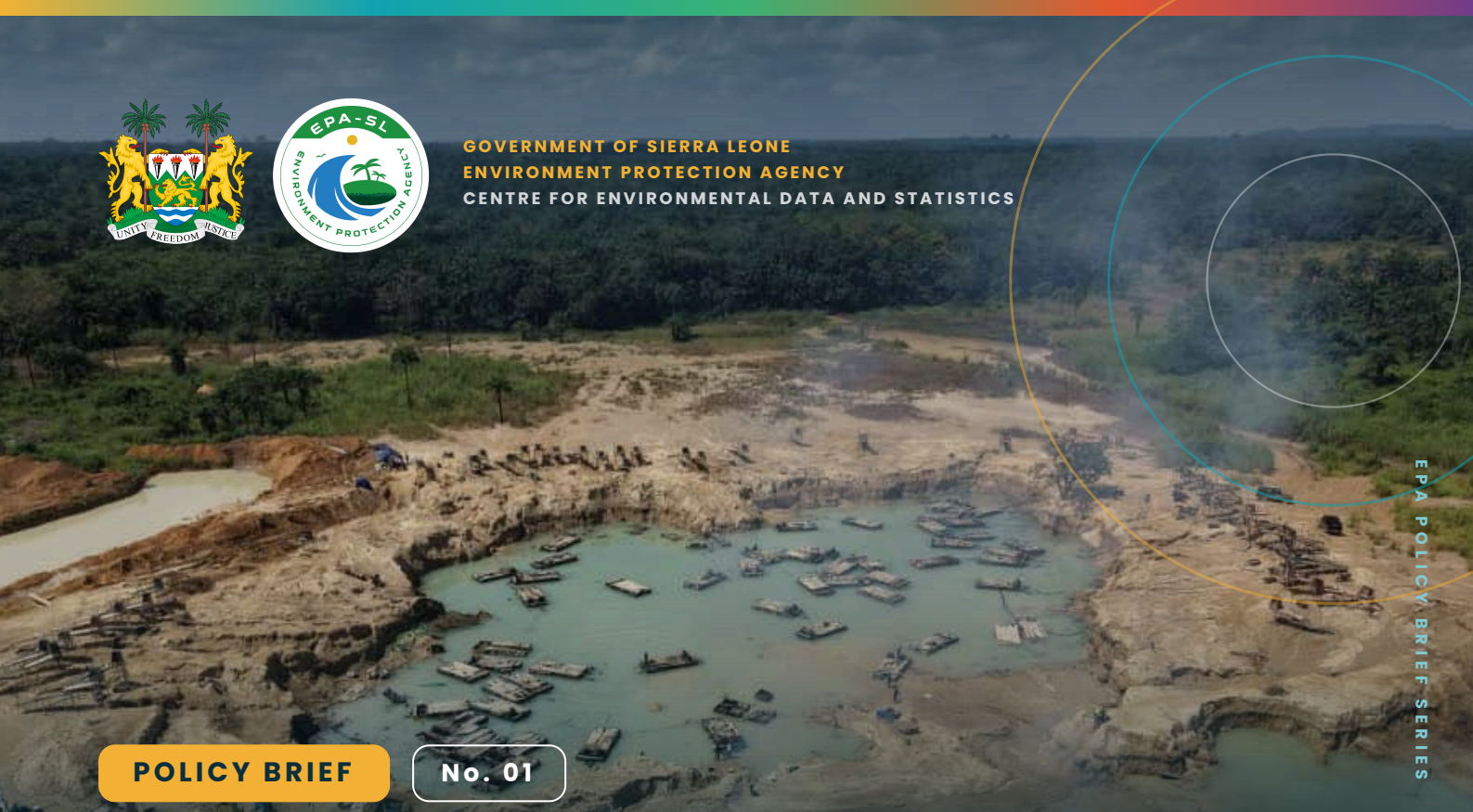


GOVERNMENT OF SIERRA LEONE
ENVIRONMENT PROTECTION AGENCY
CENTRE FOR ENVIRONMENTAL DATA AND STATISTICS

EPA POLICY BRIEF SERIES

POLICY BRIEF | No. 01

Riverbed Mining on the Pampana and Jong Rivers

Mercury and other heavy metals are entering the water, fish and soil that communities in four districts rely on. What the evidence shows, and what to do about it.

48×
the WHO guideline value for mercury in river water at Masanga

85%
of residents say access to clean water has greatly decreased

68%
do not know who issues mining permits

KOINADUGU · TONKOLILI · MOYAMBA · BONTHE | 2026

THE BRIEF IN ONE PAGE

Key messages

Dredging on the Pampana and Jong rivers is introducing mercury and other heavy metals into the water, fish and soil that communities in four districts rely on. Contamination is greatest **upstream**, where mining is concentrated. Enforcement alone has not stopped the damage, because **no effluent standards exist to enforce and no single body is clearly in charge.**

48×
WHO mercury value, highest reading

85%
report greatly reduced clean water

68%
do not know who issues permits

12–35×
spread in national mercury-use estimates

What the evidence shows

1. The rivers are contaminated

The highest heavy-metal readings in river water exceeded WHO drinking-water guideline values: mercury by about **48 times**, cadmium by about **73 times** and lead by about **34 times**. These are screening-level measurements.

2. The source is upstream mining

Mercury in the water falls from **0.29 mg/L at Masanga** (upper reach) to **0.03 mg/L at Mattru Jong** (lower reach), mirroring mining: 89% of upper-reach respondents name mining as the main activity, none in the lower reach do.

3. People already feel it

85% say access to clean water has greatly decreased, and **84%** say riverbed mining harms the environment and health.

4. Nobody is clearly in charge

68% do not know who issues mining permits, **61%** do not know who monitors, and the law contains no effluent standards for the sector.

5. The scale of mercury use is unknown

National estimates vary by a factor of **12 to 35**, and **65%** of respondents declined to say whether mercury is used.



Figure 1. Collecting a river water sample in the field. *Photo: study team.*

THREE PRIORITIES

1 · Safe water now
2 · One enforceable governance system
3 · National standards backed by monitoring

Measurements are screening level: they show the direction of the problem, not precise national figures.

FIVE HEADLINE RECOMMENDATIONS

What we recommend

RECOMMENDATION 1

Protect health first

Safe water and fish-consumption advice along the rivers, in collaboration with the Ministry of Health.

RECOMMENDATION 2

Establish a single governance system

A joint framework by the EPA and the National Minerals Agency (NMA) for riverbed mining, with defined roles for permits, monitoring and enforcement.

RECOMMENDATION 3

Set standards with teeth

Implement Section 43 of the Environment Protection Regulations 2013 and agree effluent and ambient standards with the Sierra Leone Standards Bureau.

RECOMMENDATION 4

Confirm and monitor

Repeat sampling with accredited laboratory confirmation and fixed monitoring points, published openly.

RECOMMENDATION 5

Offer a way out of mercury

Link miners to the Minamata Action Plan and the planetGOLD programme so that enforcement is paired with an alternative.

The roadmap: nine actions, in order

Section 8 sets out who leads and who helps

NOW
0 to 6 months

1 Protect health
2 Confirm the evidence
3 Decide on an interim pause

NEXT
6 to 18 months

4 One governance framework · 5 Standards with teeth
6 Monitor continuously · 7 Measure and cut mercury
8 Enforce and offer a way out

LATER
18+ months

9 Restore and scale



Dredging at a river-edge pit: aerial view of the practice at the centre of this brief.

Written for

MoECC · EPA Board · MMMR · MLGCA · NMA · Development partners

RIVERBED MINING IS A LOCAL FACE OF A GLOBAL PROBLEM

1 Background and scope

Poorly governed nationally, riverbed mining on the Pampana and Jong rivers is one of thousands of affected river systems worldwide.

A global mercury problem

38%
of human-caused mercury air emissions in 2015 came from artisanal and small-scale gold mining (ASGM)

1,220 t
of mercury also released to soil and freshwater by the sector

10–15 m
miners in about 70 countries

UNEP's Global Mercury Assessment 2018 attributes about 38% of roughly 2,220 tonnes of human-caused mercury emitted to air in 2015 to the sector. The WHO calls mercury use in ASGM "particularly hazardous" and names the foetus and young children as most vulnerable because methylmercury builds up in fish.

Sierra Leone's national position

Ratified the Minamata Convention on 1 November 2016. ASGM National Action Plan, 2020, led by the EPA

80,000
artisanal gold miners, 47% of them women

~5%
of an estimated 2.94 t of gold a year was officially exported (142 kg in 2017)

US$22.4 m
action plan cost, about half funded

The plan sets targets to cut mercury use in artisanal mining by **30% in 2022** and **50% in 2024**, and to **eliminate it by 2029**. Progress against these targets was not available for this brief and should be confirmed.

Nobody knows how much mercury is used: two national estimates are 12 to 35 times apart

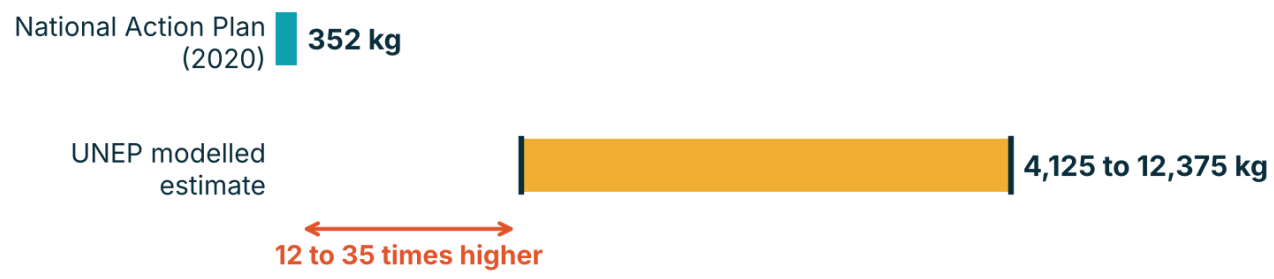


Figure 2. National estimates of annual mercury use in artisanal gold mining differ 12 to 35 times. *Source: ASGM National Action Plan (2020); UNEP estimate as cited in the plan.*

Why the gap matters

The plan's 352 kg a year rests on visits to a few sites; UNEP's 2018 model for Sierra Leone gives 4,125 to 12,375 kg. Without measurement, neither the targets nor the progress can be verified.

Scope of this brief

Reports the study by the Centre for Environmental Data and Statistics (CEDAS) of the Pampana and Jong system (Koinadugu, Tonkolili, Moyamba, Bonthe). It does not assess other rivers or the formal mining sector.

HOW THE STUDY WAS DONE

2 Evidence base and approach

A three-phase pilot with screening-level methods shows a clear direction of travel, but does not support precise national estimates.

Study design

Community survey

311 respondents in 78 communities; KoboToolbox questionnaire; chosen purposively by proximity to the river

Environmental sampling

Water, soil and fish at Masanga (upper), Taiama (middle) and Mattru Jong (lower); one value per site and round

Analysis

EPA mobile laboratory and Njala University lab; portable anodic stripping voltammetry for metals in water

Remote sensing

Drone flights over the sampling points

Benchmarks

WHO drinking-water guideline values (4th edition); Codex Alimentarius levels for fish

Three phases, three seasons

November 2025	March 2026	June 2026
dry season	late dry season	rainy season

How the evidence was handled

WHO guideline values for water

0.006	0.003	0.01
mg/L mercury (inorganic)	mg/L cadmium	mg/L lead

What the survey can and cannot say

Results describe purposively selected respondents, not all riverside residents. Health results reflect perceptions, not clinical records.

311 survey respondents

78 communities

3 sampling points × 3 phases

1 value per site and round

FOLLOWING THE CORRIDOR

3 The river system and the contamination found

Mercury is highest in the upper reach, where most mining occurs, and stays above the WHO guideline value all the way to the lower reach.

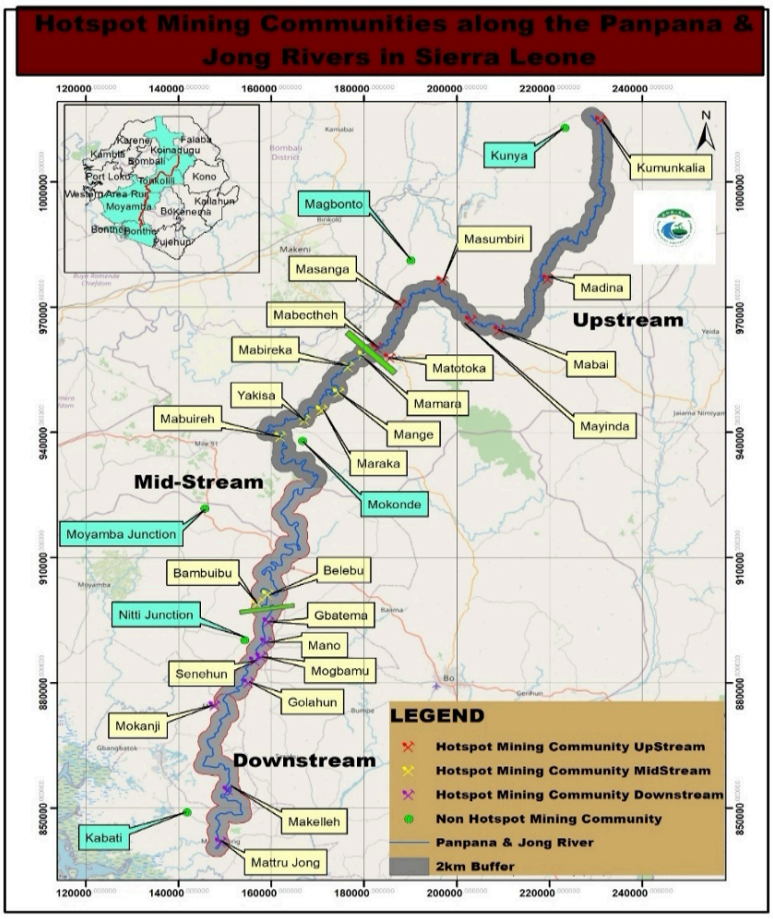


Figure 3. The study corridor from Kumunkalia to Mattru Jong, with the 2 km buffer and the communities visited. *Source: CEDAS and EPA Sierra Leone project map. Grid coordinates are in metres.*

~240 km
study corridor, Kumunkalia (Diang Chiefdom, Koinadugu) to Mattru Jong (Jong Chiefdom, Bonthe)

~960 km²
covered by the 2 km buffer on each side

8,300 km²
basin; published river length 230 to 249 km

477 m³/s
modelled mean discharge near the mouth

The Jong River forms at the confluence of the Pampana and Teye rivers and flows to the Sherbro River estuary on the Atlantic coast. Three sampling points describe about 240 km: roughly one point every 80 km.

Three reaches, three stories

Reach	Channel and form	Mercury in water	Mining as main activity
Upstream	Most winding; channel at least 1.36 times the straight-line distance	**Masanga: 0.29 mg/L**, 48 times the WHO value	**89%**
Midstream	1.17 times	**Taiama: 0.16 mg/L**, 27 times	**11%**
Downstream	1.08 times	**Mattru Jong: 0.03 mg/L**, 5 times	**0%**

The project map classifies eight communities in each reach as hotspot mining communities, whereas the survey found mining to be the main activity almost entirely upstream.

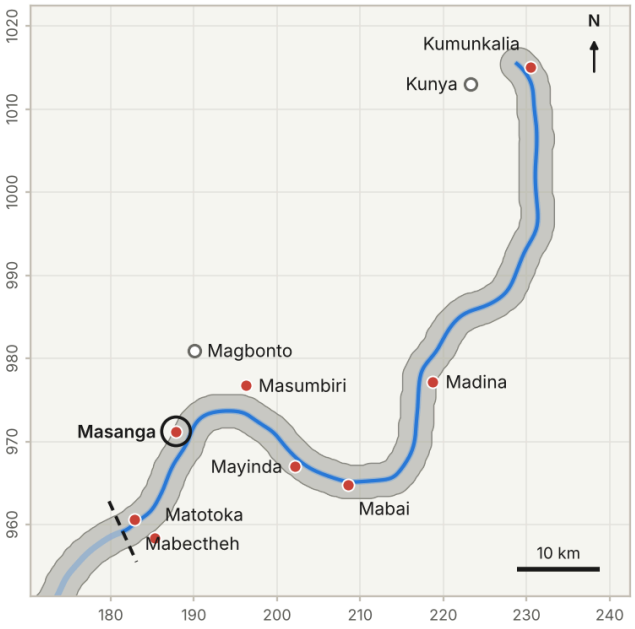
Reach by reach: the project maps

Redrawn from the CEDAS project map; community positions are indicative

UPSTREAM **Kumunkalia to Matotoka**

Upstream: where mining is concentrated and mercury is highest

Kumunkalia to Matotoka, km 0 to 100 of the mapped corridor. Shaded band is the 2 km study buffer.



Upstream reach

Koinadugu and Tonkolili districts.
The most winding reach: channel length is 1.36 times the straight-line distance.

48x
WHO guideline for mercury in water at Masanga (0.29 vs 0.006 mg/L)

89%
of respondents report mining as the main activity in this reach

8 + 2
hotspot and non-hotspot communities named on the project map

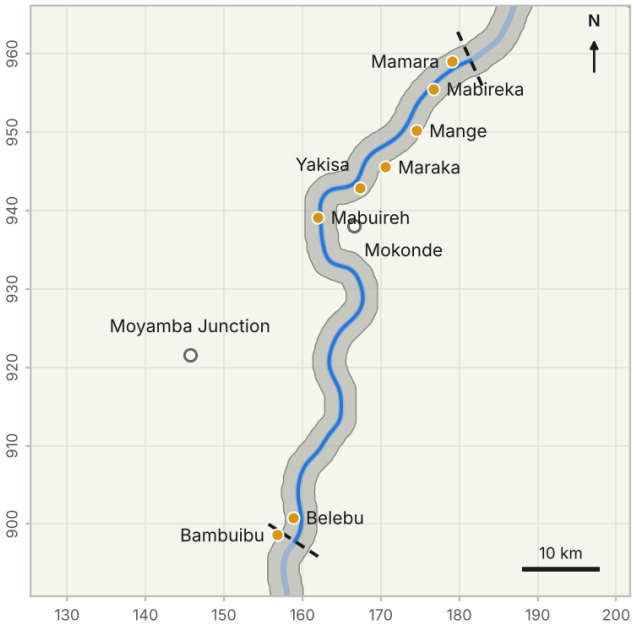
- Hotspot mining community
- Non-hotspot community
- Sampling point (Masanga)

Figure 4. Upstream reach, Kumunkalia to Matotoka. *Source: CEDAS project map; community positions are indicative.*

MIDSTREAM **Matotoka to the Nitti Junction area**

Midstream: mining thins out and nutrient loading shows up

Matotoka to the Nitti Junction area, km 100 to 177 of the mapped corridor.



Midstream reach

Tonkolili and Moyamba districts.
Channel length is 1.17 times the straight-line distance.

27x
WHO guideline for mercury in water at Taiama (0.16 vs 0.006 mg/L)

11%
of respondents report mining as the main activity in this reach

8 + 2
hotspot and non-hotspot communities named on the project map

- Hotspot mining community
- Non-hotspot community

Taiama sampling point is not plotted on the project map

Figure 5. Midstream reach, Matotoka to the Nitti Junction area. *Source: CEDAS project map. The Taiama sampling point is not plotted on the project map.*

DOWNSTREAM **Nitti Junction area to Mattru Jong**

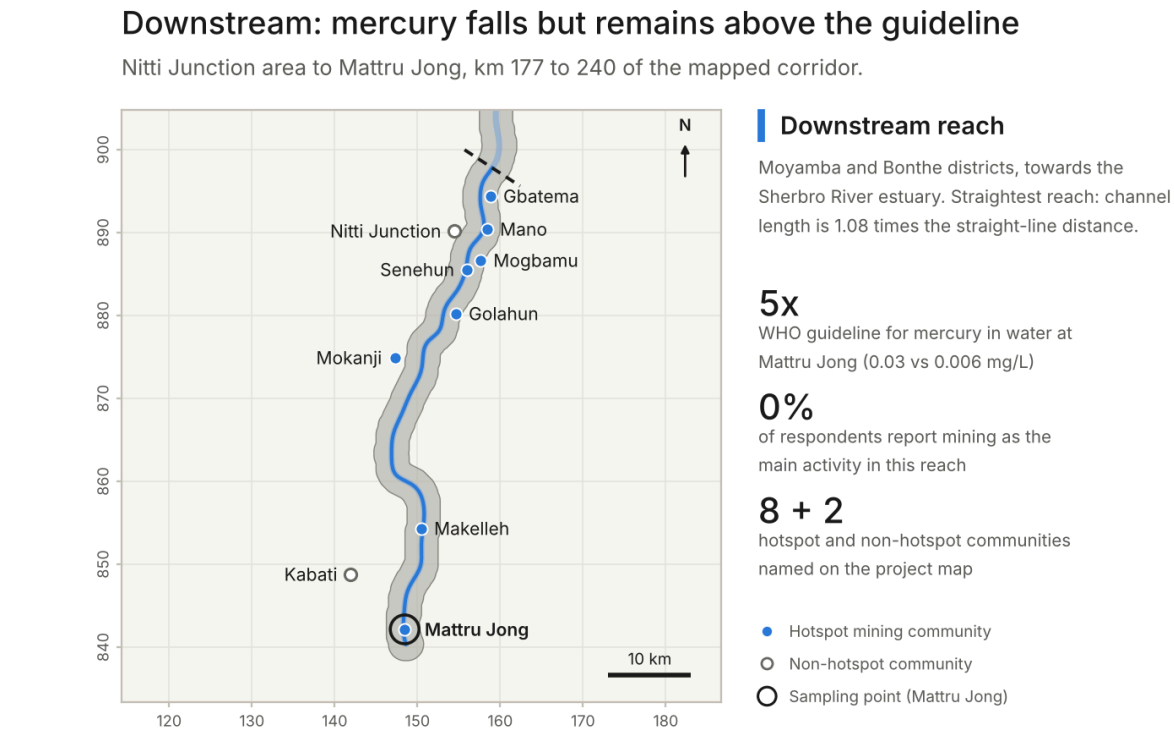


Figure 6. Downstream reach, Nitti Junction area to Mattru Jong. *Source: CEDAS project map; community positions are indicative.*

The mercury steps down with every reach

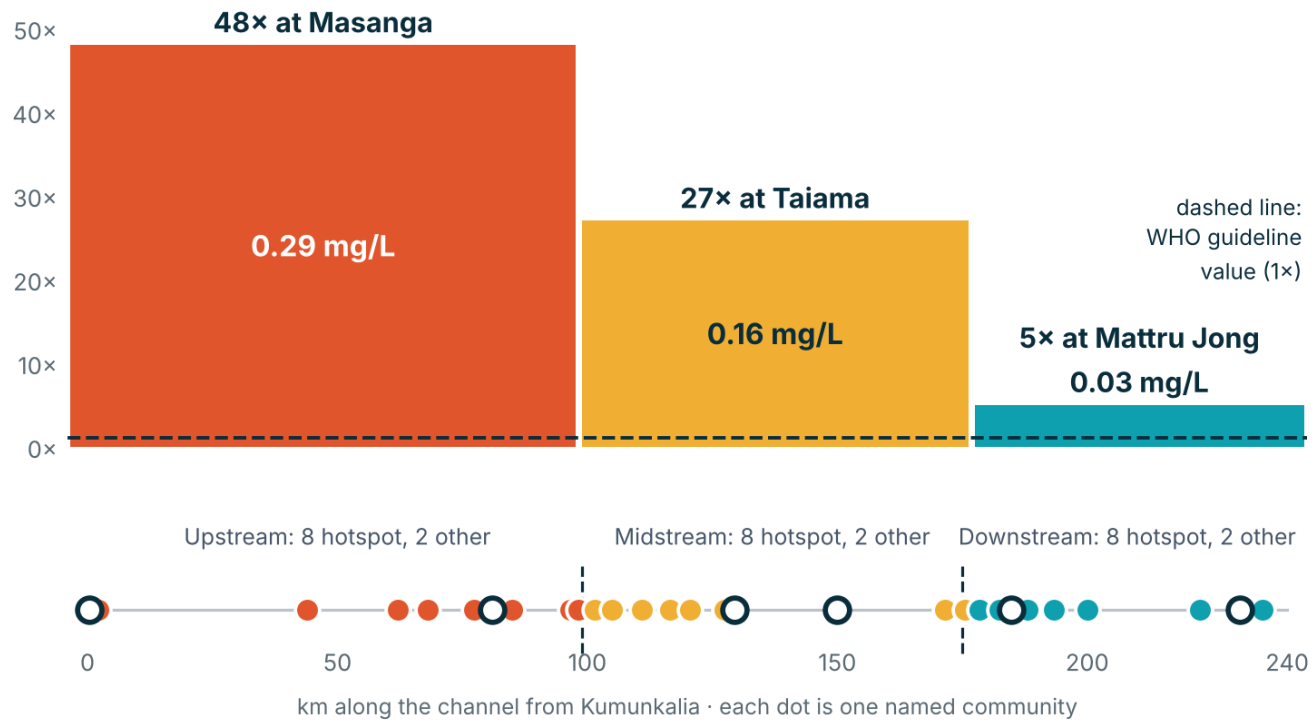


Figure 7. Mercury in river water at the three sampling points, with the 30 named communities by distance along the channel (hollow dots are non-hotspot communities). *Source: CEDAS study, 2025 to 2026. Community positions digitised from the project figure.*

3.2 WHO LIVES BY THE RIVER
Setting and livelihoods

One rainy season

May to October. Six months of heavy rain mean disturbed banks and spoil can wash into the channel for much of the year.

Gold-bearing rock

Archaean crust of the Kenema-Man shield, with greenstone belts that host gold. The Pampana and its tributaries are reported to have held rich alluvial gold.

1.41 million people

About 18.6% of the national total at the 2021 census, in the four districts.

Farmers first

51% of survey respondents were farmers; 41% earned income from other sources, including fishing, mining and trade.

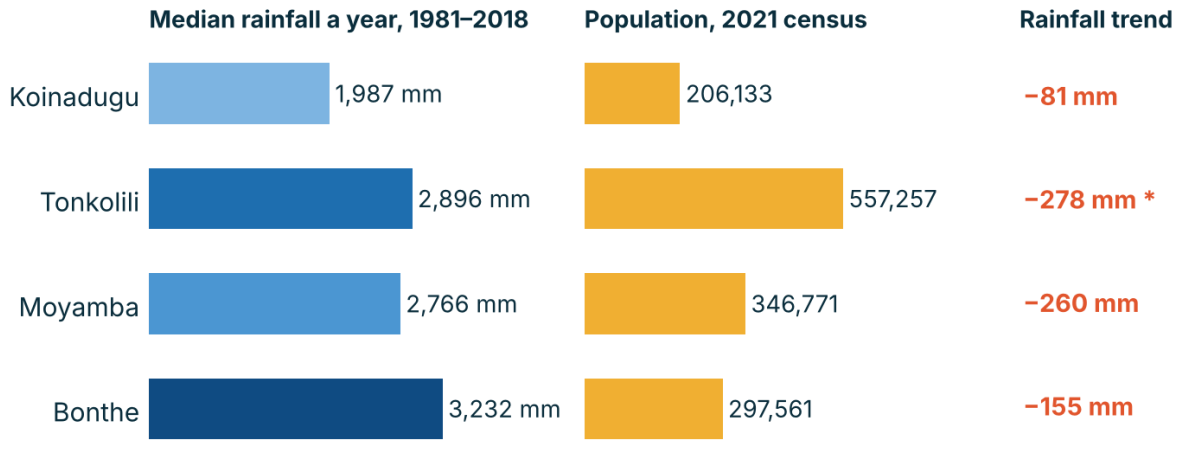
Fishing at the estuary

An EU-commissioned assessment reports fishing contributes on average 70% of household economies in the Sherbro River Estuary, and that siltation is blocking small-boat navigation (it notes internal inconsistencies in some figures).

From dry uplands to wet coast

Median rainfall rises along the river from 1,987 mm in Koinadugu to 3,232 mm in Bonthe, and rainfall has fallen in every district.

From drier uplands to the wettest coast, past 1.4 million people



* statistically significant, p < 0.05

Figure 8. Median annual rainfall, 2021 population and rainfall trend for the four districts. *Source: CHIRPS-based estimates in Climate (2019); Statistics Sierra Leone 2021 mid-term census.*

3.3 Metals and water quality

WHAT THE WATER CONTAINS

Mercury was detected in every river-water sample, at 5 to 48 times the WHO guideline value, and the other metals tested were also above health-based guideline values.

Metal	WHO guideline value (mg/L)	Highest reading (mg/L)	Times the guideline
Mercury	0.006	0.29	About 48
Cadmium	0.003	0.22	About 73
Lead	0.01	0.34	About 34

Highest water readings were 34 to 73 times the WHO guideline value

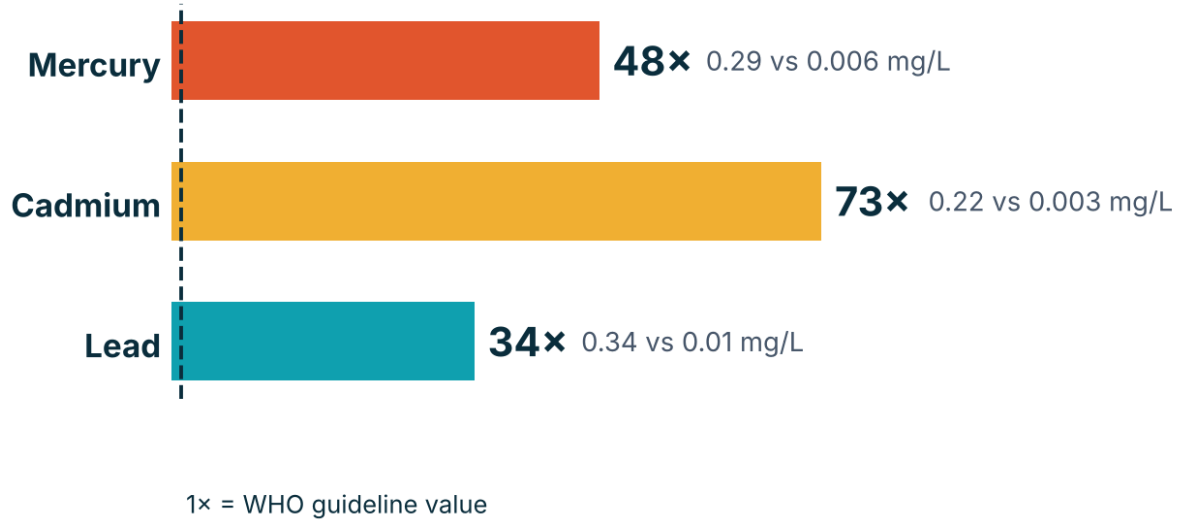


Figure 9. Highest readings of mercury, cadmium and lead in river water as multiples of WHO guideline values. *Source: CEDAS study, 2025 to 2026; WHO Guidelines for drinking-water quality, 4th edition. Ratios calculated.*

Other measurements point to the same source

80.95 NTU
turbidity in the upper reach, about 16 times the 5 NTU acceptability benchmark: consistent with dredging sediment

3,000 mg/L
total dissolved solids upstream; WHO treats this as an acceptability issue, not a health issue

3 more
iron, ammonia and phosphate above the study's benchmarks: nutrient and chemical loading

Where do cadmium and lead come from?
The study does not establish whether they come from mining chemicals or disturbed natural sediment.

Fish
Samples contained mercury, lead, cadmium and arsenic at or near guideline levels in at least one round, but results were on a dry-weight basis, so no site values are quoted.

WHAT RESIDENTS SEE

4 Impacts on people, water and livelihoods

Residents first see the damage to their water and livelihoods, and most do not think mining has made them better off, even though it also brings visible benefits.

Most residents say riverbed mining has greatly reduced their access to clean water



Figure 10. Reported access to clean and potable water. These are perceptions from the community survey, not measured supply. *Source: CEDAS community survey.*

🩺 Health, as perceived

51% noticed changes in community health over 5 to 10 years. **Malaria (38%)** was most cited, then cholera and diarrhoea (each 12% to 28%), skin disease, coughing and vomiting. Perceptions, not clinical records. Mercury does not cause malaria; a plausible link is standing water in abandoned pits. In Ghana, asymptomatic malaria was **64.6%** in three mining communities against **27.7%** in a mining-free one.

🐟 Fish consumption: when does a portion reach the limit?

JECFA provisional tolerable weekly intake for methylmercury: 1.6 µg per kg of body weight. At the Codex level of 0.5 mg/kg:

Person	Weekly limit	Fish at 0.5 mg/kg that reaches the limit
Adult woman, 60 kg	96 µg	About **190 g** a week
Child, 15 kg	24 µg	About **48 g** a week

Livelihoods, safety and acceptance

33% name declining fish stocks as the top negative impact

22% riverbank erosion

13% contaminated water

62% report labour risks at sites

15% say children under 18 are involved

Crime and conflict

Respondents reported a **35% increase in crime**; labour risks include child labour, unfair pay, conflict and injuries.

Why support persists

66% said their community receives infrastructure: meeting halls, schools, a mosque, feeder roads, periodic payments to chiefs, and food.

4.4 How the contamination could reach people

SIX PATHWAYS, FROM RIVER TO HOUSEHOLD

⛏️ Dredging and excavation

PATHWAY Sediment and turbidity in river water; bank erosion

WHO IS EXPOSED Everyone using the river for drinking, washing and irrigation

STUDY FOUND Turbidity 80.95 NTU upstream; erosion named by 22%

⚗️ Mercury used to separate gold

PATHWAY River water; sediment; methylmercury in fish

WHO IS EXPOSED Households drinking untreated water; fish eaters, especially pregnant women and young children

STUDY FOUND Mercury in water 0.03 to 0.29 mg/L; use confirmed by 18%, withheld by 65%

🧪 Cadmium and lead

PATHWAY Drinking water; fish

WHO IS EXPOSED Same

STUDY FOUND Cadmium up to 0.22 mg/L, lead up to 0.34 mg/L; origin not established

🌱 Acidic or contaminated soil

PATHWAY Uptake by crops and vegetables

WHO IS EXPOSED Farming households (51% of respondents)

STUDY FOUND Soil analysis incomplete; not used

🦟 Pits and ponds left by mining

PATHWAY Standing water as mosquito habitat

WHO IS EXPOSED Whole community, especially children

STUDY FOUND Rise in malaria reported by 38% (perception)

🚰 Loss of safe water

PATHWAY Fall back on unsafe sources

WHO IS EXPOSED Households without alternatives

STUDY FOUND 85% report greatly reduced access

Regional evidence on the cost of losing safe water and on how mercury reaches people through fish is in Section 6; the actions it supports are in Section 7.

5 Law, institutions and enforcement

WHO CAN ACT, AND ON WHAT BASIS

The sector is large, informal and governed by no single body, and the rules that would let the EPA act on pollution are not yet in force.

Three legal gaps

1

No operative effluent standards

Section 43 of the Environment Protection Regulations 2013 requires the Board to prescribe effluent and emission quality standards. It remains unimplemented.

2

The mining law is silent on discharge

The Mines and Minerals Development Act 2022 (Section 27) sets out licences issued by the NMA but has no clause on effluent discharge or emission standards.

3

No harmonised structure

The EPA Act 2008 (amended 2010) gave no explicit authority over artisanal mining, and the 2022 repeal Act has not yet closed the gap in practice.

Who is in charge, as communities see it

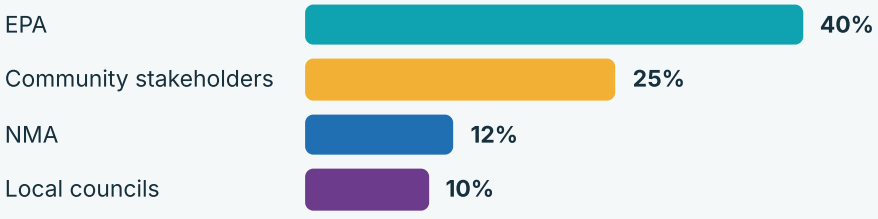
68% do not know who issues permits

61% do not know who monitors

54% look to government where they identify a lead

58% say chiefs and elders settle disputes

Most effective body, among 121 who rated



Why dredging continues

56% of those who answered point to interference by traditional authorities, political leaders, officials and private investors. **58%** would not state daily revenue, which signals fear of exposure. **52%** describe community action against the impacts as limited.

What the EPA is doing, and where it falls short

Front	What the EPA has done	The limit
🚔 **Enforcement**	Destroyed illegal dredging equipment; arrests, prosecution and penalties. In July 2026 the EPA and the Sierra Leone Police shut down a large illegal dredging camp on the Pampana River at Mayata Village, Kholifa Rowala Chiefdom, Tonkolili District	Degradation has accelerated despite these measures; no effluent standards to enforce against; single-site closures are easily reversed because damage spreads downstream
🏘️ **Communities**	Sensitisation campaigns; nine Chiefdom Environment Enforcement Committees (CEECOMs) in hotspot chiefdoms, supported to develop by-laws and piloting financial support for patrols and communication	Limited local rules (52%) and low awareness of who regulates
🔬 **Evidence**	The CEDAS pilot study, using the EPA laboratory, its mobile laboratory trailer and Njala University	No routine monitoring network yet; fish could not be caught at some sites
🌍 **Mercury governance**	Ratified the Minamata Convention (2016); led the ASGM National Action Plan (2020); among countries added in the second phase of planetGOLD	Targets for 2022 and 2024 have passed; progress to be confirmed

About 300 dredges destroyed in two years: has it worked?

At roughly three a week, destruction has not been matched by a decline in degradation. The question is whether dredges are replaced or reoccupied faster than they are removed.

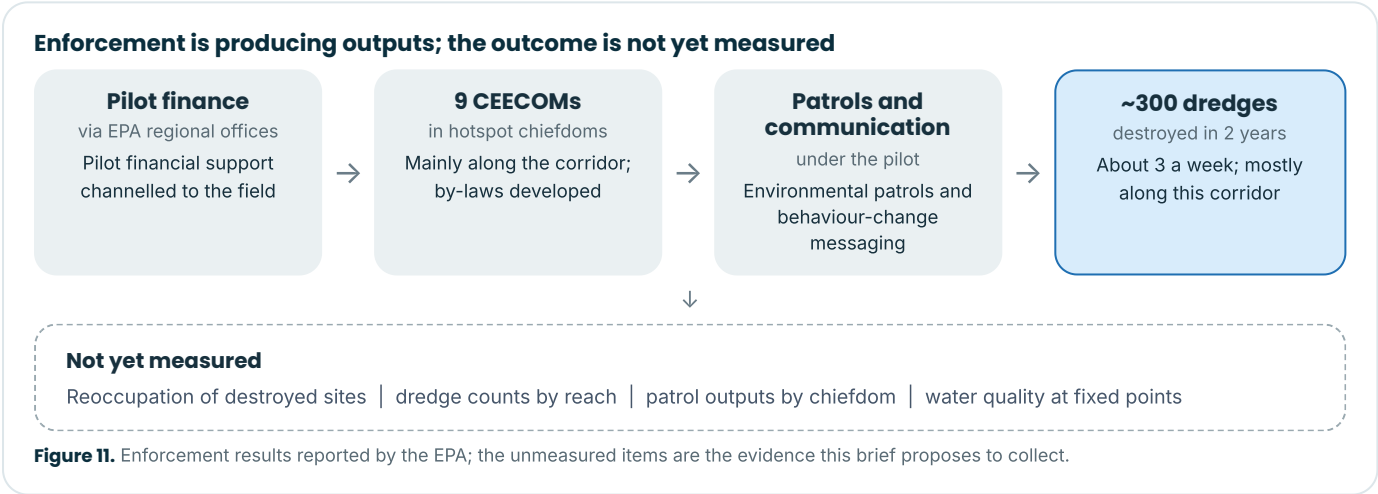


Figure 11. Enforcement results reported by the EPA; the unmeasured items are the evidence this brief proposes to collect.

Five additions would answer it

- 📍 A geo-referenced register of each destruction (date, site, reach)
- 📜 The nine CEECOM by-laws published
- 👩‍⚖️ An independent review after 12 months
- 🔁 Follow-up visits at 30 and 90 days to record reoccupation
- 💰 Patrol and communication spending reported by chiefdom, compared with turbidity at fixed points

WHAT OTHERS TEACH US

6 Regional and global contexts

Waiting costs more: the bill arrives as water treatment and lost livelihoods. Enforcement works better when paired with finance, technology and a market for cleaner gold.

Upstream sources, downstream dilution

Loading is highest near the dredging and dilutes downstream. What differs here is the absence of a routine monitoring network.

Route of exposure

The WHO identifies methylmercury in fish as the main route of human exposure, so prevention at source matters.

Delivery and measurement

Minamata Convention practice is a baseline inventory, targets and periodic review. The gap is delivery, not design.

Cases from the region

🇬🇭 Ghana: siltation from illegal mining

Ghana Water Limited named seven badly affected plants on the Birim, Pra and Black Volta rivers, spent GH¢77.8 million in a year on two dredging exercises, asked for GH¢300 million more, and switched from alum to specialised polymers, raising operating costs. A 24-month recovery plan targets eight river basins.

LESSON
Treating after the damage costs far more than preventing it. Identify drinking-water intakes and protect them first.

🇬🇳 Guinea: planetGOLD

A US$17 million, five-year GEF project launched in April 2023, led by UNEP, aims to cut mercury use, formalise miners, improve access to finance, promote mercury-free technology and strengthen regulation. Refiner Argor Heraeus committed to buy US$10 million of responsibly produced gold if due diligence is met.

LESSON
Pair enforcement with a legal market for cleaner gold; a buyer commitment gives miners a reason to formalise.

🇸🇱 Sierra Leone: planetGOLD phase two

One of 15 countries added in phase two, co-implemented by UNEP, Conservation International, UNDP and UNIDO, which connect mining communities with mercury-free technology.

LESSON
An existing entry point; the EPA should confirm project scope and whether river-dredging operators qualify.

🇸🇱 Sierra Leone: Minamata Action Plan

Estimated cost US$22.4 million, about half funded; strategies on formalisation, better practices, trade, public health and vulnerable groups.

LESSON
It already covers most of what this study asks for; the issue is delivery and measurement.

Partners the response needs

- **Ministry of Health and district health teams** — safe-water and fish advice, surveillance
- **NMA** — permit register, licence conditions, joint inspections
- **Sierra Leone Standards Bureau** — effluent, water, soil and fish standards
- **Njala University** — confirmatory analysis and training
- **Chiefdom councils, committees, local councils** — by-laws, reporting, grievances
- **UNEP, UNIDO, UNDP, Conservation International, UNITAR** — technology, formalisation, capacity
- **Responsible gold buyers and refiners** — market access under the Guinea model

7 FIVE AREAS OF ACTION

What this means for the EPA

Monitoring and priority areas
Treat the upper reach as the priority; site the next round of sampling using the community map, not only the three original points, and include drinking-water intakes.

Protecting health
Begin safe-water and fish-consumption advice for pregnant women and young children now, before confirmatory results are available.

Legal basis and enforcement
Implement Section 43, agree discharge conditions with the NMA, and publish the enforcement register.

The mercury-free alternative
Use planetGOLD and the Minamata plan as the delivery vehicle; treat the Guinea buyer commitment as a model for approaching responsible refiners.

Measuring progress
Publish the indicators below in a concise annual scorecard, and repeat the study with the improvements on the next page.

Indicators for monitoring progress

Section 9.1: the baseline against which a second round can be measured

48 · 27 · 5
× WHO mercury value: Masanga, Taiama, Mattru Jong

85%
greatly reduced access to clean water

32% · 39%
know who issues permits · who monitors

0
effluent standards adopted under Section 43

Indicator	Baseline	Source
Mercury in river water at fixed points, times the WHO value	**48** (Masanga), **27** (Taiama), **5** (Mattru Jong)	CEDAS pilot, 2025 to 2026
Respondents reporting greatly reduced access to clean water	**85%**	CEDAS survey
Respondents who know who issues permits, and who monitors	**32%** and **39%** (derived from 68% and 61% who do not know)	CEDAS survey
Dredges reoccupied within 90 days of destruction	Not recorded	To be collected through the enforcement register
Effluent standards adopted under Section 43	None	EPA, Standards Bureau
Respondents reporting mercury use	**18%** yes, **65%** declined	CEDAS survey; to be replaced by an anonymised survey

NINE ACTIONS: 1 TO 3 RESPOND TO THE STUDY; 4 TO 9 ARE PROPOSALS FOR CONSULTATION

8 Policy options and recommendations

NOW · 0 to 6 months

1 Protect health

Provide safe water points or treatment in riverside communities, starting at the upper reach; issue fish-consumption advice for pregnant women and young children until results are confirmed; brief communities in plain language.

Lead Ministries of Water Resources and Health; EPA supports
Partners District councils, chiefs, WHO and UN partners
Responds to 85% report greatly reduced access; metals above WHO values

2 Confirm the evidence

Repeat sampling with replicate samples, wet-weight fish results and confirmatory analysis in an accredited laboratory.

Lead EPA CEDAS and Environmental Health and Safety directorate
Partners Njala University, Standards Bureau
Responds to Screening-level methods; three sampling points

3 Decide on an interim pause

For a decision by the EPA Board and the NMA: pause new riverbed-dredging permits on the Pampana and Jong until standards and monitoring exist; publish the permit register.

Lead EPA Board and NMA
Partners Ministry of Mines, local councils
Responds to 68% do not know who issues permits; no effluent standards

NEXT · 6 to 18 months

4 One governance framework

Agree a joint EPA and NMA framework (memorandum or regulation) naming who permits, inspects, samples and answers complaints; set up a river-basin coordination group with chiefdom representation.

Lead EPA and NMA
Partners Ministries of Health and Water Resources, councils
Responds to 61% do not know who monitors; no harmonised structure

5 Standards with teeth

Implement Section 43; agree effluent, water, soil and fish standards with the Standards Bureau, aligned to WHO values; carry discharge conditions into licences and permits.

Lead EPA
Partners Standards Bureau, NMA
Responds to Legal gap in Section 43 and the Mines and Minerals Act

6 Monitor continuously

Fixed monitoring points at Masanga, Taiama, Mattru Jong, in midstream and downstream hotspot communities and at drinking-water intakes; quarterly results published through CEDAS; trained community turbidity monitors.

Lead EPA CEDAS
Partners Njala University, councils
Responds to Trends cannot be read from three snapshots

7 Measure and cut mercury

Run an anonymised mercury-use survey; pilot retorts and mercury-free methods; link riverside miners to the Minamata action plan and planetGOLD.

Lead EPA (Minamata focal point)
Partners UNEP, UNIDO, UNDP, Conservation International, UNITAR
Responds to 65% did not answer on mercury use; estimates differ 12 to 35 times

8 Enforce and offer a way out

Intelligence-led operations against dredges, paired with a formalisation path for artisanal miners and a responsible-buyer link on the Guinea model; publish enforcement outcomes and open a protected complaints line.

Lead EPA, NMA and Police
Partners Responsible buyers and refiners, cooperatives
Responds to Enforcement alone has not halted degradation; fear of exposure

LATER · 18+ months

9 Restore and scale

Require rehabilitation commitments in licences; extend the register and monitoring to other river systems.

Lead EPA and NMA
Partners Development partners
Responds to The Pampana and Jong are a pilot; the gap is sector-wide

WHAT THE NEXT ROUND MUST ADDRESS

9 Implementation, monitoring and evidence gaps

The findings are consistent and credible: contamination is present, highest upstream where mining is concentrated, and residents report harm. The exact numbers are screening level.

Limits of the evidence, and the remedy

	WHY IT MATTERS	NEXT ROUND
Benchmarks	Water results are compared with WHO values; national values for some metals are less strict, so the same data would show smaller exceedances.	Publish one benchmark table with sources, units and basis
Fish samples dried before analysis	Guideline levels such as the Codex 0.5 mg/kg apply to fish as eaten; dry-weight results can overstate exceedance, so fish values are not quoted.	Report wet-weight, methylmercury-specific values
Field screening methods	Metals in water used a portable voltammetry unit, and a soil instrument failed in the last round; soil mercury and acidity values are not quoted.	Confirm a subset in an accredited laboratory with blanks, duplicates and reference materials
Few samples, no control site	Three locations in three phases give one value per site and season; without an unmined reference site, mining cannot be separated from natural geology or upstream sources.	Replicate a reference tributary and add more sites
Survey design	311 respondents in 78 purposively chosen communities describe those respondents, not all residents; 58% to 67% declined questions on revenue and gold volume, and 65% on mercury use.	Treat refusals as unknown, not as “no”; use anonymous methods
Health findings are perceptions	No clinical data, and some illnesses named, such as malaria, have other causes.	Cross-check with district health records; a mercury biomarker study if resources allow

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15 Changes in rainfall in Sierra Leone, 1981 to 2018. Climate, 2019.

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Abbreviations

ASGM, Artisanal and Small-scale Gold Mining; CEDAS, Centre for Environmental Data and Statistics; CEECOM, Chiefdom Environment Enforcement Committee; GDWQ, Guidelines for Drinking Water Quality; JECFA, Joint FAO/WHO Expert Committee on Food Additives; MLGCA, Ministry of Local Government and Community Affairs; MMMR, Ministry of Mines and Mineral Resources; MoECC, Ministry of Environment and Climate Change; NMA, National Minerals Agency; NTU, nephelometric turbidity units.

Notes on data

Concentrations are in mg/L, mg/kg and µg. Multiples are simple ratios of the cited values (for example 0.29 mg/L divided by 0.006 mg/L). Reach maps, channel lengths and community positions were traced from the CEDAS project map and are approximate; the Taiama sampling point is not plotted on that map. We redrew the charts in this brief from the figures in our study report and digitised the community positions in Figure 7 from the original figure. Legal citations are given as stated in the respective statutes. Figure 1 is a field photograph taken by the study team during sampling.

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