in the mouth without an adult.

How to check a fruit

1. **Growth:** is it an herb, a knee-high dwarf shrub, a shrub or a tree? Deadly nightshade is an herb, bilberry a low dwarf shrub.
2. **Leaf:** arrangement (opposite, alternate, whorled), margin, smell when rubbed.
3. **Fruit:** single or in a cluster, with or without a calyx, stone or tiny seeds, flesh colour in cross-section.
4. **Time:** is it the right ripening time? Bilberries ripen Jul–Aug, ivy in winter and spring.
5. **Place:** the habitat (open woodland, edge, shade, damp) must match the description in the field guide.

Edible fruits



Bilberry (Vaccinium myrtillus): a low shrub with green angular twigs, berries with a small crown at the tip.



Wild strawberry (Fragaria vesca): trifoliate toothed leaves, a small red fruit with seeds on the surface.



Raspberry (Rubus idaeus): upright canes, leaves white underneath, the fruit separates from the receptacle and is hollow.



Blackberry (Rubus fruticosus): prickly trailing canes, black compound fruits that stay attached to the receptacle.



Black elder (Sambucus nigra): a shrub with woody bark, hanging clusters of black berries: eat only cooked.



Rose hip (Rosa canina): a thorny shrub, elongated red fruits with sepals at the tip.



Common hawthorn (Crataegus monogyna): a thorny shrub with deeply lobed leaves, red fruits with 1–2 stones.



Cornelian cherry (Cornus mas): opposite leaves with arching veins, bright red elongated drupes.



Sloe (Prunus spinosa): a thorny shrub, blue-black fruits with a grey bloom, astringent until the first frost.



Lingonberry (Vaccinium vitis-idaea): evergreen leathery leaves, red berries in clusters at the tips of the twigs.



Sweet chestnut (Castanea sativa): a husk with dense thin spines, a nut with a pointed tip.



Common hazel (Corylus avellana): round toothed leaves, hazelnuts in groups of 2–3 in a frilly husk.



Beechnut (Fagus sylvatica): three-sided nuts in a woody husk that opens into 4 lobes.

- **Sloe (blackthorn):** the fruits are very astringent. Pick them after the first frost or freeze them for 1–2 days. Do not crush or grind the stones.
- **Hazelnut:** ripe in August and September, when the husk turns brown and the shell separates easily. Dry in a thin layer; in the shell it keeps up to 1 year.
- **Lingonberry:** raw it is sour. Cook it into a compote or preserve – thanks to natural preservatives it keeps for a long time.
- **Black elder:** eat the berries only cooked. Raw and unripe (green) ones cause nausea and vomiting. Remove the stalks.
- **Beechnut:** peel and roast. Raw in larger quantities it causes nausea.

Poisonous look-alikes



Deadly nightshade (Atropa belladonna): a single shiny black berry on a star-shaped calyx: deadly poisonous.



Yew (Taxus baccata): flat needles in two rows, a red aril open at the top with a dark seed: deadly poisonous.



Fly honeysuckle (Lonicera xylosteum): smooth red berries in pairs, often fused at the base: poisonous.



Herb Paris (Paris quadrifolia): 4 leaves in a whorl and one blue-black berry on top: poisonous.



Mezereon (Daphne mezereum): red berries sit directly on the stem: very poisonous.



Ivy (Hedera helix): an evergreen climber, black berries in round umbels in winter and spring: poisonous.



Dwarf elder (Sambucus ebulus): a herb with upright flower clusters and foul-smelling leaves: poisonous even when cooked.



Horse chestnut (Aesculus hippocastanum): palmate leaves, a husk with sparse thick spines, a round fruit with no point: poisonous.



Lily of the valley (Convallaria majalis): 2–3 leaves around a common stalk, red berries in summer: deadly poisonous.

Pairs: edible ↔ poisonous

Edible	Poisonous	Key differences
Bilberry (*Vaccinium myrtillus*)	Deadly nightshade (*Atropa belladonna*)	The bilberry is a dwarf shrub up to 50 cm with green angular twigs; the berries grow singly under the leaves, have a flat ring at the top, and the flesh is dark purple. Deadly nightshade is an herb up to 1.5 m with large soft leaves; single shiny black berries the size of a cherry sit on a star-shaped green calyx with 5 lobes. The berries are juicy and sweet – **even a few berries can be fatal for a child**.
Black elder (*Sambucus nigra*)	Dwarf elder (*Sambucus ebulus*)	Black elder is a shrub or tree with woody bark; the flower heads and berry clusters hang down. Dwarf elder is an herb up to 1.5 m that dies back every winter; the flower heads and berry clusters stand upright; the leaves and the whole plant stink. Dwarf elder is poisonous even when cooked.

Edible	Poisonous	Key differences
Raspberry, lingonberry	Fly honeysuckle (*Lonicera xylosteum*), mezereon (*Daphne mezereum*)	The raspberry is a compound fruit of tiny drupelets, hollow; the lingonberry has evergreen leathery leaves and berries in clusters at the ends of the twigs. Fly honeysuckle has smooth red berries that grow **in pairs**, often fused at the base. Mezereon has red berries that sit **directly on the stem** under the leaves; it flowers pink in early spring before the leaves and smells strongly. Mezereon is highly poisonous; the sap irritates the skin too.
Cornelian cherry, rose hip	Yew (*Taxus baccata*)	Cornelian cherry has oblong red drupes on a deciduous shrub; rose hip has oblong fruits with sepals at the tip on a thorny shrub. Yew is a conifer with flat dark green needles in two rows. Its red fleshy covering is open at the top like a cup, with a dark seed inside. The seed, needles and wood are deadly poisonous.
Sweet chestnut	Horse chestnut (*Aesculus hippocastanum*)	Sweet chestnut has oblong toothed leaves and a burr with dense thin spines; inside are 1–3 nuts with a pointed tip and a "tuft". Horse chestnut has palmate leaves with 5–7 leaflets, a green husk with sparse thick spines and a round shiny nut without a tip. Horse chestnut is poisonous.
Blackberry, bilberry	Ivy (*Hedera helix*)	Blackberry is a prickly shrub with compound fruits that ripen Aug–Sep. Ivy is an evergreen climber on trees and walls; its black berries grow in globular umbels and ripen in winter and spring, when no other berries are around.
Wild garlic	Lily of the valley (*Convallaria majalis*)	Wild garlic smells of garlic, and each leaf grows singly on its own stalk. Lily of the valley has 2–3 leaves clasping a shared stem, white bell-shaped flowers in May and in summer **red berries**. It does not smell of garlic. All parts are deadly poisonous.

Herb Paris (*Paris quadrifolia*) has no edible counterpart, but bilberry pickers often come across it: it has 4 leaves in a whorl and a single blue-black berry on top. It is poisonous.

> **TIP**
>
> Make a family herbarium of fruits. Photograph every species you learn with an expert in flower and in fruit, dry the leaf between newspaper sheets and glue it onto a sheet of paper with the name, date and place. In 2–3 seasons you have a collection for your area.

10.4 Deadly mix-ups

- **Wild garlic ↔ lily of the valley ↔ autumn crocus:** wild garlic smells of garlic when rubbed, and each leaf has its own stalk from the ground. Do not pick in handfuls – pull leaf by leaf. Once your fingers already smell of garlic, the smell test no longer works: check each leaf separately. Lily of the valley has 2–3 leaves wrapped around a shared stem and red berries in summer. In spring autumn crocus sends up a cluster of 3–5 broad leaves from one point, without a stalk, with a green seed capsule between them. It flowers in autumn, pink, without leaves. Autumn crocus is poisonous even cooked and dried.



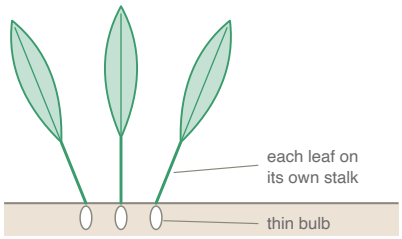
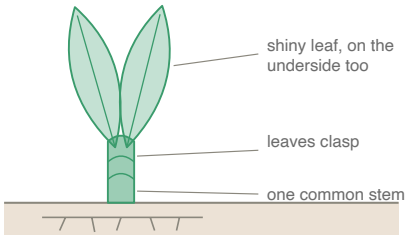
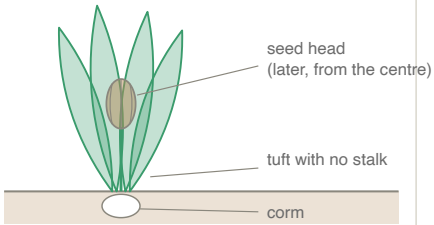
Wild garlic (Allium ursinum): each leaf on its own stalk from the ground, a strong garlic smell when rubbed.



Autumn crocus (Colchicum autumnale): in spring a tuft of broad leaves with no stalk and no garlic smell: deadly poisonous.

Tell wild garlic from its poisonous look-alikes by how the leaf grows from the ground

Schematic drawings of three plants that grow in spring on the same damp forest soil.

Plant	Features
	**Wild garlic** — EDIBLE *Allium ursinum* • Each leaf grows from the ground on its own thin stalk. • Leaves stand singly and do not clasp each other. • The underside of the leaf is matte. • A crushed leaf smells strongly of garlic.
	**Lily of the valley** — POISONOUS *Convallaria majalis* • 2–3 leaves grow from one stem and clasp each other at the base. • A single leaf has no stalk of its own. • Leaves are shiny on both sides and firmer. • No garlic smell.
	**Autumn crocus** — DEADLY POISONOUS *Colchicum autumnale* • In spring a tuft of 3–4 broad leaves, like a tulip. • Leaves have no stalk and sit tightly together. • Later a seed head grows from the centre of the tuft. • No garlic smell.

The smell test works only with clean fingers.

Garlic smell lingers on hands and can mask a scentless leaf. Decide by the stalk; smell is a bonus.

Plan. Wild garlic has each leaf on its own thin stalk, while lily of the valley and autumn crocus have leaves without a stalk. The garlic smell counts only with clean fingers.

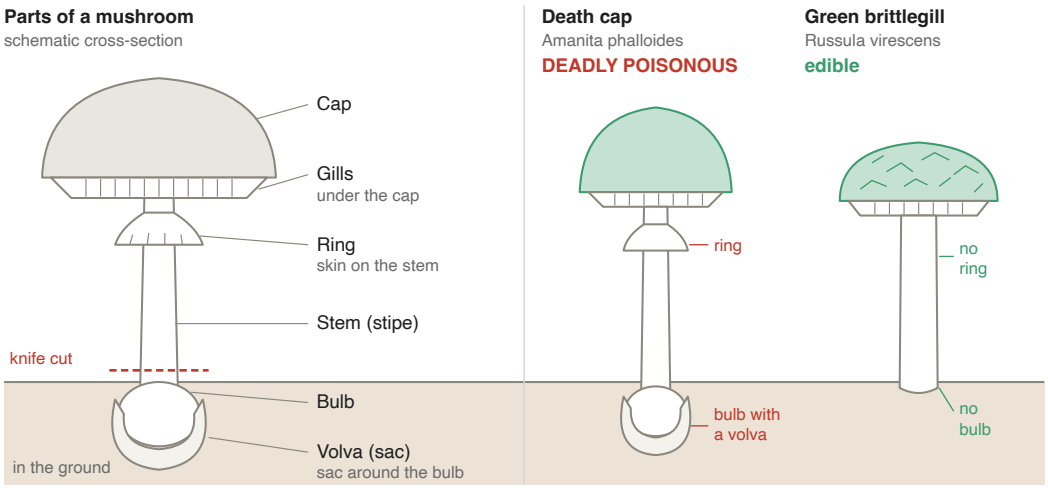
- **Umbellifers (carrot, parsley, wild carrot) ↔ poison hemlock (*Conium maculatum*), water hemlock (*Cicuta virosa*):** do not eat any wild plant with an umbel (a flower like an umbrella) unless you are an expert. These are the deadliest plants in Europe.
- **Edible mushrooms (russulas, parasol mushrooms) ↔ death cap (*Amanita phalloides*):** the death cap causes most mushroom deaths. Symptoms come only after 6–24 hours, when the liver is already damaged.
- **Black elder ↔ red elder, dwarf elder (stinking elder):** dwarf elder grows as an herb up to 1.5 m and has smelly leaves – poisonous.
- **Spruce ↔ yew:** yew has flat soft needles in two rows and red fleshy "berries". All parts except the red covering are deadly poisonous.

10.5 Mushrooms – general rules only

- [ ] Eat only species you know from years of foraging or that have been inspected by a member of a mycological society.
- [ ] Never trust an app, a photograph or a "rule" (silver spoon, slugs eat them, peelable cap). No such rules exist.
- [ ] Pick whole mushrooms with the stem base and bulb – the base of the stem is how deadly Amanitas are told apart. Amanitas have white gills, a ring on the stem and a bulb with a sac-like volva in the soil.
- [ ] Do not pick old, soft, mouldy or frozen mushrooms.
- [ ] Always cook mushrooms thoroughly, at least 20 minutes. Try a new species in a small quantity.
- [ ] Keep a portion of every meal in the refrigerator for a day – in case of poisoning the doctor will know what it was.
- [ ] If you feel nauseous, vomit or have diarrhoea after eating mushrooms, call 112 or the Poison Control Centre immediately, even if you feel better after a few hours.

You do not recognise a death cap by its cap but by the bulb in the ground

Schematic cross-section of a mushroom and a comparison of the deadly death cap with the edible green brittlegill.



Feature	Death cap	Green brittlegill
Cap	greenish, smooth	greenish, cracked into a net
Gills	white, crowded	white, brittle – they snap
Ring on the stem	YES	NO
Bulb with volva	YES – hidden in the ground	NO – the stem ends flat

The bulb stays in the ground if you cut the mushroom – so pull or dig up the whole mushroom.

A cut death cap without its bulb looks almost the same as a green brittlegill.

Do not eat a mushroom you are not certain of. A single death cap can kill an adult.

Plan. You do not recognise a death cap by its cap but by the bulb with a volva, which stays in the ground when cut with a knife, so pull or dig up the whole mushroom.

Foraging is restricted in Slovenia: up to 2 kg of mushrooms per person per day, and in places (protected areas) it is prohibited.

10.6 Simple recipes

Nettle soup (serves 4)

1. With gloves, pick 2 full handfuls (about 200 g) of the top 4–6 leaves.
2. Wash them and chop roughly. Once they wilt, they no longer sting.
3. In 2 tablespoons of oil or lard, sauté 1 onion, add 2 diced potatoes.
4. Add 1 l of water or stock, cook for 15 minutes.
5. Add the nettles, cook for another 5 minutes. Add salt and, if you like, blend or thicken with a spoonful of flour.

Dandelion coffee

1. In autumn or early spring dig up the roots (they are thickest in autumn).
2. Wash them well, cut into 1 cm pieces and dry (3–5 days in the air or 2 hours in an oven at 50 °C).
3. Roast them in a dry pan or oven at 180–200 °C for 20–30 minutes, until dark brown and fragrant.
4. Grind them in a coffee grinder. Store in a closed jar.
5. 1 teaspoon per cup: simmer for 5 minutes, strain. Coffee from chicory or roasted acorn is made in a similar way.

Rose hip tea

1. Pick ripe red fruits after the first frost – then they are softer and sweeter.
2. Cut them open and remove the seeds and hairs with a small knife. The hairs irritate the throat and intestines.
3. Dry them in the air or in an oven at 50 °C at most.
4. Soak 2 tablespoons of dried fruit in 0.5 l of cold water overnight, then heat to boiling and simmer for 5 minutes at most. Longer cooking destroys vitamin C.
5. Strain through a close-woven cloth.

Acorn flour

1. Gather sound, heavy acorns without holes (a hole = a larva). Unusable ones float in water.
2. Peel them and crush into pea-sized pieces.
3. **Cold leaching:** put the meal in a cloth bag and submerge it for 3–7 days in a flowing stream, or rinse it 2–3 times a day with fresh water.
4. **Faster hot leaching:** boil the meal for 15 minutes, pour off the water, repeat with new boiling water 5–10 times until the water is no longer brown.
5. Taste a piece: when it is no longer bitter, it is ready.
6. Dry it on a tray at 50–60 °C or in the sun and grind it into flour.
7. For bread, mix 1 part acorn flour with 2 parts wheat flour. On its own it does not bind the dough.

10.7 Medicinal herbs for the home medicine cabinet



A home herbal pharmacy: chamomile, sage, linden, St John's wort, calendula ointment.

Herb	Use	How
Chamomile	Soothes digestion, sore throat and gums, inflamed eyes, insomnia	1 teaspoon of flowers per 2.5 dl of boiling water, covered for 10 min. For the eyes only a strained, cooled, fresh tea
Sage	Gargle for sore throat and gums, sweating	1 teaspoon per 2.5 dl, 10 min. Do not drink for several weeks in a row, nor during pregnancy and breastfeeding
Marigold (*Calendula*)	Grazes, cracked skin, minor wounds, nappy rash	Ointment (recipe below)
St John's wort	Oil for bruises and scars; tea for mild low mood	See the warning
Linden	Colds, sweating in fever	1–2 teaspoons per cup, 10 min
Wild thyme	Cough, cold	1 teaspoon per cup, with honey
Ribwort plantain	Cough; a crushed leaf on an insect sting	Syrup with honey, or tea
Mint	Nausea, bloating	1 teaspoon per cup

Marigold ointment

YOU NEED

- 2 full cups of fresh or 1 cup of dried marigold flowers
- 250 ml of olive or sunflower oil
- 25–30 g of beeswax (€5 from a beekeeper)
- Jars with lids, gauze, a pot for a water bath

1. Leave fresh flowers for a day to wilt – too much water in them causes mould.
2. Pour the oil over the flowers in a jar so that they are covered.
3. Place the jar in a water bath and heat for 2 hours at about 60 °C. The oil must not boil. Without energy: leave the jar for 2 weeks in the sun, shaking it every day.
4. Strain the oil through gauze and squeeze out well.
5. Add grated wax to the warm oil and stir until it dissolves. Test a drop on a cold plate: too soft = more wax.
6. Pour into clean jars, let it cool uncovered, then close. In a cool place it keeps for about 1 year.

WARNING: ST JOHN'S WORT

St John's wort causes sensitivity to sun: after drinking the tea, or from oil on the skin, you can get burns after even brief sunbathing. It weakens the action of many medicines: contraceptive pills, antidepressants, anticoagulants (warfarin), heart medicines (digoxin), transplant medicines and HIV medicines. If anyone in the family takes regular medication, do not use it without consulting a doctor or pharmacist. Do not give other herbs to pregnant women and small children without consultation either.

10.8 The edibility test (only if there is no other option)

For unknown plants there is a universal test that takes 24 hours and does not apply to mushrooms: skin contact 15 min, lip 3 min, tongue 15 min, chewing without swallowing 15 min, then a small bite and 8 hours of waiting without other food. Any stinging, itching or bitter, soapy taste = stop. The test is an emergency measure, not a reliable one – some deadly poisons neither sting nor taste bitter. It is better to have a printed plant atlas and to learn now.

10.9 Equipment and foraging rules

- A printed field guide to edible plants and mushrooms for Slovenia (€20–35)
- A foraging basket (not a plastic bag – mushrooms and herbs sweat)
- A small knife, gloves for nettles, cloth bags for drying

- [ ] Do not forage along roads (lead, salt), on sprayed fields or along dog-walking paths.
- [ ] Take at most a third of the plants in one spot – that way the plant will be there again next year.
- [ ] Do not pick protected species (e.g. arnica, gentian).
- [ ] Dry herbs in the shade, in an airy place, in a thin layer. Store dry ones in paper bags or jars, labelled with name and date.

CHAPTER 11

Health and Hygiene

In longer crises more people die from dirty water, infected wounds and diarrhoea than from hunger. Hygiene and basic first aid are therefore part of survival, not a luxury.

> **WARNING**
>
> This chapter is not a substitute for a doctor. Check doses of medicines, combinations, and medicines for children, pregnant women and chronic patients with a doctor or pharmacist – now, while that is still possible. Always follow the instructions in the box. When the telephone works, call 112.

11.1 First aid: safety first, then ABC

1. **Safety:** check whether you are in danger (electricity, fire, traffic, gas, CO). A dead rescuer helps no one.
2. **Responsiveness:** speak to the casualty loudly and shake them by the shoulders.
3. **A – airway:** one hand on the forehead, lift the chin with two fingers of the other. The head tilts back.
4. **B – breathing:** for up to 10 seconds look, listen and feel for normal breathing. Occasional gasping breaths are not normal breathing.
5. **C – circulation:** find and stop severe bleeding. If they are not breathing normally, start resuscitation.

If they are breathing and unconscious, turn them into the recovery position and check their breathing every minute.

Basic life support for an adult (per ERC guidelines)

1. Call 112, or tell someone else to call and to bring an AED (automated external defibrillator) if one is nearby.
2. Kneel beside the chest. Place the heel of one hand on the centre of the chest, the other hand on top, fingers interlaced.
3. Elbows straight, shoulders directly above your hands. Press 5–6 cm deep, at a rate of 100–120 compressions per minute.
4. After each compression release the chest completely, keeping your hands on it.
5. After 30 compressions give 2 rescue breaths: open the airway, pinch the nose, blow for 1 second so that the chest rises.
6. Continue at a ratio of 30:2. If you cannot or do not want to give breaths, compress continuously.
7. When the AED arrives, switch it on and follow the voice instructions. Do not interrupt compressions for more than a few seconds.
8. Continue until help arrives, until the casualty starts to breathe normally or until you are exhausted. If there are several of you, swap every 2 minutes.

For children and drowning victims start with 5 rescue breaths, then 30:2. For an infant compress with two fingers about 4 cm deep. Learn all this on a course – on a manikin, not from a book.

11.2 Bleeding

1. Gloves or a bag over your hands. Sit or lay the casualty down.
2. Direct pressure with clean gauze or cloth on the wound for 10 minutes without lifting. When the gauze soaks through, add new on top of the old.
3. A pressure (Israeli) bandage firmly over the gauze. The fingers must remain warm and pink.
4. Severe bleeding on a limb that pressure does not stop = tourniquet 5–8 cm above the wound, never on a joint. Tighten until the bleeding stops. Write the time of application on the forehead. Do not remove the tourniquet yourself.
5. Pack a deep wound in the neck, armpit or groin with haemostatic or ordinary gauze and press for at least 3 minutes.
6. Cover the casualty so that they do not get cold – blood loss and cold add up.

11.3 Burns

- Cool the burn at once with running lukewarm or cool water for 20 minutes. No ice.
- Remove rings, watch and clothing that has not stuck to the skin.
- Cover with cling film (lay a layer on, do not wrap tightly) or clean, dry gauze.
- Do not apply butter, oil or toothpaste. Do not burst blisters.
- For extensive burns (larger than the casualty's palm on the face, hands or genitals, or larger than 10 palms anywhere) give ORS to drink and arrange transport as soon as possible.

11.4 Fractures, dislocations and splints

1. Do not straighten a fracture and do not put a dislocation back. Leave the limb in the position in which the casualty can hold it most easily.
2. Check the fingers before and after the splint: are they warm, pink, can the casualty feel and move them?
3. The splint must include the joint above and the joint below the fracture. Use boards, sticks, rolled cardboard, a newspaper, a ski pole or a rolled-up SAM splint (€15).
4. Pad in between with something soft: clothing, towels.
5. Fasten with straps or bandages above and below the fracture, not on the fracture itself.
6. Hang the arm in a triangular sling. A broken leg can be fastened to the healthy one.
7. Cool with a bag of cold water for 20 minutes per hour, and raise the limb.

Cover an open fracture (bone through the skin) with sterile gauze; do not push the bone back. If a spinal injury is suspected, do not move the casualty unless they are in immediate danger.

11.5 Hypothermia, heatstroke, dehydration

Condition	Signs	What you do
Hypothermia	Shivering, confusion, clumsiness, slurred speech; in severe cases the shivering stops	Move to a warm place, take off wet clothes, wrap in blankets and foil, cover the head. Warm sweet drinks only if conscious. Do not rub the limbs, do not give alcohol, move the person gently
Heat exhaustion	Sweating, nausea, headache, dizziness, muscle cramps	Into the shade, lying down with legs raised, sip ORS or water, cool with wet cloths
Heatstroke	Body temperature above 40 °C, hot skin, confusion, convulsions, unconsciousness	Life-threatening. Cool at once: pour cool water over them, wet sheets and fanning, cold compresses on the neck, armpits and groin. Do not give an unconscious person anything to drink
Dehydration	Thirst, dark urine, little urine, dry mouth; in children a sunken fontanelle, no tears	ORS (11.7) in sips. Urine should be light yellow

11.6 Home medicine cabinet (for 4 people)

Category	What	Quantity
Wounds	Sterile gauze 10×10 cm, elastic bandages, plasters, adhesive wound closure strips (steri-strip)	50 / 10 / 100 / 20
Severe bleeding	CAT tourniquet, haemostatic gauze, Israeli bandage	2 / 2 / 2
Disinfection	Povidone iodine (Betadine), 70% alcohol, saline solution	2 × 100 ml / 1 l / 10 × 250 ml
Pain, fever	Paracetamol, ibuprofen	2 boxes each
Digestion	Oral rehydration salts (ORS), loperamide, activated charcoal	20 sachets / 2 / 2

Category	What	Quantity
Allergies	Antihistamine (cetirizine), adrenaline auto-injector if needed	30 tablets
Tools	Scissors, tweezers, thermometer, nitrile gloves, FFP2 mask, ice pack	1 / 1 / 1 / 100 / 20 / 2
Extras	Triangular bandages, SAM splint, thermal foil blanket, clove oil, burn ointment	4 / 1 / 4 / 1 / 1
Regular medication	Medicines that someone in the family takes regularly	3 months' reserve (agreed with the doctor)
Literature	Printed first aid manual (Red Cross)	1



A home medicine cabinet for four people, sorted by purpose.

Keep the cabinet in a dry, dark place at room temperature, closed to children. Twice a year check the expiry dates and replace what has been used. The whole kit costs about €150–250.

> **TIP**
>
> The best investment is a first aid course with the Red Cross (16 hours, about €50–100). You learn resuscitation, stopping bleeding, and the care of burns and fractures. Repeat it every few years.

11.7 Homemade oral rehydration solution (ORS)

Diarrhoea in a crisis is life-threatening, especially for children and the elderly. The WHO recipe: **1 litre of clean water + 6 level teaspoons of sugar + 1/2 level teaspoon of salt.**

- Drink in sips, 200 ml after each bowel movement. Children up to 2 years: 50–100 ml.
- If vomiting, wait 10 minutes, then continue with a teaspoon every 1–2 minutes.
- Use the solution within 24 hours. It should not taste saltier than tears.
- Continue breastfeeding. When the appetite returns, eat rice, bananas, rusks, boiled potato.
- If diarrhoea lasts more than 2 days or there is blood in the stool, seek help.

11.8 Wound care without a hospital

1. Stop the bleeding (11.2).
2. Irrigate with plenty of clean (boiled, cooled) water – at least 1 litre for a dirty wound. This is the most important step against infection. A jet from a bottle with a small hole in the cap works well.
3. Remove foreign bodies with clean tweezers. Do not close deep puncture wounds and bites.
4. Clean, straight cuts can be brought together with adhesive strips, but only if they are less than 6–8 hours old and thoroughly irrigated.
5. Cover with sterile gauze, change daily. Honey (real, raw) on a wound has an antibacterial effect.
6. Signs of infection: spreading redness, heat, pus, red lines towards the heart – see a doctor urgently.

Tetanus vaccination should be up to date for all family members (every 10 years).

11.9 Toothache

- Rinse your mouth with warm salt water (1 teaspoon of salt per glass) 3–4 times a day.
- For pain, ibuprofen or paracetamol as directed.
- Clove oil: a drop on a cotton wool ball, placed against the painful tooth. Or press a whole clove against the gum.
- Temporarily seal a lost filling with emergency dental cement from the pharmacy (€5–10) or with beeswax.
- A swollen cheek, fever or trouble swallowing = a purulent infection that can spread. See a doctor urgently.
- The best preparation: a dental check-up and repair of all teeth now.

11.10 When to transport a patient urgently

If 112 does not work, arrange transport to the nearest health centre or hospital when you notice:

- [ ] Unconsciousness, confusion, convulsions or sudden weakness on one side of the body
- [ ] Chest pain lasting more than 5 minutes, or severe difficulty breathing
- [ ] Bleeding you cannot stop, or a tourniquet in place
- [ ] An open fracture, a fractured thigh bone or suspected head or spinal injury

- [ ] Extensive burns or burns of the face and airways
- [ ] A wound infection with red lines or a high fever
- [ ] An infant with a fever above 38 °C, or a child who is not drinking and not passing urine
- [ ] Severe abdominal pain, blood in the stool or vomiting blood
- [ ] Poisoning with mushrooms, CO or chemicals

Before transport write down: what happened, when, which medicines they have received, allergies. Attach the note to the patient.

11.11 A toilet without water

When the water supply is down, you cannot flush the toilet. Do not pour precious drinking water into the bowl.

YOU NEED

- 2 buckets of 20 l with tight lids (2 × €8)
- A toilet seat or bucket seat (€10–20)
- Strong 60 l rubbish bags (100 pieces, €10)
- A sack of sawdust, peat or cat litter (50 l, €5–10)
- A funnel and a bottle for urine, gloves, disinfectant

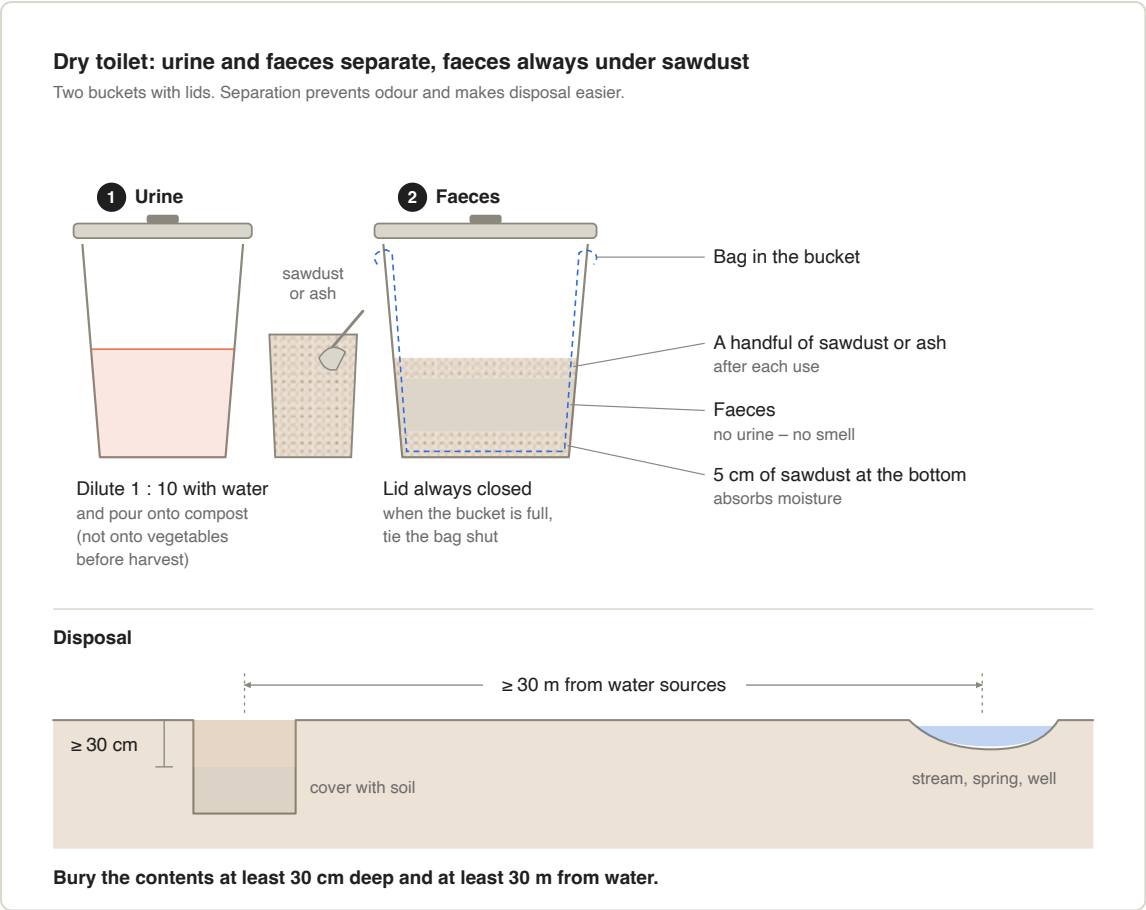
The two-bucket system (the most hygienic):

1. Two 20-litre buckets with tight lids, one for urine, one for faeces. Kept separate, there is no smell.
2. In the faeces bucket put a plastic bag and 5 cm of sawdust, peat, ash, leaves or cat litter. After each use sprinkle on a full handful.
3. Dilute the urine 1:10 and pour it onto the compost or a meadow away from water sources.
4. Tie up the full bag and bury it 30+ cm deep and 30+ m from wells or streams, or compost it separately for 1–2 years.
5. After each use wash your hands with soap or disinfectant – this is the key measure against the spread of disease.

You can also place the bucket right in the dry toilet bowl, lined with a bag. For 4 people you use about 1 bag and 2–3 l of covering material per day.



A dry toilet made of two buckets with sawdust, with no water and no smell.



Plan. A dry toilet and the rules for disposal.

WARNING

Before first use shut off the water to the cistern and empty it. When water returns after a mains outage, the pipes may be contaminated – boil the water for the first few days (chapter 3). In an apartment building do not flush if the sewage system is not working: wastewater can back up into the lower apartments.

11.12 Personal hygiene on 1 litre of water a day

- **A tap from a canister:** a canister with a small tap on a table + soap + a bucket underneath = a washbasin using 0.2 l per hand wash.
- Wash your hands for 20 seconds before cooking, eating, and after the toilet and changing nappies.
- Wash the body with a wet cloth in sections, from the face downward, every 2–3 days. Genitals and armpits every day.
- Brush teeth with 100 ml of water. Keep a stock of toothbrushes, toothpaste, dental floss.
- Wet wipes, hand sanitiser (5 l), dry shampoo, menstrual cups (reusable), nappies for infants, soaps (20 pieces).
- Cut hair short – less water, fewer lice.
- Use the washing water (grey water) for flushing or for watering ornamental plants.

11.13 Washing laundry

1. A 20 l bucket with a lid, with a hole in the lid for the handle of a washing plunger (€10–20).
2. Fill with 10–12 l of lukewarm water and 1 tablespoon of washing powder or grated soap.
3. Soak the laundry overnight, then press it up and down with the plunger for 3–5 minutes.
4. Wring it out and rinse in a second bucket with rainwater. Use the rinse water for the next wash.
5. Dry in the sun – UV light disinfects.

Wash underwear and socks often, outer clothing rarely. Everyone should have 2 sets of spare clothes.

11.14 Waste

In a crisis rubbish collection stops within a few days. Compost or bury whatever rots. Rinse, flatten and store plastic and cans in closed bags away from the house – waste feeds rats, and they spread disease. Keep stove ash in a metal container, not plastic. Do not burn waste in the open – the smoke is toxic. Seal used dressings, nappies and needles in double bags and label them separately.

11.15 Mental health and children

Routine, work and community preserve sanity. A daily schedule (getting up, work, meals, reading), games for children, books and musical instruments are part of preparation, not a luxury.

- **Schedule:** get up, eat and sleep at the same time every day. 7–9 hours of sleep matters more than keeping watch late into the night.
- **Everyone has a task:** children too (carrying firewood, feeding the chickens) and the elderly (story-telling, mending). Whoever is useful suffers less.
- **News in measured doses:** listen to the radio twice a day, then switch it off. Constant listening to bad news drains your strength.
- **Conversation:** every evening for 10 minutes, about what went well and what is planned for tomorrow. Say your fear out loud.
- **Movement and light:** at least 30 minutes outdoors every day.

Children

- Tell the truth in words the child understands: what happened, what we are doing to stay safe.
- Keep school going at home: 1–2 hours of reading, arithmetic and writing a day.
- Prepare a "crisis box": crayons, notebooks, cards, board games, books, a ball.
- Children express fear through play, drawing, bed-wetting, anger. This is normal. Stay close, do not punish.
- Children model themselves on adults: your calm is their safety.

If someone has not slept or eaten for several weeks, talks about death or self-harm, do not leave them alone and seek help from a doctor or the community.

CHAPTER 12

Security, Communication and Community

No individual survives a long crisis alone. A street or village that organises itself in the first 3 days is safer and better supplied than the best-equipped bunker.

12.1 Information and communication

- **A radio powered by batteries, a solar cell or a hand crank** (FM/AM/SW) – in a disaster Radio Slovenija broadcasts announcements from the Administration of the Republic of Slovenia for Civil Protection and Disaster Relief. €30–60. Write the frequencies for your region on a slip of paper stuck to the radio.
- **PMR radios** (446 MHz, licence-free): 1–5 km in built-up areas, up to 10 km in the open. A set of 4 radios for your family and neighbours costs €60–150. Agree on a channel and a check-in time (e.g. channel 3, every full hour for 5 minutes).
- **Amateur radio:** the exam allows contacts across the country and the world without infrastructure. Preparation is organised by the radio clubs of the Slovenian Amateur Radio Association (Zveza radioamaterjev Slovenije). Radio amateurs are an official part of the civil protection and rescue system.
- **Meshtastic / LoRa devices** (€30–50): short text messages without a network over 2–10 km, even further via other devices. In Europe they operate on the licence-free 868 MHz band and connect to a phone via Bluetooth.
- **Paper maps** of your area at 1:25,000 and a compass. A printed list of telephone numbers and addresses.
- **A family plan:** two meeting points (in front of the house and outside the town), a contact person in another town, who picks the children up from school (chapter 2).



A hand-crank radio, PMR radios, a printed contact list and a map.

A PMR channel plan for the street

PMR radios have 16 channels. Write the agreement on a slip of paper and stick it on each radio.

Channel	Purpose	Rule
1	Emergency call – everyone listens	Urgent only: fire, injury, missing person
3	Regular street check-in	Every full hour, the first 5 minutes, from 7:00 to 22:00
5	Family A, B …	Each family has its own channel for internal arrangements
8	Watch and work groups	Permanently open during a shift
12	Reserve	If channel 3 is disturbed

- [ ] Speak briefly: "This is Novak, Street 5. All is well. Over." Wait 1 second after pressing the button before you speak.
- [ ] Do not mention supplies, absences from home or personal data – anyone can listen.
- [ ] Radios on AA batteries have priority: you can charge them with a solar charger.

12.2 Money and documents

- **Cash** in small notes (€5, 10, 20) for 2–4 weeks of expenses. In a power cut cards and ATMs do not work. Keep it in 2 different places.
- **Barter goods** for a longer crisis: coffee, sugar, salt, alcohol, cigarettes (for trading), batteries, candles, seeds, painkillers, freezer bags, screws and nails.
- **Documents** in a waterproof bag and a copy on a USB stick: identity cards, passports, land registry records, insurance policies, medical records, a list of medicines, photos of property.
- Precious metals make sense only as a long-term store of value, not as everyday payment – consult an expert before investing.

12.3 Barter

- Trade at an agreed communal place (the fire station yard, the square), by day, in company.
- Bring only what you are trading. Do not reveal how much you have at home.
- Trade in small quantities: 1 kg of sugar, not 20 kg.
- Knowledge and labour are the best currency: repairs, sewing, an hour of childcare, help with firewood do not get used up.
- Agree on rough "prices" in the community, e.g. 1 hour of work = 1 loaf of bread. This prevents disputes.
- Do not trade prescription medicines you are not familiar with, or food of unknown origin.

12.4 Security at home

- A 6 kg fire extinguisher (ABC powder) in the kitchen and by the stove, a fire blanket, battery-powered smoke and CO detectors.
- Do not show off your supplies. Black out the windows at night – a lit house in a dark village attracts attention.
- A solid door, good locks, a neighbourhood watch in shifts. Safety lies in numbers and good relations, not in weapons.
- In a flood or earthquake: know where the main valves for water and gas and the main fuse are, and how to shut them off.
- **An evacuation backpack** (chapters 2 and 15) by the door – when danger comes you leave within 5 minutes.

Non-violent conduct in tense moments

- [ ] Answer a stranger at the door through the closed door or a window. Do not open the door at night.
- [ ] Stay calm, speak slowly, do not threaten. Most conflicts calm down if the other side has a way out.
- [ ] Things are not worth a life. If someone threatens you, let them go and notify your neighbours and the police.
- [ ] Help a hungry neighbour with a little food instead. Help creates an ally, refusal an enemy.
- [ ] The watch observes and notifies by PMR – it does not intervene on its own.

12.5 Community – organise now

1. Get to know 5–10 neighbouring households. Write down who has what: a generator, a well, a tractor, bees, medical knowledge, tools.
2. Set up a group (Viber/Signal for now, a PMR channel for the crisis) and agree on a meeting place.
3. Divide the roles: water, food and kitchen, health, energy and repairs, children and the elderly, watch.
4. A shared store of seeds, tools and knowledge. Do the pig slaughter (koline), the sauerkraut and the firewood together – this is how rural communities survived for centuries.
5. Help the vulnerable (the elderly, the sick, families with infants): a community that looks after its weak is stronger.



Community is the strongest reserve: a shared kitchen and work after a storm.

The first neighbours' meeting – agenda (90 minutes)

1. **Invitation:** a note in the letterbox 1 week earlier. Place: a yard, the fire station, the local community hall. Bring cake and coffee.
2. **Introductions (15 min):** each person gives their name, address and how many people live in the house.
3. **Why we are here (10 min):** power cut, flood, ice storm – a recent example from the area.
4. **Inventory of skills and equipment (25 min):** each household fills in the table below.
5. **The vulnerable (10 min):** who needs help – the elderly, sick, disabled, infants.
6. **Agreements (20 min):** the meeting place, the PMR channel and a phone group, who is coordinator, who visits the vulnerable within the first 6 hours.
7. **Next step (10 min):** the date of the next meeting and a joint exercise (e.g. 24 hours without electricity).

Inventory of skills and equipment (template)

Household / address	No. of people	Skills	Equipment	Needs help	Contact
Example: Novak, Lipova 5	4	nurse, carpenter	3 kW generator, chainsaw	no	PMR channel 5

Roles in the community

Role	Tasks
Coordinator and deputy	Leads meetings, gathers information, liaison with the municipality and civil protection
Water	Water sources, filtering, distribution (chapter 3)
Food and kitchen	Communal kitchen, inventory of supplies, preserving
Health	First aid, medicine cabinet, visits to the sick, hygiene
Energy and repairs	Generators, photovoltaics, firewood, tools
Children and the elderly	Childcare, school at home, visits to the lonely
Communications and watch	PMR check-ins, shift schedule, observation and notification

12.6 Skills worth more than supplies

FROM HISTORY

For centuries Slovenian villages operated as a community: communal work (tlaka, moba) for threshing, building and haymaking, and village watches during fires and floods. The volunteer fire brigades that we have today in almost every place grew out of this tradition – they are the first natural partner for your street.

Skill	Where to learn
First aid	Red Cross, 16-hour course
Gardening and seed saving	Organic gardeners' societies, your own garden
Canning, fermentation, pig slaughter (koline)	Older relatives, farm women, video tutorials
Fishing	A fishing club
Repairs: wood, metal, electrics, bicycle	A home workshop, adult education centres
Sewing and mending	A hand sewing machine, courses
Cooking on a fire, firing a stove	Camping with scouts, weekends without electricity
Radio communication	A radio club in your municipality
Foraging plants and herbs	Botanical and herbalist societies, guided walks
Rescue and firefighting	A volunteer fire brigade

EXERCISE

Once a year switch off the main fuse for 48 hours and shut off the water. It is the best test of what you are missing. Invite your neighbours to do the same the same weekend, and meet on Sunday evening to compare notes.

CHAPTER 13

Wilderness Survival

Out in the wild, cold and panic threaten you first, thirst comes next, and hunger almost never. Stay put, conserve heat, find water and make yourself findable. Everything else comes later.

13.1 The STOP Rule and the Order of Priorities

When you get lost, injured or caught by nightfall, do STOP first. The first minutes decide everything. Most accidents in the Slovenian mountains happen because people rush onward in a hurry and stray even deeper.

1. **S – Stop.** Halt. Sit down. Take a sip of water and eat something sweet.
2. **T – Think.** Where were you last sure of the route? What time is it? How much daylight do you have left?
3. **O – Observe.** Weather, terrain, the supplies in your backpack, phone battery, injuries in the group.
4. **P – Plan.** Decide: return along the known route, call 112, or spend the night where you are. Tell everyone in the group your decision.

The Rule of Threes tells you what is urgent: you last about 3 minutes without air, 3 hours without warmth in bad weather, 3 days without water and 3 weeks without food. That is why the order of priorities is always the same:

Priority	What you do	Time
1. First aid	Stop the bleeding, immobilise the injury, call 112	Immediately
2. Shelter and warmth	Dry clothing, insulation from the ground, protection from wind and rain	Within the first hour
3. Signal	Phone, whistle, torch, bright colours	As soon as you are safe
4. Water	At least 2–3 l a day, more in heat and when walking	Within the first day
5. Fire	Warmth, boiling water, signalling, morale	Before dark
6. Food	Only if you are waiting for several days	Your last concern

TIP

If you are lost, stay where you are. Rescuers search the route you announced first. So before every trip, tell someone where you are going and when you will be back. Look after your phone: turn off mobile data, lower the screen brightness and keep it warm, close to your body.

13.2 What You Always Carry: 10 Essentials

These ten items weigh 1.5–2 kg in total and belong in every backpack, even for a "short walk" up Šmarna gora.

YOU NEED

- Map (1 : 25,000 or 1 : 50,000) and compass – €15–40
- Headlamp + spare batteries – €20–50
- Sun protection: sunglasses, sunscreen, hat – €20
- Spare clothing: hat, gloves, fleece or wool sweater, windbreaker – you already have these
- First aid: bandages, plasters, elastic bandage, medication, tweezers for ticks – €15–25
- Fire: lighter, waterproof matches, ferro rod, fire-starter cubes – €15
- Knife or multitool – €20–60
- Food for 1 extra day: energy bars, walnuts, chocolate – €5
- Water: 1–2 l + disinfection tablets or a filter – €10–35
- Emergency shelter: space blanket and bivvy bag, or a 2 × 3 m tarp – €5–40

Add a whistle, 10 m of cord (paracord), duct tape, a charged power bank and a card with names and phone numbers. In winter, also crampons, trekking poles and a thermos of tea.

13.3 Shelter

A shelter protects you from three thieves of heat: wind, wetness and the cold ground. You lose the most heat through the ground, so the insulation under you matters more than the roof over you. Lay at least 20–30 cm of compressed spruce boughs, dry leaves or bracken beneath you. When you lie down on it, at least 10 cm of the layer must remain.



A tarp shelter at a 45° angle with a bed of branches and a reflector wall behind the fire.

Choosing a Site

- Not at the bottom of a gully (cold air and water collect there), and not on a ridge (wind, lightning).
- Not under dead or leaning trees and branches ("widowmakers").
- Not in a stream bed – a storm in the higher terrain can fill it within minutes.
- Close to dry wood and materials, but 50–100 m from water (mosquitoes, damp, animals).
- Face the entrance away from the prevailing wind.

Tarp Lean-To

1. Stretch a rope between two trees at a height of 1–1.2 m.
2. Drape a 2 × 3 m tarp over the rope, with the longer side sloping down to the ground on the windward side.
3. Peg the lower edge down with stakes or weigh it with stones. The slope should be 45° or steeper so that water runs off.
4. Lay insulation under the shelter. Build your fire 1.5 m in front of the open side, and behind it set up a wall of logs that reflects the heat back.

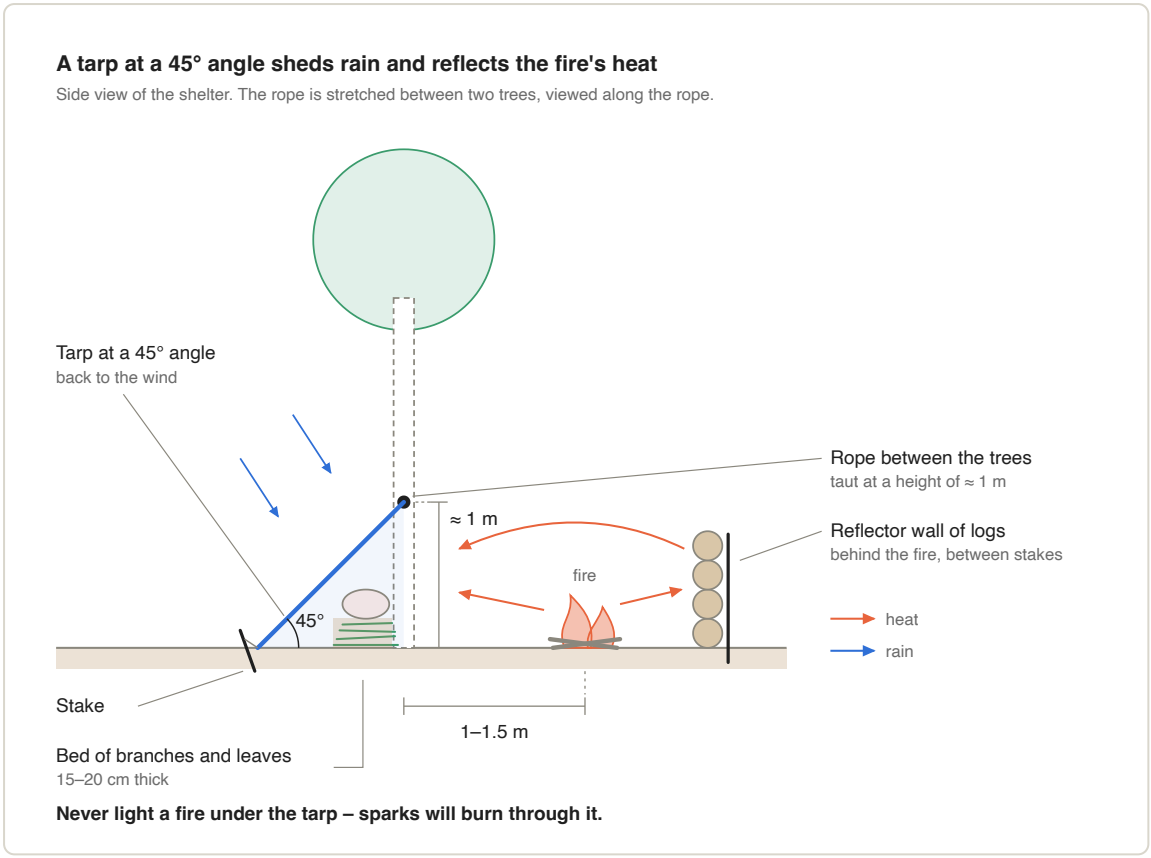
A-Frame Tent

Stretch a rope at a height of 1 m. Drape the tarp over the middle and peg both halves to the ground. You get a tent closed on two sides that withstands rain well. Close one opening with a backpack or branches.

Debris Hut – No Equipment Needed

This hut warms you without a fire, because it works like a sleeping bag made of leaves. Building it takes 1–2 hours.

1. Find a ridgepole: a straight pole as long as your height + 1 m (about 2.8–3 m), as thick as your wrist.
2. Rest one end on a stump, a rock or in a fork at a height of 80–90 cm. The other end lies on the ground.
3. On both sides, lean dense ribs (poles) against it at a 45° angle. The inside should be just wide enough for your shoulders, about 60–70 cm. A smaller space warms up faster.
4. Lay a lattice of thinner twigs across the ribs.
5. Pile leaves, bracken and needles on top: at least 60 cm thick, in freezing weather 1 m. As thick as your arm is long.
6. Put a few branches on top so the wind does not blow the leaves away.
7. Fill the inside with dry leaves right to the top. Crawl in feet first and close the entrance with a heap of leaves.



Plan. A tarp shelter with a reflector wall.

Snow Shelter – Basics

Snow insulates well: in a well-built shelter it is around 0 °C, even when it is −20 °C outside.

- **Snow trench:** dig a trench 2 m long, 1 m wide and 1 m deep. Cover it with skis, poles or branches and a tarp, and pile 20–30 cm of snow on top. The fastest solution (1 hour).
- **Quinzee:** pile up a mound of snow 2 m high and 3 m wide. Wait 1–2 hours for it to settle, then hollow out the inside. The walls should be 30 cm thick – first push 30 cm sticks into the mound as a gauge.
- The entrance should be lower than the sleeping platform – cold air stays below.
- Smooth the ceiling into a dome so that droplets do not drip on you.
- Poke a vent hole the diameter of a pole (5 cm) through the ceiling and check it regularly.
- Take a shovel or tool inside with you so you can dig your way out.

> **WARNING**
>
> A stove or candle in a snow shelter without a vent can cause carbon monoxide poisoning. Never dig a shelter in a slope where there is avalanche danger, and never under cornices.

13.4 Fire

Fire needs three things: fuel, heat and oxygen (the fire triangle). If one is missing, the fire goes out. Most failures happen because there is too little fine material or because it is damp.



Ferro rod and birch bark: sparks onto tinder, then thin dry twigs.

Material in Three Sizes

Type	Thickness	Amount	Examples in Slovenian forests
Tinder	Fluff, fibres	Two handfuls	Birch bark, dry grass, reeds, tinder fungus, bulrush fluff, cotton wool with petroleum jelly

Type	Thickness	Amount	Examples in Slovenian forests
Kindling	From match to pencil	Two bundles	Dry spruce twigs from the lower part of the trunk, resinous splinters, wood shavings
Fuel	From thumb to wrist and thicker	A pile up to the knee	Dry beech, hornbeam, oak (burn for a long time), spruce and pine (catch fire quickly)

- **Birch bark** contains oils and burns even when damp. Peel only the outer, papery layer from fallen birches and do not harm the living tree.
- **Resinous splinters** (known locally as "smolnjak", fatwood) can be found in spruce and pine stumps. The wood is yellowish, heavy and smells of turpentine. The splinters burn like a torch, even in the rain.
- **Tinder fungus** (Fomes fomentarius) grows on beech and birch. The inner, brown layer catches a spark and smoulders for a long time. It works best when dried.
- **Dry lower spruce twigs** ("witch's twigs") stay dry even after rain, because they are under the canopy.

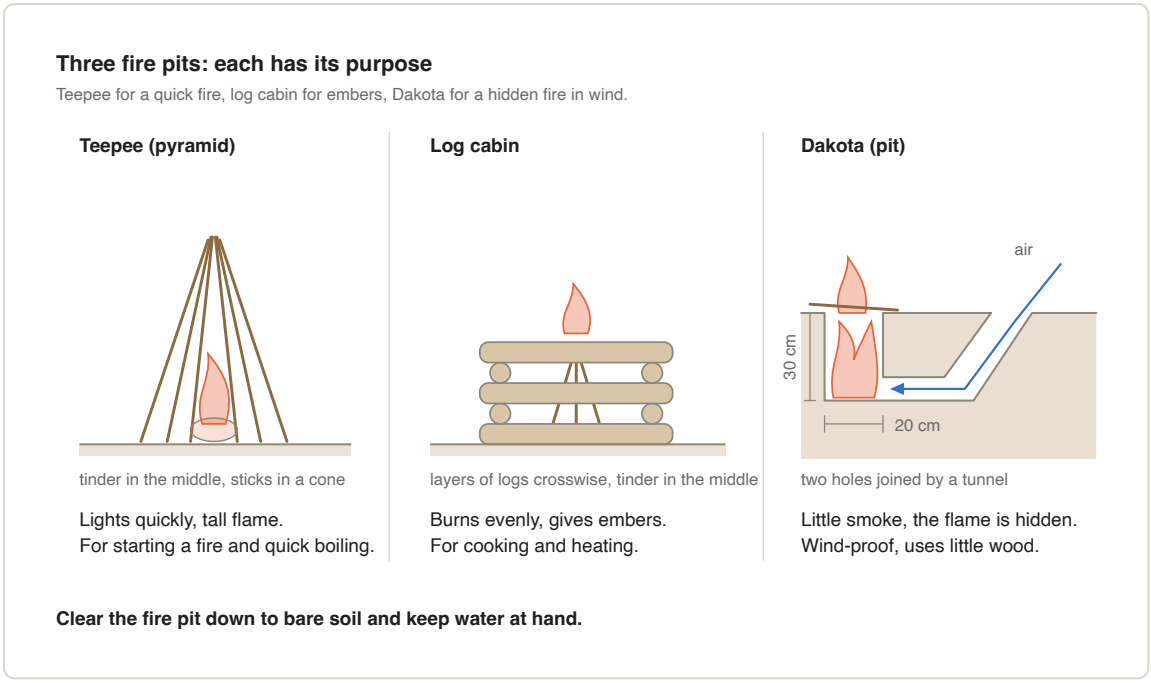
> **FROM HISTORY**
>
> Ötzi, the Iceman found in the Ötztal Alps, carried tinder fungus and flint with him about 5,300 years ago. Shepherds in our Alps still used the same technique in the 20th century.

Lighting

- **Lighter:** the most reliable. Carry two, one in a pocket against your body (gas does not vaporise in the cold).
- **Ferro rod:** works even when wet, for thousands of strikes. Hold the knife still right next to the tinder and pull the rod backwards – that way you do not scatter the tinder.
- **Matches:** waterproof, in a tight box, with a spare striker.

Laying a Fire

1. **Tipi:** tinder in the centre, with kindling around it in a cone shape, leaving an opening toward the wind. It catches quickly, good for boiling water.
2. **Log cabin:** a small tipi in the centre, and around it lay sticks in a square, alternating in 4–6 layers. It burns evenly and gives embers and warmth for a long night.
3. Once it is going, add fuel gradually, from thinner to thicker. Do not smother the fire with thick logs too early.



Plan. Three kinds of fire pits.

Fire in the Rain

- Make a base of dry sticks or stones so the fire does not sit on wet ground.
- Split thicker dry dead branches: the inside is dry. Use a knife to cut shavings ("feather sticks").
- Use resinous splinters and birch bark. Dry the kindling against your body or under the tarp.
- Build the fire under a shelter, but at least 1 m below the lowest point of the tarp.

Dakota Fire Hole

A fire in the ground that is barely visible, uses little wood and is not disturbed by wind.

1. Dig a hole 25–30 cm in diameter and 30 cm deep.
2. On the windward side, 25–30 cm away, dig a second hole 10–15 cm in diameter and connect it at an angle to the bottom of the first. This is the air intake.
3. Light the fire at the bottom of the large hole. Place the pot directly over the opening on two sticks or stones.

WARNING

In the forest, light fires only in designated fire pits or with the landowner's permission. When a high fire danger is declared, which is common in summer in the Karst and the Primorska region, burning in the natural environment is prohibited – Karst fires spread extremely fast. Build the fire on bare ground or stones, clear 1.5 m around it, and do not light it near roots or peat. Never leave it unattended. Put it out with water, stir, soak it again, and check with the back of your hand that the ashes are cold.

13.5 Water in the Wild

When walking in the heat you lose 3–5 l of water a day. The first signs of deficiency are a headache, dark urine and fatigue. Do not ration the water in your body, ration your sweating: walk in the shade and rest during the hottest part of the day.

Where to Find Water

- **The Alps and the pre-Alpine region:** streams and springs are common. Follow valleys and gullies downhill. On the map, look for blue lines and spring symbols.
- **The Karst:** water sinks underground and there are almost no surface streams. Look for "kal" (livestock ponds), rainwater cisterns near houses, and water in rock hollows after rain.
- **Forest:** damp ground, moss and green vegetation point to water. In a dry stream bed, dig on the outside of a bend – water often seeps in.
- **Rain and dew:** set up the tarp as a funnel. In the morning, collect dew from the wet grass with a cloth and wring it out – 0.5 l an hour is attainable.

- **Snow:** melt it in a pot, do not eat it – it cools you down. First put a little water in the pot so the bottom does not scorch.

Purification

1. Collect water upstream of settlements, pastures and roads, from running water.
2. Strain cloudy water through a scarf or sock.
3. Boil it at a strong rolling boil for 1 minute (3 minutes above 2,000 m). Or use a hand filter or tablets according to the instructions (see chapter 3).

> **TIP**
>
> If you have no pot, you can boil water in a metal bottle without its plastic cap, or with heated stones in a container made of bark. Stones from a stream can crack when heated – use dry stones from the bank.

13.6 Food: Be Realistic

A healthy adult can survive 3 weeks or more without food. In most accidents you are found within 1–3 days. Searching for food burns more energy than you gain and exposes you to injuries and poisoning. So: conserve heat, drink water, rest.

- Without water, do not eat protein-rich food – digestion uses up water.
- Eat emergency food in small meals, preferably in the evening, so that it warms you through the night.
- Eat only plants and mushrooms that you know one hundred percent (see chapter 10). Never unknown mushrooms.
- Hunting, fishing and trapping are illegal without a permit in normal circumstances (see chapter 9).

13.7 Orientation



Map and compass: first turn the map to the north.

Map and Compass

1. **Orient the map:** place the compass on the map with its edge parallel to a north-south grid line. Turn the map together with the compass until the red needle points to the map's north. Now the terrain in front of you matches the picture.
2. **Determine the direction to your destination:** lay the edge of the compass from your position to your destination. Turn the dial so that the lines inside the housing are parallel to the map's north-south lines.
3. **Walk on the bearing:** hold the compass in front of you and turn until the red needle lines up with the arrow in the housing. The direction of travel arrow on the baseplate shows your heading.
4. Pick a point in that direction (a tree, a rock), walk to it and repeat. That way you get around obstacles without losing your direction.

In Slovenia the difference between magnetic and true north is small (about 4–5° to the east) and you can ignore it when hiking. Do not hold the compass near a phone, a knife or a steel cable.

South with an Analogue Watch (Northern Hemisphere)

1. Hold the watch horizontally. Point the hour hand at the sun.
2. Bisect the angle between the hour hand and the number 12. This bisector points south.
3. In summer (daylight saving time, from the end of March to the end of October), use the number 1 instead of 12, because the clock is shifted by one hour.

The method is approximate (error of up to 15–20°), and worst around noon and in summer when the sun is high.

The North Star via the Big Dipper

Find the Big Dipper (seven bright stars in the shape of a pan). Through the last two stars of the "pan" (on the side opposite the handle) draw an imaginary line upward. Extend it by about 5 times the distance between those two stars. There is Polaris, a medium-bright star at the end of the handle of the Little Dipper. North is beneath it. Polaris does not move through the night, while the other stars circle around it.

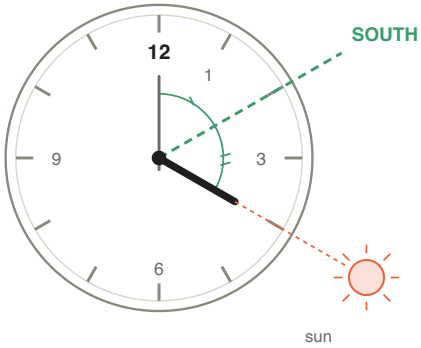
The Shadow-Stick Method

1. Push a 1 m stick into level ground. Mark the end of its shadow with a stone (point 1 = west).
2. Wait 15–20 minutes. Mark the new end of the shadow with a second stone (point 2 = east).
3. The line from stone 1 to stone 2 runs from west to east. If you stand with stone 1 on your left and stone 2 on your right, you are facing north.

Navigating without a compass: south by watch, north by the Pole Star

Both methods work in the northern hemisphere.

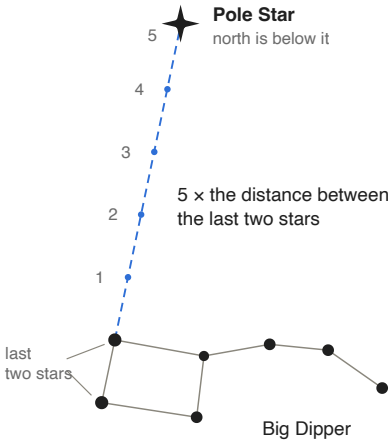
a South with an analogue watch



1. Point the hour hand at the sun.
2. The bisector of the angle between the hour hand and the 12 points south.

   In summer (daylight saving time) use 1 instead of 12.

b North by the Pole Star



1. Find the Big Dipper.
2. Extend the line through the last two stars 5 times to reach the Pole Star.

Check the direction using several methods; the watch is only a rough aid.

Plan. Finding direction with a watch and by the Pole Star.

> **WARNING**
>
> Moss "on the north side of trees" is unreliable – in a forest it grows wherever it is damp. Rely on the sun, the stars and a compass instead. If you are not sure, stay where you are or go back along the known route.

13.8 Signalling

The number for all emergencies, including mountain rescue, is **112**. The call also works without a SIM card and over another operator's network. Say: who is calling, what happened, where you are (coordinates from your phone or the nearest marker), how many people are injured, what the weather is like. Stay reachable and save your battery. If the call does not go through, send an SMS to 112 or try from a higher point.



A signal mirror is visible from several kilometres away.

- **The rule of three:** three sounds, three fires in a triangle, three piles of stones – the international sign of distress.
- **SOS:** three short, three long, three short (··· – – – ···) with a torch or whistle. At night a torch carries for several kilometres.
- **Alpine distress signal:** 6 signals a minute (one every 10 seconds) by sound, light or waving, then a 1-minute pause, then repeat. **Reply:** 3 signals a minute (one every 20 seconds), then a minute's pause.
- **Whistle:** audible up to 1 km, whereas shouting carries only about 100 m and quickly exhausts your voice.
- **Mirror:** stretch out your arm, make a V with your fingers and catch the target in it (aircraft, helicopter, hut). Direct the reflection of the sun from the mirror through the V. It is visible for more than 10 km.
- **Smoke:** by day, put green branches or moss on the fire – white smoke is visible from afar.
- **Helicopter:** both arms raised in the letter Y = "I need help". One arm up, one down = "I do not need help". When the helicopter is landing, crouch down, secure loose objects and do not walk toward it until the crew signals you.

13.9 Hazards

Hypothermia

It can occur even at +5 °C if you are wet and in the wind. The signs by stage: shivering and clumsy fingers, then confusion, slurred speech, stumbling. When the shiver-

ing stops, the condition is critical.

1. Stop the heat loss: get into shelter, replace wet clothing with dry, insulate from the ground.
2. Wrap the person in a sleeping bag or blanket with a space blanket over it. Give a warm, sweet drink if the person is conscious and able to swallow.
3. Apply warm compresses (a bottle of warm water in a sock) to the chest, armpits and groin – not to the arms and legs.
4. Severe hypothermia: keep the person lying down, move them gently, call 112. Do not rub the limbs.

Lightning

- In summer in the Alps, thunderstorms build in the afternoon. Head into the mountains early and descend from the summit by noon.
- If you hear thunder less than 30 seconds after the flash, you are in the danger zone. After the last thunder, wait 30 minutes.
- Move away from ridges, summits and the steel cables on via ferratas. Do not stand under a lone tree.
- Crouch on insulation (backpack, sleeping mat), feet together, head down. The group should spread out at least 10 m apart.

Falls

Falls are the most common cause of death in the Slovenian mountains. Most happen on the descent, on wet grass, rock and snow. Wear suitable footwear, carry an ice axe and crampons in snow, and know how to use them. Do not walk on steep snowfields without equipment, even in summer. When you are tired, turn back – the mountain will wait.

Ticks

Slovenia is among the European countries with the most cases of tick-borne meningoencephalitis (TBE). Ticks also transmit Lyme disease.

- **Vaccination against TBE** is the best protection. The primary vaccination is 3 doses within one year, the first booster after 3 years, then every 5 years (more often for older people). Consult your doctor.
- There is no vaccine against Lyme disease. Watch for redness spreading around the bite 3–30 days after the bite, or for flu-like symptoms – see a doctor.
- Wear long trousers, light-coloured clothing and repellent. After a trip, check the whole body, including the scalp, armpits, groin and behind the ears.
- Remove a tick as soon as possible: grasp it with tweezers right at the skin and pull it out steadily. Do not smear it with oil and do not twist it forcibly. Disinfect the spot and write down the date.

Bears

Around a thousand brown bears live in Slovenia, mostly in the Kočevje region and Notranjska, and increasingly elsewhere too. A bear normally avoids people. Surprises, a sow with cubs and bears that have become accustomed to human food are dangerous.

- Walk noisily in the forest and talk. Keep your dog on a leash.
- Store food and rubbish in a closed bag, hung 4 m high at night and 100 m away from camp.
- When you see a bear: stay calm, do not run, do not climb a tree. Speak calmly in a low voice, back away slowly, and do not turn your back on it. Never step between a sow and her cubs.
- If a bear attacks: lie on your stomach, keep your backpack on, protect the back of your neck with your hands, and spread your legs so it cannot flip you over. Stay still until it leaves.
- Report the encounter to 112 or to the Slovenia Forest Service (Zavod za gozdove).

Snakes: Nose-Horned Viper and Adder

The nose-horned viper (Vipera ammodytes, with a small horn on its snout) lives on warm, rocky slopes, the adder (Vipera berus) at higher elevations and on Pohorje. A bite seldom endangers the life of a healthy adult, but it is always an emergency, for children and the elderly especially.

1. Calm the casualty. Have them lie down and not move – movement spreads the venom.
2. Remove rings, watches and tight clothing, because the limb will swell.
3. Immobilise the limb with a splint, at the level of the heart.
4. Call 112. Write down the time of the bite.
5. **Do not** cut the wound, suck it, apply a tourniquet, cool it with ice or give alcohol.

A snake bites when you step on it or grab it. Watch where you step and where you put your hand on the rocks.

13.10 Four Knots You Must Know

Practise each knot at home until you can tie it with your eyes closed and while wearing gloves. The end of the rope you are moving is the "working end", the rest of the rope is the "standing part".

Bowline – a Loop That Does Not Tighten

1. Make a small loop (the "lake") in the standing part, with the working end lying on top.
2. Push the working end up through the loop from below ("the rabbit comes out of the hole").
3. Wrap it around the standing part from behind ("the rabbit goes around the tree").

4. Return it down through the small loop ("the rabbit jumps back into the hole").
5. Tighten: hold the working end and the large loop, and pull the standing part. Leave a tail of at least 10 cm.

Uses: a loop around a tree, rescuing a person (around the chest), tying down a tarp. It does not jam under load and is easy to untie afterwards.

Taut-Line Hitch – Adjustable Tension

1. Wrap the rope around a stake or tree. Run the working end parallel to the standing part.
2. Wrap the working end twice around the standing part inside the loop (toward the stake).
3. Wrap it a third time around the standing part outside the loop (away from the stake).
4. Tighten. Slide the knot along the rope to tighten or slacken; under load it holds.

Uses: tent and tarp guy lines, a washing line.

Clove Hitch – Quick onto a Pole

1. Wrap the working end around the pole.
2. Cross it over the standing part and make another turn around the pole.
3. Push the working end under the second turn so that both ends are parallel and run in opposite directions.
4. Tighten by pulling both ends.

Uses: starting a lashing of poles, tying to a stake. It can work loose under variable load, so add two half hitches.

Square Knot (Reef Knot) – Joining Two Ends

1. Left end over the right and under it (the first half knot).
2. Right end over the left and under it (the second half knot).
3. The rule: "left over right, right over left". A correctly tied knot is flat and symmetrical.

Uses: bandages, a triangular bandage, tying a bundle. It is not for joining two load-bearing ropes or ropes of different thicknesses – it can slip under load.

CHAPTER 14

How People Survived Wars and Sieges

In all the great crises of the 20th and 21st centuries, those who survived were the ones with water, warmth and community – not the ones with the biggest stockpiles. The stories from Sarajevo, Leningrad, Slovenian forests, Britain and Ukraine show what works when the system fails for months or years.

Behind each of these figures stand real victims. This chapter does not recount them for the sake of drama, but because people paid for them with their lives, and we can learn from them.

14.1 The Siege of Sarajevo (1992–1996)

Sarajevo was surrounded from April 1992 to February 1996, almost four years. It is the longest siege of a capital city in modern history. More than 10,000 people died, among them more than a thousand children. The city of more than 300,000 inhabitants was without electricity, water, gas and heating for most of that time.

Water

The water supply worked only intermittently. People carried water from drinking fountains, springs and from the Sarajevo Brewery, which has its own spring. They queued in front of the water points, often under sniper fire. They moved water in children's prams, on bicycles and in shopping-centre trolleys, in bottles and jerrycans. They collected rainwater from gutters and balconies. Every container was precious.



Illustration: in besieged cities, people carried water in jerrycans every day.

Heat and Cooking

The winters were cold and the windows broken. Instead of glass, people stretched plastic sheeting marked UNHCR. They built stoves from tins, barrels and sheet metal, with a flue pipe out through the window. They burned furniture, parquet, doors, books, shoes and trees from parks and avenues. One room in the flat was heated, and the whole family lived in it.



Illustration: an improvised tin-can stove with a flue pipe through the window.

Food

The city lived on humanitarian aid, which arrived by an airlift through the airport. It was one of the longest humanitarian airlifts in history. The parcels contained flour, oil, rice, pulses, tinned food and military rations. People grew vegetables on balconies, in parks, in yards and between apartment blocks. They gathered nettles, dandelion and other wild plants. "Recipes without ingredients" appeared: meatless pie, "fish" made of rice, cakes made of bread and cocoa powder. Such recipes were also collected in books published during and after the war.

Barter and the Value of Things

Money lost its value. Cigarettes, lighters, candles, batteries, coffee, sugar and medicines became currency. A small item such as a lighter was worth more than a bag of flour. Anyone with skills – repairing stoves, sewing, first aid – was always welcome.

Community and Culture

In cellars there were schools, theatre performances, concerts and exhibitions. In 1993 they even organised a beauty contest. A cellist played in the ruins. People say that it was precisely this "normality" that kept them alive: getting dressed, shaving, going to work, meeting friends. Neighbours shared water, stoves and food.

FROM HISTORY

In 1993 a tunnel about 800 m long was dug under the airport. Through it, food, fuel and medicines were brought into the city, and the wounded were taken out. Today it is a museum. The tunnel shows that improvised solutions sometimes saved an entire city.

What We Learn

- Have plenty of water containers and a way of carrying them (a trolley, jerrycans with handles).
- Prepare to heat one room and to cook without gas (see chapter 7).
- Plastic sheeting and duct tape replace a broken window.
- Lighters, candles, batteries and medicines are bartering value – buy more of them than you need.
- Seeds and a balcony garden mean vitamins that aid does not bring.
- Keep up routine and contacts. Morale is part of survival.

14.2 The Siege of Leningrad (1941–1944)

German and Finnish forces encircled Leningrad (today Saint Petersburg) in September 1941. The siege lasted until January 1944, about 872 days. Estimates of civilian deaths range from around 600,000 to more than a million, most of them from hunger and cold.

Bread and Hunger

Food was distributed by ration cards. The lowest rations came in November and December 1941: 250 g of bread a day for workers and only 125 g for office employees, children and dependants. The bread was partly made of substitutes – cellulose, bran, dust from sacks. People boiled wallpaper paste, belt and shoe leather, and yeast soups. Losing a card meant a death sentence, so people guarded them like their lives.

Cold

The winter of 1941/42 was exceptionally cold, with temperatures down to −30 °C. There was no electricity, no heating and no water. Water was carried from the Neva through holes in the ice. People made small sheet-metal stoves ("burzhuikas") and burned furniture and books in them.

The Road of Life

The only link to the hinterland was across Lake Ladoga. In winter a road was laid over the ice, along which lorries carried food and fuel into the city and evacuated people out. In summer, goods were moved by ship. The road was under shelling and lorries fell through the ice, but it saved hundreds of thousands.

What Helped People Survive

- **Discipline with rations:** survivors often recounted that they divided their bread into several portions and ate it slowly, never all at once.
- **Movement and routine:** whoever stayed in bed often died. People forced themselves to get up, wash, and go for water.
- **Community:** families and neighbours gathered in a single room, shared warmth and looked after one another. Young volunteers visited flats and rescued people who were alone.
- **Vitamins:** a drink against scurvy was brewed from spruce needles. In spring 1942 gardens were planted in parks and squares.

FROM HISTORY

During the siege, staff of the plant-industry institute in Leningrad guarded a large collection of seeds and potatoes. Several of them died of hunger, but they did not eat the seeds, because they knew they were the future of agriculture.

What We Learn

- Your food stockpile should be calorie-dense enough – oil, lard, pulses, grains (see chapter 4).
- Portion out food in advance and stick to the plan. Set daily rations on the very first day of the crisis.
- Keep important documents and ration vouchers safe.
- Warmth is as important as food: sleeping bags, blankets, one heated room.
- Stay active and look after neighbours who are alone.
- Vitamin C and multivitamins prevent scurvy.

14.3 Slovenia in the Second World War (1941–1945)

Slovenia was divided among three occupiers. People lived with shortages, ration cards and fear. At the same time the resistance movement developed remarkable ways of surviving in the forest.

Hidden Hospitals

The Partisans had several dozen hidden hospitals. The best known is the Franja hospital in the Pasice gorge near Cerkno. It operated from December 1943 to May 1945 and treated more than 500 wounded. The wooden barracks stood in a narrow ravine, accessible only along the stream and over footbridges that were taken away. The hospital was never discovered. The Pavla hospital in the Primorska region was similarly hidden, and several hospitals were in the Kočevski Rog. They had their own hydroelectric generators, operating rooms and kitchens. Food was brought by farmers from the surrounding area, and medicines were smuggled in from the towns.

Food and Substitutes

- **Ration cards:** in towns food was rationed – bread, flour, fat, sugar, meat. In 1942 the occupier surrounded Ljubljana with barbed wire, so smuggling and barter with farmers developed.
- **Coffee substitutes:** roasted chicory (root), roasted barley, acorns ("žir") and rye. Acorns were peeled, soaked, dried and roasted.
- **Hand mills:** farmers ground grain at home on hand mills to avoid handing over their harvest and to escape inspection.
- **Hidden stores:** grain, lard and potatoes were hidden in caves, buried barrels and double walls. The Partisans had buried storage bunkers in the forests.
- Almost every family kept chickens, rabbits and a pig, and had a garden.

> **TIP**
>
> You can make a chicory coffee substitute even today: wash the root of common chicory, cut it into cubes, dry it and roast it in a pan until dark brown. Grind it and brew it like coffee, 1 spoonful per cup. It contains no caffeine.

What We Learn

- Hard-to-reach, hidden places and silence were the best protection.
- The link between town and countryside decides who eats. Get to know the farmers in your area today.
- A hand mill and grain in the kernel extend your supplies for years.
- Substitutes (chicory, barley) preserve habits and morale.
- Spread your stores over several places – one discovered stockpile does not mean losing everything.

14.4 Britain: "Dig for Victory" and Rationing

Before the war Britain imported about two thirds of its food. When German U-boats attacked ships, the country quickly organised self-sufficiency.

- **Rationing:** from January 1940, bacon, butter and sugar were rationed, later meat, tea, cheese, eggs, jam and more. Each adult received about one egg, 50 g of butter and a few hundred grams of meat a week. The last rationing only ended in 1954.
- **Dig for Victory:** the government called on everyone to dig up a garden, park, playground or railway verge. The number of allotments rose from about 800,000 to more than 1.4 million. Vegetables were even grown in the moat around the Tower of London.
- **Pig clubs:** neighbours raised pigs together on kitchen scraps.
- **Education:** leaflets, radio broadcasts and courses taught people to cook with potatoes and carrots, to preserve food and to throw nothing away.

Interestingly, the diet of the poorer people improved during the war. Rations were modest but balanced, with more vegetables and less sugar.



Illustration: gardens on balconies and in parks fed cities during the war.

What We Learn

- Every scrap of land can produce food: a balcony, a yard, the edge of a car park (see chapter 8).
- Community gardens and shared livestock-keeping are more effective than solitary attempts.
- Fair sharing keeps the peace and trust.
- Knowing how to cook from basic foodstuffs is worth as much as a stockpile.
- Potatoes and vegetables give the most food per square metre.

14.5 Ukraine since 2022

Since autumn 2022 Russia has systematically attacked Ukraine's energy infrastructure. Millions of people live with scheduled power cuts, sometimes more than 12 hours a day, in winter and in apartment blocks with lifts, pumps and electric cookers.

- **Outage schedules:** people adapted their day – cooking, laundry and charging devices when the power is on. Apps and Telegram channels published the schedules.
- **Power banks and portable power stations:** they became standard household equipment. Shops, cafés and hairdressers worked with generators at the door.
- **Invincibility Points:** in November 2022 the state and municipalities opened several thousand points in schools, administrative buildings and tents. They offer heating, electricity for charging, water, hot tea, internet and first aid. They operate around the clock when the power is out for longer.
- **Solidarity in apartment blocks:** residents placed boxes with water, snacks, a torch and a small stool in the lifts for those who get stuck during an outage. Neighbour groups on messaging apps shared information and help for the elderly.

- **Heat:** people added extra insulation to windows, and used gas cookers, thermal containers and sleeping bags in their flats.
- **Shelters:** when the alarm sounds, people retreat to the cellar or an underground station; there they have chairs, water and blankets ready.

What We Learn

- Scheduled power is manageable if you have power banks, torches and cooking that does not need electricity (see chapters 6 and 7).
- Charge everything when the power is on: phones, batteries, thermoses with hot water.
- Shared spaces for warmth and charging relieve households – know where the nearest one is in your municipality.
- Small gestures between neighbours (a box in the lift) save lives.
- Adapt your daily rhythm to the available energy.

14.6 Summary: The Lesson and What You Do Today

Lesson from history	What you do today
Water is the first concern, carrying it is hard (Sarajevo, Leningrad)	Buy 4–6 jerrycans with handles and a trolley; find the nearest springs and drinking fountains
One room is heated (Sarajevo, Leningrad)	Choose a warm room, prepare sheeting, blankets, a safe heat source and a CO detector
Calories decide (Leningrad)	Put oil, lard, grains and pulses in your stockpile, not just tins
Ration discipline (Leningrad)	Write a plan for using your stockpile and stick to it from day one
Small items are currency (Sarajevo)	Buy extra lighters, candles, batteries, soap, over-the-counter medicines
Every scrap of land counts (Britain, Sarajevo)	Plant a balcony or home garden, save non-hybrid seeds
Grain in the kernel and a hand mill (Slovenia)	Buy a hand mill and 25–50 kg of wheat berries
Stores in several places (Slovenia)	Split your stockpile: cellar, flat, relatives
Scheduled power (Ukraine)	A power bank per person, headlamps, cooking on gas or wood
Community survives better (all cases)	Get to know your neighbours, agree on help for the elderly and a shared meeting point
Routine and culture preserve morale (Sarajevo, Leningrad)	Print books, games, cards; agree on a daily family schedule
Knowledge is worth more than things (all cases)	First aid course, gardening, preserving, repairs

CHAPTER 15

Checklists

Tick the lists off as you go. Start with the first (2 weeks), then work through one further set each month. Do not buy everything at once – spreading it over 12 weeks is cheaper and less stressful.

15.1 Always at Home – the 2-Week Basics (4 People)

Water and Food

- [ ] 224 l of drinking water (jerrycans or bottles)
- [ ] Water disinfection tablets or unscented bleach
- [ ] Hand water filter (Sawyer / LifeStraw)
- [ ] Food for 14 days that does not take long to cook: tins, pasta, rice, cereal, peanut butter, honey
- [ ] Tin opener (manual!)
- [ ] Pet food and baby food / milk
- [ ] Trolley or jerrycans with handles for carrying water

Heat, Cooking, Light

- [ ] Gas stove + 2 spare cylinders or 12 cartridges
- [ ] Lighters and waterproof matches, fire steel
- [ ] A sleeping bag for each member, wool blankets
- [ ] Headlamps + lithium AA/AAA batteries
- [ ] Candles, oil lamp
- [ ] A supply of dry firewood (if you have a stove)
- [ ] A 1 l thermos for each member

Energy and Information

- [ ] Battery / hand-crank radio
- [ ] 20,000 mAh power banks (one per person) + solar charger
- [ ] Portable power station or battery system (chapter 6)
- [ ] PMR radios
- [ ] A printed list of phone numbers and this handbook
- [ ] A paper map of your surroundings and municipality

Health and Hygiene

- [ ] Home first-aid kit (chapter 11)
- [ ] 3 months of medication for chronically ill people
- [ ] 2 buckets with lids + bags + sawdust (dry toilet)
- [ ] Soap, sanitiser, toilet paper (40 rolls), wet wipes
- [ ] 60 l rubbish bags (50 pieces)
- [ ] Spare glasses, baby supplies, sanitary pads

Safety and Documents

- [ ] Cash in small notes
- [ ] Documents in a waterproof bag + USB copy
- [ ] Fire extinguisher, smoke and CO detector
- [ ] Tools: multitool, axe, saw, shovel, duct tape, ropes, plastic tarp, wire, combination pliers
- [ ] Plastic sheeting and battens for emergency window boarding

15.2 Evacuation Backpack (72 Hours, 1 per Person, up to 10 kg)

- [ ] 3 l of water + a filter bottle
- [ ] Food for 3 days: energy bars, nuts, dried meat, chocolate
- [ ] Windbreaker, warm sweater, hat, gloves, 2 pairs of socks, underwear
- [ ] Space blanket, poncho, light sleeping bag or blanket
- [ ] Headlamp, lighter, knife or multitool
- [ ] Mini first-aid kit + personal medication for 7 days
- [ ] Copies of documents, cash, contact list, map
- [ ] Power bank with cable, whistle, FFP2 mask
- [ ] For children: favourite toy, nappies, a card with their name and their parents' phone number
- [ ] Compass, 10 m of cord, duct tape, 2 × 3 m tarp (chapter 13)
- [ ] Ferro rod and fire-starter cubes

15.3 Car Kit

- [ ] Fuel tank always at least half full
- [ ] 6 l of water, energy bars
- [ ] Blanket, space blanket, warm clothes, boots
- [ ] Shovel, tow rope, jump leads, ice scraper
- [ ] First aid, torch, phone charger
- [ ] In winter: snow chains, sand or cat litter to put under the wheels
- [ ] A reflective vest for each passenger, warning triangle

15.4 Upgrade for 3 Months and Longer

- [ ] A dry food supply according to table 4.1 for each member
- [ ] Mylar bags, oxygen absorbers, food-grade buckets
- [ ] Pressure canner + 50 jars + spare lids
- [ ] 10 kg of salt, 10 l of vinegar, sugar for preserving
- [ ] IBC tank for rainwater + first flush
- [ ] Homemade sand filter or gravity ceramic filter
- [ ] Solar system with battery or hybrid inverter with EPS (emergency power supply)
- [ ] Wood stove or wood-burning range + 2 winters' worth of firewood
- [ ] Non-hybrid seeds for 2 seasons, garden tools, compost bin
- [ ] 3 kg of seeds for sprouting
- [ ] Hand grain mill + 50 kg of wheat
- [ ] Fishing kit + permit
- [ ] A printed atlas of edible plants and mushrooms
- [ ] First aid course for at least one adult
- [ ] Vaccination against tick-borne meningoencephalitis for the whole family

15.5 Monthly and Annual Routine

- [ ] **Monthly:** use up the oldest food and top up with new; charge the power banks; check the batteries in the detectors
- [ ] **Every 6 months:** replace the water in the jerrycans; check the expiry dates of medicines; test the generator / battery system under load
- [ ] **Annually:** a 48-hour drill without electricity and water; update the family plan and contact list; clean the chimney; review the skills list and learn one new one
- [ ] **In autumn:** check the winter equipment in the car, firewood, gas cylinders, window sealing
- [ ] **In spring:** check the seeds, gutters and first flush, inspect the backpacks and change clothing according to the children's growth

15.6 A 3-Month Supply – Shopping List by Week

The plan is for 1 adult and follows table 4.1. For a family of four, multiply the quantities by 3.5 (children eat less). Prices are approximate, for 2026, in ordinary shops and on special offers. Every week also buy what you already eat, and mark the date on the packaging (FIFO rule).

Week	What you buy (1 person)	Cost for 1 person	Cost for 4 people
1	2 jerrycans of 20 l (HDPE), water tablets, manual tin opener	€30	€80
2	12 kg of white rice, 2 kg of salt	€25	€85
3	6 kg of pasta, 5 kg of rolled oats	€20	€70
4	10 tins of meat and fish (tuna, sardines, pâté)	€22	€75
5	6 kg of beans, lentils, chickpeas; spices, baking soda	€25	€85
6	4 l of oil, 1 kg of lard	€16	€55
7	10 tins of meat and beans, gas cartridges	€30	€90
8	8 kg of flour or wheat berries, yeast, 2 kg of sugar	€15	€50
9	2 kg of powdered milk, 2 kg of peanut butter	€35	€120
10	20 jars and tins of vegetables, tomato purée	€30	€100
11	10 tins (goulash, fish), 1 kg of honey	€30	€100
12	Coffee, tea, multivitamins (90 tablets), chocolate, mylar bags and absorbers	€35	€110
Total	About 60 kg of food + basic water equipment	**about €310**	**about €1,020**

TIP

Shop on sale days and in larger packs (rice 5 kg, oil 5 l). Once week 12 is finished, start rotating: every month use 1–2 of the oldest items and replace them. That way the cost of the stockpile falls to almost nothing – you simply eat from the pantry instead of from the shop.

CHAPTER 16

Appendices: Tables, Conversions, Glossary

These pages hold the data you need quickly: how much water and food, how many calories, how long to sterilise, how much bleach, and what each term means. Print them out and keep them in your pantry. You will find the knots in chapter 13.10.

16.1 Daily Needs

Person	Total water (l/day)	Of which for drinking (l)	Energy (kcal/day)
Infant 0–1 year	1–1.5 (for milk and hygiene)	0.7–1	600–800
Child 1–3 years	2–3	1–1.3	1,000–1,300
Child 4–8 years	3	1.3–1.6	1,300–1,700
Child 9–13 years	3.5–4	1.6–2	1,700–2,300
Teenager 14–18 years	4	2–2.5	2,000–3,000
Adult woman	4	2	1,800–2,400
Adult man	4	2–2.5	2,200–3,000
Older adult over 65	4	1.5–2	1,700–2,300
Pregnant or breastfeeding woman	4.5–5	2.5–3	+300 to +500
Pet	50 ml per kg of body weight	–	according to the food instructions

For heavy physical work, heat (above 30 °C) or cold, add 1–2 l of water and 500–1,000 kcal a day.

16.2 Calorie Content of Basic Foods

The values are approximate, per 100 g of the food in the state in which you buy it.

Food	kcal / 100 g	Food	kcal / 100 g
Rice, dry	350	Oil	880
Pasta, dry	360	Lard	900
Rolled oats	370	Butter	740
Flour, wheat berries	340	Peanut butter	590
Beans, dry	330	Walnuts, hazelnuts	650
Lentils, chickpeas, dry	350	Chocolate, milk	530
Cornmeal (polenta)	360	Sugar	400
Potatoes, raw	80	Honey	305
Powdered milk, whole	500	Dried fruit	250–300
Tuna in oil	190	Hard cheese	400
Sardines in oil	210	Dry salami	450
Meat pâté	300	Rusks, crackers	420

Food	kcal / 100 g	Food	kcal / 100 g
Egg (1 piece ≈ 60 g)	145	Apple	50

Example: you get 2,200 kcal a day from 250 g of rice, 100 g of beans, 40 ml of oil, 50 g of peanut butter and 50 g of sugar or honey.

16.3 Sterilisation Times – Summary

Detailed instructions are in chapter 5. The times apply to altitudes up to 300 m; at higher altitudes, extend the time or increase the pressure according to the pot manufacturer's instructions.

Food	Method	0.5 l jar	1 l jar
Meat, game, poultry	Pressure canner, 1 bar	75 min	90 min
Beans, pulses	Pressure canner, 1 bar	75 min	90 min
Soups and stews	Pressure canner, 1 bar	by the ingredient with the longest time	
Low-acid vegetables (carrots, peas, green beans)	Pressure canner, 1 bar	according to the instructions, usually 25–40 min	
Fruit, jams, compotes	Water bath, 100 °C	10–25 min after boiling point is reached	
Tomatoes (with added acid)	Water bath, 100 °C	35–45 min	
Gherkins and vegetables in vinegar	Water bath, 100 °C	10–15 min	

WARNING

Always sterilise meat, beans and low-acid vegetables in a pressure canner. A water bath does not destroy botulism spores. A bulging lid, hissing on opening or a strange smell = throw it away, do not taste it.

16.4 Conversions

Kitchen Volume

Measure	Volume	Example
1 drop	about 0.05 ml (20 drops = 1 ml)	Bleach in water
1 teaspoon	5 ml	5 g of salt, 4 g of sugar
1 tablespoon	15 ml	15 g of salt, 10 g of flour
1 cup	250 ml	200 g of rice, 140 g of flour
1 drinking glass	200 ml	

Temperature

°F = °C × 1.8 + 32. °C = (°F − 32) ÷ 1.8.

°C	°F	Meaning
−18	0	Freezer
0	32	Freezing point of water
4	39	Refrigerator
37	99	Body temperature
100	212	Boiling point of water (sea level)
116–121	240–250	Pressure canner at 0.7–1 bar

Electricity

- **Battery energy:** Wh = V × Ah. Example: 12 V × 100 Ah = 1,200 Wh.
- **Usable energy:** LiFePO4 about 90%, lead-acid battery only 50% (deeper discharge destroys it).
- **Run time:** hours = usable Wh × 0.85 ÷ the appliance's power in W. Example: 1,080 Wh × 0.85 ÷ 60 W (a refrigerator on average) = about 15 hours.
- **Power bank:** mAh × 3.7 V ÷ 1,000 = Wh. 20,000 mAh = 74 Wh = about 4–5 phone charges.
- **Power:** W = V × A. 230 V × 10 A = 2,300 W.
- 1 kWh = 1,000 Wh. 1 kW = 1,000 W.

Pressure and Other

- 1 bar = 100 kPa = 14.5 psi.
- 1 l of oil ≈ 0.92 kg ≈ 8,000 kcal.
- 1 l of water = 1 kg.
- A cubic metre of firewood (stacked volume) ≈ 400–500 kg of dry beech.

16.5 Bleach Dosing (Sodium Hypochlorite, Unscented)

Purpose	Bleach concentration	Dose	Waiting time
Drinking water, clear	5%	2 drops per 1 l	30 min
Drinking water, cloudy (strain first)	5%	4 drops per 1 l	30 min
20 l jerrycan	5%	1/2 teaspoon (2.5 ml)	30 min
Drinking water, clear	2.5–3%	4 drops per 1 l	30 min
Drinking water, clear	8%	1–2 drops per 1 l	30 min
Disinfecting empty jerrycans	5%	1 teaspoon per 1 l of water, shake	2 min, then rinse
Surfaces, toilet, buckets	5%	1 dl per 5 l of water	10 min

After 30 minutes the water should smell faintly of chlorine. If it does not, repeat the dose and wait another 15 minutes. Prepare the solution for surfaces fresh every day.

> **WARNING**
>
> Never mix bleach with vinegar, ammonia or other cleaning products – toxic gases are produced. Use only unscented bleach without additives. Check the concentration and expiry date on the bottle – old bleach loses its strength.

16.6 Phone Numbers

Number	For what
112	Ambulance, fire brigade, mountain rescue, cave rescue, divers, civil protection and rescue; the Notification Centre of the Republic of Slovenia. It works without a SIM card and without credit. SMS is also possible.
113	Police

Write in your own numbers below and print the page. When the phone does not work, paper is the only address book.

Contact	Name	Phone
Family doctor		
Nearest pharmacy		
Electricity distributor (ODS) – fault reporting		
Water utility operator		
Municipality – civil protection		
Vet		

Contact	Name	Phone
Neighbour 1		
Neighbour 2		
Relative outside the area (meeting point)		
Children's school / kindergarten		

16.7 Short Glossary of Terms

Term	Meaning
Ah (ampere-hour)	Battery capacity; together with voltage it gives energy in Wh
Anti-islanding	Protection that switches off the inverter during a grid outage so that it does not feed power into the grid and endanger line workers
BMS	Electronics in a battery that protect the cells from overcharging, over-discharging and overheating
CO	Carbon monoxide; a toxic, colourless and odourless gas produced by combustion
DoD	Depth of discharge of a battery, in percent
EPS	Emergency power supply; the output of a hybrid inverter that works during a grid outage
FFP2	Protective mask that filters at least 94% of particles
FIFO	"First in, first out" – use the oldest stock first
First flush	A device that diverts the first, dirty portion of rainwater from the roof away from the collection tank
HDPE	High-density polyethylene; the plastic used for jerrycans and food buckets
Hybrid inverter	An inverter that works with photovoltaics, a battery and the grid at the same time
IBC	A 1,000 l container in a metal cage, suitable for rainwater
kWp	Rated (peak) power of a solar power plant
LiFePO4	Lithium iron phosphate battery; safe, lasts 3,000–6,000 cycles
MPPT	Charge controller that extracts the most power from solar panels (up to 30% more than PWM)
Mylar	Multilayer aluminised film for long-term food storage
ODS	Distribution system operator (DSO); the company that manages the electricity grid in your area
Off-grid (island) system	A solar system that is not connected to the grid
Oxygen absorber	A sachet of iron powder that removes oxygen from sealed packaging
PMR	Radios on 446 MHz, for licence-free use
PWM	A simple and cheaper charge controller, less efficient than MPPT
Raw pack	Filling raw food into jars before sterilisation
SoC	State of charge of a battery, in percent
SODIS	Disinfecting water with sunlight in transparent bottles
Space blanket (thermal foil)	Thin aluminised foil that reflects body heat
TBE (KME)	Tick-borne meningoencephalitis; a viral disease transmitted by ticks, against which a vaccine exists
V2L	Vehicle-to-load; an electric car as a source of electricity for appliances and the home

Term	Meaning
Wh (watt-hour)	Unit of energy; 1,000 Wh = 1 kWh

TIP

This handbook is a general guide. For electrical installations, gas appliances and health problems, always consult a qualified professional. In an emergency, call 112.