



PROJECT REPORT · PAPUA NEW GUINEA

Safe Water from the Mountain: Eastern Highlands, Papua New Guinea

How a community-built gravity pipeline reached more than 3,500 people, why we chose filters at the tap stands to make its water safe, and how a new local nonprofit, PNG Safe Water, will own and run the systems.

PILOT UNIT DELIVERED

UPDATED

September 28, 2026

PARTNER

Philip Wayaki Bongi; PNG Safe Water

PREPARED BY

Clean Water Help volunteers

WEB

cleanwaterhelp.org/projects/png

Clean Water Help is a 100% volunteer-run 501(c)(3) nonprofit (EIN 99-0765687). Founders cover all operating costs, so 100% of public donations go to projects. Numbers are current as of September 28, 2026. Photos are shared by partners with permission; names of private individuals are withheld. impact@cleanwaterhelp.org

At a glance

LOCATION

Daulo District, Eastern Highlands

LOCAL LEADER

Philip Wayaki Bongi

LOCAL NONPROFIT

PNG Safe Water (registering)

EXISTING SYSTEM

Gravity pipeline, 3,500+ people

NOW

Pilot unit delivered

CWH ROLE

Design, pilot funding, NGO start-up

3,500+

people on the pipeline today

~5,000

more people with the full plan

~\$25,000

full plan (estimate)

~\$450

est. cost per life saved

1 Executive summary

KEY FINDING

The community already solved the hardest part: getting water down the mountain to 3,500+ people. The remaining gap is a reliable germ barrier at the taps. The chosen design is a gravity-powered ultrafiltration unit at each tap stand, which needs no electricity or chemicals. The pilot unit was delivered in September, and a plumber is being arranged to install it. Rainy-season testing follows. A local nonprofit is forming to own the systems.

In 2024, Philip Wayaki Bongi and his community built a gravity water system: a catchment on a mountain creek, a storage tank, and a pipeline to tap stands in the village. Villagers dug the trenches by hand. An extension completed in 2025, funded through writer Elan Head's appeal, brought the total to more than 3,500 people.

To add a dependable germ barrier at the taps that needs no power or daily trips uphill, the team looked at multi-barrier filtration. In June 2026, CWH's technical team compared the options and chose ultrafiltration at each tap stand for a pilot. The pilot unit was delivered in September 2026, and a plumber is being arranged to install it.

At the same time, CWH is paying the start-up costs of PNG Safe Water, a nonprofit led by Philip with a PNG-majority board. CWH will manage the water projects until PNG Safe Water is operating, funded and self-governing, then step back to an advisory role.

What happens next

1. Install the pilot at a tap stand, measure pressure, fit the pressure-reducing valve, and record cloudiness, bacteria and cleaning needs through the rainy season.
2. If the pilot works, install four more systems, one for each community down the mountain.

3. If sediment clogging makes filters impractical, train households in point-of-collection chlorination as the fallback.
4. Register PNG Safe Water (Notice of Intent, 60-day public notice, incorporation; target January 2027), then open its bank account and tax registration.
5. Raise about \$25,000 (estimate): filtration for the existing line (about \$5,000), a pipeline extension for about 1,500 more people (about \$5,000) and a new pipeline for about 3,500 more people (about \$15,000).

THE ISSUE TO WATCH

Sediment after heavy rain. Ultrafiltration removes germs reliably, but muddy water can clog prefilters and membranes. How often the filters need cleaning in the rainy season will decide whether the design can scale or whether the fallback is needed.

Key numbers and how solid they are

Each number is labeled by its basis: **MEASURED** counted or tested, **REPORTED** reported by a partner or a document, **RECORD** from our own payments, contracts and correspondence, **ESTIMATE** a calculation or assumption, **PLANNED** a plan or target, not yet done.

ITEM	VALUE	BASIS	SOURCE
People served by the pipeline	3,500+	REPORTED	Phase 2 completion report, 2025
Original build cost	about \$15,000	REPORTED	Project summary, 2026
Household repair-fund contribution	about K20 (about \$4)	REPORTED	Phase 2 completion report
Parts per tap-stand filter unit	about \$100–120	RECORD	Supplier quote and invoice, Jul–Aug 2026
Systems if the pilot works	4 more	PLANNED	CWH plan
Filtration for the existing line	about \$5,000	ESTIMATE	CWH plan
Pipeline extension	~1,500 more people, about \$5,000	ESTIMATE	CWH plan
New pipeline	~3,500 more people incl. a mountain school, about \$15,000	ESTIMATE	CWH plan
Full plan	about \$25,000 for ~8,500 people	ESTIMATE	10-year life, about \$0.30 per person per year

ITEM	VALUE	BASIS	SOURCE
Estimated cost per life saved	about \$450	ESTIMATE	Method at cleanwaterhelp.org/technical
PNG Safe Water registration	about K2,000–4,000	ESTIMATE	Start-up cost plan

2 Background and progress

The place and the need

The project is in the Korepa area of Daulo District, near Goroka in Papua New Guinea’s Eastern Highlands. Before the pipeline, families walked miles each day for water that was not safe to drink, and relatives died of typhoid. A piped supply built in the 1980s had long since rusted out.



Digging the trench by hand



Carrying materials up the mountain

How the pipeline was built

Philip Wayaki Bongi grew up in the area. Donors paid for his university education, and he built a career in monitoring and evaluation before turning to his village’s water. In 2024, with support from a US water charity, the community built a creek catchment, a storage tank and a gravity line with tap stands, for about \$15,000 and in under six months. In 2025 an extension added about 1.5 km of pipe, a tank and eight tap stands, funded through an appeal by writer Elan Head. Carey Lafferty, Elan’s mother, knew Philip from her years with a health charity in PNG.

The community reports shorter walks, easier access for elderly people, and fewer cases of typhoid. These are community observations, not a health study.

How Clean Water Help became involved

A CWH volunteer contacted Philip in January 2026, and he joined our team in February. In May, about 45 CWH volunteers were invited to join technical, awareness and grant teams. The technical team met from June 2026 to work through distribution, safe water and long-term operation.



Two girls at a new tap stand. Photo: Philip Wayaki Bongji

Timeline

1980s	An earlier piped supply is built; it later rusts out.
Apr–May 2024	Community gravity system started by Philip and the community.
Dec 2024–May 2025	Extension built; 3,500+ people served.
Jan 20, 2026	CWH volunteer contacts Philip.
Feb 8, 2026	Philip joins Clean Water Help.
May 12–20, 2026	CWH PNG teams formed (technical, awareness, grants).
Jun 8–13, 2026	Treatment options reviewed; ultrafiltration at the tap chosen for the pilot.
Jul 2026	Plan for an independent, locally led PNG nonprofit; CWH board funds the pilot.
Aug 2026	Pilot unit shipped from Hong Kong to Goroka.
Sep 3, 2026	PNG Safe Water’s first board meeting.
Sep 2026	Pilot unit delivered; a plumber is being arranged to install it.
<i>Next</i>	<i>Install and test; register PNG Safe Water (target January 2027).</i>

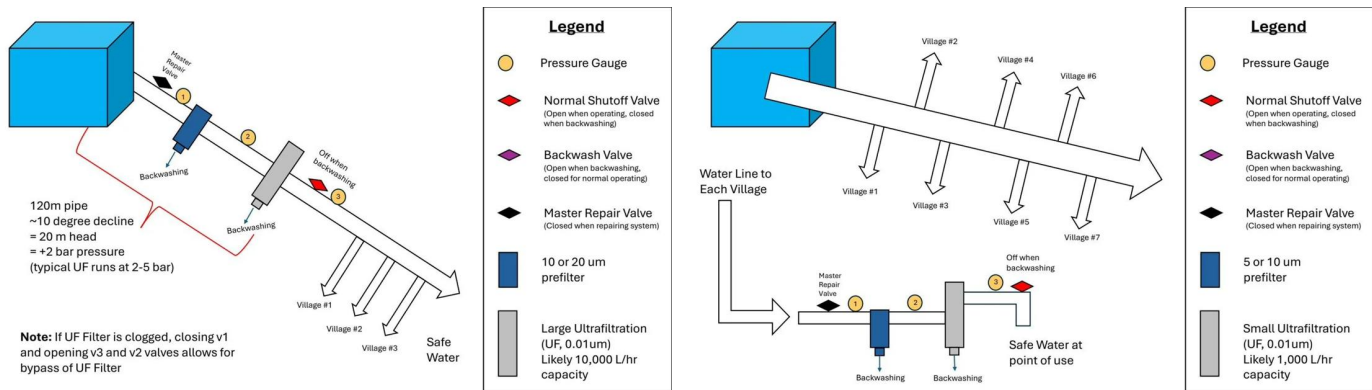
3 Technical foundation

The tap-stand filter

Each unit fits at a tap stand and runs on the pressure the mountain provides. The treatment train is:

1. Pressure-reducing valve (the lowest taps can see very high static pressure)
2. 40 micron stainless steel spin-down screen with a flush valve

- 3. 5 micron polypropylene cartridge
- 4. PVDF hollow-fiber ultrafiltration membrane, about 0.01 micron, about 2,000 L per hour, backwashable
- 5. Pressure gauges before and after each stage, so a caretaker can see when cleaning is due



Option A: one large unit for a whole line

Option B (chosen): a small unit at each tap

What it removes. Bacteria (0.5–2 micron, including those behind cholera and typhoid) and protozoa such as Giardia and Cryptosporidium (4–6 micron). **What it does not do.** It leaves no chlorine residual, so water can be re-contaminated in dirty containers after collection; hygiene training covers this.

Maintenance

A caretaker reads the gauges weekly, flushes the screen, and changes the 5 micron cartridge when the pressure drop rises. The membrane is backwashed as needed and replaced every one to three years (replacement elements cost about \$15–30). Cloudy water from a tap is treated as a possible membrane breach: stop use and check.

Decisions and the options we set aside

DECISION	OPTIONS CONSIDERED	WHY
Ultrafiltration at each tap stand	One central unit at the tank; household filters	No power or chemicals; fault isolation; each village maintains its own unit.
No in-line chlorine dosing	Venturi or tablet dosers in the pipeline	Not proven at this flow; venturi dosers need more flow than the line provides; tablet supply is hard to sustain.
No UV	Solar-powered UV at the tank or taps	Needs electricity (no grid; theft risk for solar) and the same fine prefilter as ultrafiltration.
Point-of-collection chlorination as fallback	No fallback	Less ideal (daily effort; long-term use about 40–50%) but far better than nothing.
A new, locally led nonprofit	A CWH branch in PNG	Local ownership; grants held in PNG Safe Water’s own name; CWH steps back once it is self-governing.

Risks and how we respond

RISK	LEVEL	RESPONSE
Sediment clogging after heavy rain	High	Screen and cartridge prefilters, source protection, gauges; fallback to chlorination.
Landslides and pipe damage	Medium	Community repair fund; local plumber; spare pipe.
Theft or tampering	Medium	Lockable enclosures; no solar panels at remote sites.
Reliance on one caretaker per system	Medium	Train at least two people per village.
Registration delays	Low	Filing prepared; 60-day public notice built into the plan.

4 What we learned and what is still open

- **Respect what the community already built.** The pipeline is the hard part and it works. Our job is to add what is missing, not start over.
- **Design for the site, not the catalog.** No power, steep slopes, landslides and long supply lines ruled out several standard solutions.
- **Plan the handover from day one.** PNG Safe Water gives the community ownership and a legal home for future grants.

Open questions

- How often do the prefilters and membranes need cleaning in the rainy season?
- What pressures do the lowest tap stands see, and which valve setting protects the units best?
- Can the creek source be protected further upstream to reduce sediment?
- Which funders will support the pipeline extension and the new pipeline?

5 How you can help

Help bring safe water to more villages

Your gift pays for filtration on the existing line, pipe to about 5,000 more people and PNG Safe Water's start-up costs. The water plan costs about \$25,000 (estimate). 100% goes to the project.

- Give: cleanwaterhelp.org/projects/png
- Engineers and water scientists: [join the PNG technical team](#)

References and sources

1. Community Water Supply Project, Phase 2 Completion Report and Phase 2 update, 2025 (Philip Wayaki Bongi).
2. Clean Water Help. PNG UF System Concept: installation and operation protocol (2026).
3. Clean Water Help PNG technical team: Distribution; Safe Water; Legacy and Longevity working documents (June 2026).
4. Clean Water Help. Master Project Information, Parts 3.3 and 5A (internal, September 2026).
5. Papua New Guinea Associations Incorporation Act 2023.