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A Critical Analysis of the Parliamentary Committee of Inquiry's Final Report on the Alleged Use of Hazardous Chemicals in Mining Activities in Manica Province[1]

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1. Introduction

Against the backdrop of significant gold mining activity in Mozambique, particularly in Manica Province, the Parliamentary Commission of Inquiry (CPI) report was drawn up. Gold mining has grown to become a major contributor to the extractive industry, with an economic impact on state revenues. This growth has been driven by artisanal mining and the performance of mining companies in the province.

However, gold mining can lead to predatory practices that cause environmental damage, such as habitat destruction and mercury pollution. These practices can also have socio-economic impacts on local communities, including loss of livelihoods and public health issues.

CPI report is significant because, despite the considerable investigative and research work already carried out by the media[3,4,5,6] and civil society organisations, including the Centre for Public Integrity (CIP)[7], the complexity of the problem indicates the need for more work of this kind to better identify the causes and produce recommendations.

CPI conducted a technical, scientific and legal study of gold mining activities and their socio-environmental impacts in Manica Province. The CPI aimed to: i) establish the facts relating to the use of chemicals in mining activities; ii) investigate the pollution of rivers flowing into the Chicamba Reservoir; iii) identify those responsible; iv) assess compliance with environmental and mining legislation; v) propose corrective and preventive measures in response to the identified problems.

As the Assembly of the Republic established this Commission – a central state body responsible for overseeing the actions of the Executive – it had sufficient powers to require all Mozambican public and private entities to cooperate with the study. Consequently, this report should have been one of the most

[1] Parliamentary Committee of Inquiry (31 March 2026). Final Report of the Parliamentary Committee of Inquiry to Investigate the Alleged Use of Hazardous Chemicals in Mining Activities in Manica Province. Maputo: Assembly of the Republic, 83 pp.

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[3] @ Verdade (16 July 2011). Six rivers in Manica polluted by small-scale miners. https://verdade.co.mz/poluidos-seis-rios-de-manica-por-garimpeiros/ [accessed on 18 May 2026 at 14:33]

[4] O País (6 August 2017). Nyusi gives Manica two weeks to resolve river pollution. https://opais.co.mz/nyusi-da-duas-semanas-para-manica-resolver-poluicao-de-rios/ [accessed 20 June 2026 at 14:31]

[5] Júnior, F. (2 February 2018). Gold mining pollutes rivers in Manica. https://www.voaportugues.com/a/mineracao-de-ouro-polui-rios-de-manica/4235903.html [accessed 12 July 2026 at 17:11].

[6] Jaquete, B. (10 November 2022). Manica: Mercury contamination of rivers affects the population. https://www.dw.com/pt-002/manica-contaminação-de-rios-por-mercúrio-afeta-produção-de-alimentos/a-63714337 [accessed on 2 July 2026 at 16:16].

[7] Rodrigues, M, R. Massingue and M. Calangue (2025). The Invisible Cost of Gold in Manica: Mercury pollution of water and its effects on communities. https://www.cipmoz.org/2025/09/30/o-custo-invisivel-do-ouro-em-manica-poluicao-hidrica-por-mercurio-e-seus-efeitos-nas-comunidades/ [accessed on 14 June 2026 at 11.02]. *In Centre for Public Integrity.*

comprehensive ever produced on the matter under discussion. However, it had numerous limitations as a technical and scientific report.

This critical analysis aims to evaluate the content, technical consistency, methodological consistency and scientific basis of the environmental section of the Final Report of the Parliamentary Commission of Inquiry into the Alleged Use of Hazardous Chemicals in Mining Activities in Manica Province. It seeks to demonstrate the extent to which the CPI's conclusions and recommendations are supported by empirical evidence and appropriate methodology, and whether they are based on a clear and rigorous interpretation of the collected data. It also seeks to establish whether they comply with Mozambican environmental legislation.

The critical analysis of the Final Report of the Parliamentary Commission of Inquiry into the Alleged Use of Hazardous Chemicals in Mining Activities in Manica Province took a qualitative approach based on reviewing the report itself, relevant literature, and legislation. The analysis focused on the report's environmental component, involving a critical and systematic review of its content. This review emphasised methodological consistency, the quality and sufficiency of the presented evidence, the technical and scientific basis of the conclusions, the interpretation of laboratory results, the application of the legal framework, and the coherence of the recommendations. The applicable Mozambican environmental legislation was consulted as a reference for the analysis, including Ministerial Order No. 180/2004 of 15 September, which regulates water quality standards for human consumption, and Decree No. 52/2023 of 30 August, which regulates quality standards for raw water and the discharge of liquid and solid effluents. A wide range of scientific literature and technical reports on water quality, mercury contamination and public health risks were also consulted. Where relevant, the report’s findings were cross-checked against the available technical and scientific evidence in literature, as well as in civil society reports and media documents on the subject. This was done to assess the robustness of the conclusions and to identify the document’s main contributions and limitations.

The critical analysis is structured into four sections:

i) This introduction contextualises the issue of water pollution associated with gold mining in Manica Province. It presents the report under analysis, justifies its evaluation and defines the analysis's objective and methodology; ii) The critical analysis presents the report's strengths and limitations; iii) The conclusion summarises the key ideas, provides a final assessment of the report and indicates its intended audience.

2. Critical Analysis

2.1 Contribution of the report

The report makes an important contribution to the study of the environmental, health, social and institutional impacts of gold mining in Manica by acknowledging the severity of the issue and gathering information from various key stakeholders. From a scientific and academic perspective, the report is relevant because it addresses gold mining as a multidimensional phenomenon involving environmental degradation, public health and safety, natural resource governance, institutional oversight, the local economy, and the protection of affected communities. This broadens our understanding of the issue, enabling mining to be analysed from different fields of knowledge.

The report's practical value lies in the fact that the Commission carried out site visits to relevant locations, including active mines, illegal panning sites, water supply systems, mineral processing sites, contaminated or potentially contaminated rivers, and the Chicamba Reservoir. Collecting water samples from various rivers and the reservoir for laboratory analysis also constitutes a positive step towards providing technical evidence to underpin the research. By visiting various districts in Manica Province, including Vanduzi, Guro, Macossa, Báruè, Gondola, Sussundenga, Macate and Manica, as well as the city of Chimoio, the Commission has demonstrated its commitment to understanding environmental, social, economic, health and institutional issues in different local contexts.

The report has theoretical and institutional value because it combines hearings and consultations with on-site inspections and evidence gathering. The Commission consulted with provincial, district and municipal authorities, as well as community and religious leaders, representatives of concessionary companies, and associations of small-scale miners. Consultations were also held with central government bodies, particularly those responsible for agriculture, the environment, fisheries, public works, water resources, mineral resources, energy, health and the interior. This diversity of sources enables the issue of mining to be framed as a matter of public interest and integrated governance.

Furthermore, the report helps to systematise issues affecting different districts and sectors within a parliamentary document. It links the use of hazardous chemicals to river and reservoir pollution, non-compliance with environmental and mining legislation, and the need for corrective and preventive measures.

The recommendations set out in the report are multifaceted, covering immediate and corrective measures, as well as structural, legislative, institutional, environmental, public health, social, economic and safety measures, alongside international cooperation, technology, education, community protection and reform of the mining sector. Fully implementing these recommendations could be a key step towards promoting environmental sustainability in Manica and other provinces with similar issues.

2.2 Limitations of the report

When investigating river pollution in Manica Province and basing its conclusions on data relating to water quality, the use of hazardous chemicals and the socio-environmental impacts of mining activity, the CPI report was expected to present technical and scientific evidence that met minimum standards of rigour, transparency and traceability. This would allow the source, methodology and consistency of the results to be verified. However, in this context, the report reveals methodological and technical weaknesses that may compromise the robustness of the environmental data presented, the interpretation of the results, and the possibility of an independent assessment of its conclusions.

The report contained insufficient laboratory evidence regarding water quality. The authors make claims regarding high turbidity, mercury pollution and improvements in water quality, stating that certain parameters fall within national legislative standards. However, they do not consistently present laboratory results or the methods used to analyse environmental quality. They also fail to present the sampling points and the respective results obtained, or the legislation used for comparison. This data is essential for clarifying the quality of river water and the risks to public and environmental health, as well as enabling public scrutiny.

The report fails to distinguish clearly between accounts, community perceptions, direct observations and technical conclusions, mixing them together without clarifying what has been confirmed by laboratory tests, what has been observed by the Commission, what interviewees have stated and what still requires further investigation. This weakness undermines the report's coherence, as it acknowledges the presence of hazardous substances such as mercury, cyanide and arsenic, yet does not present sufficient laboratory results to demonstrate the extent, severity and spatial distribution of the contamination.

From a methodological perspective, the adopted approach is very general. Although the report refers to a mixed methodology, it does not clarify what this combination of methods consisted of. Nor does it provide sufficient details regarding the criteria used to select sampling sites and collection points, analyse physico-chemical parameters, handle samples, determine which laboratory was responsible for the analyses, interpret the laboratory reports, or compare the results with national and/or international standards applicable to water resources.

The report also lacks systematic presentation of tables, graphs, maps, images or evidence matrices, which would enable readers to trace the relationship between identified problems, sources of information, gathered evidence, responsible bodies, adopted measures and proposed recommendations.

These limitations are particularly significant given that the report concerns the contamination of water by highly toxic substances, such as mercury, which could have an impact on public health, aquatic ecosystems, agriculture, fisheries, livestock farming and the water supply. The lack of a robust technical description reduces the methodological consistency of the report and calls its usefulness into question.

The report's theoretical coherence is also limited by the way it addresses water quality. Turbidity is one of the most frequently mentioned parameters and is associated with improvements or deterioration in water resource quality. However, turbidity alone cannot be used to draw conclusions about the presence or absence of chemical contamination. Turbidity reflects a physical change in the water related to suspended particles, sediments, erosion, dredging, soil disturbance, and heavy rainfall[8,9]. Chemical contamination, such as that caused by mercury, requires specific laboratory analysis and can occur in visually clear water. Therefore, when linking the improvement in turbidity to the suspension of mining activities, the report should also have considered the impact of the rainy season, increased flow rates, greater dilution, and the apparent reduction in suspended particles.

As the Chicamba Reservoir supplies the towns of Chimoio, Manica and Gondola, an independent assessment of water quality and public health risks is essential. The report refers to the challenges posed by the turbidity of water drawn from the reservoir, and states that the presence of hazardous mining-related chemicals has not been confirmed. This statement should be supported by detailed laboratory evidence, including the parameters monitored, the frequency of analyses, and the results obtained at each sampling point. Without these details, it is difficult to assess whether the current measures are sufficient to ensure the safety of the public water supply.

Furthermore, the absence of visible signs of pollution, as outlined in the CPI report, does not provide evidence that the water is safe to consume or use for other purposes, particularly in cases of mercury contamination. Once released into the environment, mercury can convert into methylmercury, its most toxic form. Methylmercury is soluble in water and cannot be detected by simple visual inspection, even in apparently clear water. This substance can bioaccumulate in fish and, upon human ingestion, can damage the central nervous system, particularly affecting the brains of foetuses, babies, and children[10,11]. Chemical contamination cannot be assessed solely on the basis of macroscopic observations. A clear example of this is the Mbonde River [12] , where although the water appears clear, laboratory analyses have detected mercury concentrations 16 times higher than permitted limits.

The CPI report indicates that some rivers show no signs of pollution, and that there is no record of chemical contamination in other cases because they are seasonal rivers. However, this finding should be treated with caution. The absence of water at the time of the visit does not rule out the possibility of contamination in

[8] EPA (U.S. Environmental Protection Agency) (2021). Turbidity. https://www.epa.gov/system/files/documents/2021-07/parameter-factsheet_turbidity.pdf [acessado a 02 de Julho de 2026 as 12:04h].
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[12] Rodrigues, M, R. Massingue and M. Calangue (2025). The Invisible Cost of Gold in Manica: Mercury pollution of water and its effects on communities. https://www.cipmoz.org/2025/09/30/o-custo-invisivel-do-ouro-em-manica-poluicao-hidrica-por-mercurio-e-seus-efeitos-nas-comunidades/ [accessed on 14 June 2026 at 11:02]. *In Centre for Public Integrity.*

seasonal rivers, as heavy metals such as mercury can accumulate in sediments[13]. An analysis of sediments and aquatic biodiversity would have enabled an assessment of contamination and the associated ecological and human health risks[14]. In this respect, the CPI's approach appears less thorough than would be expected for a parliamentary inquiry into such a serious environmental issue.

The report states that parameters such as pH, TDS, electrical conductivity, salinity and ORP were all within acceptable limits. However, this statement cannot be independently verified because the values for each parameter, the quantification methods used, the corresponding sampling points, and the standard used for comparison are not provided. Similarly, the statement that the concentrations of mercury and cyanide reached levels of <0.005 mg/L and <0.01 mg/L respectively, remaining below the maximum permissible limits set out in Ministerial Order No. 180/2004 of 15 September[15], raises a relevant technical question regarding the type of regulation applied. This regulation applies to water intended for human consumption, which is generally used for drinking, whereas the samples were collected from rivers, i.e. raw water.

This regulatory choice undermines the interpretation of the results, given that the analysed rivers are used for multiple purposes, including drinking water, irrigation, livestock farming, fishing, and recreational activities such as swimming, hygiene, and play for children, young people, women, and the elderly. The country has Decree No. 52/2023 of 30 August, which regulates Quality Standards for Raw Water and the Discharge of Liquid and Solid Effluents.[16]

Decree No. 52/2023 establishes a reference value of 0.001 mg/L for mercury in surface waters. Using the formula for the environmental risk quotient (QR = measured environmental concentration ÷ reference value)[17], the information presented in the report ('<0.005 mg/L') cannot be used to accurately calculate this indicator, as this result represents a limit of detection or quantification rather than an actual measured concentration. For illustrative purposes only, if we assume that the concentration was equal to 0.005 mg/L, a risk quotient of 5 (0.005 ÷ 0.001) would be obtained, indicating a high potential environmental risk. However, the actual risk ratio may be lower precisely because the actual concentration is unknown. This limitation underlines the importance of the report presenting measured laboratory values, which would enable a rigorous assessment of environmental risk and a more robust interpretation of the results.

The depth of the analysis is also limited when it comes to addressing the impact on public health. In Macate, for instance, it was reported that district health services distributed chlorine and 'Certeza' for water purification in areas with polluted water. Further clarification is required regarding the type of pollution involved. If the contamination is microbiological, chlorination may be useful. However, if heavy metals such as mercury are present, simply adding chlorine does not solve the problem and may give rise to additional risks associated with exposure to these substances. Under certain chemical conditions, mercury can form toxic chlorinated compounds such as mercury chloride. Exposure to these compounds is associated with adverse health effects including gastrointestinal disorders such as nausea and vomiting, kidney damage, and even death[18,19]. Nevertheless, there is still no strategy in place for systematically monitoring heavy metals,

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[13] Bisinoti, M. and Jardim, W. F. (2004). The behaviour of methylmercury (methylHg) in the environment. https://www.researchgate.net/publication/26393387_O_comportamento_do_metilmercurio_metilHg_no_ambiente [accessed 30 May 2026 at 13:54]. *Quim. Nova*, 27 (4) 593–600. DOI: 10.1590/S0100-40422004000400014.

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[15] Ministerial Decree No 180/2004 of 15 September, regulating water quality standards for human consumption. https://mozambique.iom.int/sites/g/files/tmzbdl1106/files/documents/2024-11/annex-i.-diploma-ministerial-180_2004_water-quality.pdf [accessed on 24 June 2026 at 10.23 am].

[16] Decree No. 52/2023, of 30 August, regulates the Quality Standards for Raw Water and for Liquid and Solid Effluent Discharges. https://archive.gazettes.africa/archive/mz/2023/mz-government-gazette-series- i-dated-2023-08-30-no-168.pdf [accessed on 16 June 2026 at 15:00].

[17] EPA (U.S. Environmental Protection Agency) (2026). Technical Overview of Ecological Risk Assessment: Risk Characterisation. https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/technical-overview-ecological-risk-assessment-risk [accessed 20 June 2026 at 13:00].

[18] Urbano, T., Malavolti, M., Vinceti, M. and Filippini, T. (2024). Mercuric chloride ($_{HgCl_2}$). https://www.sciencedirect.com/science/chapter/referencework/pii/B9780128243152000841 [accessed 14 June 2026 at 11.04]. *In Encyclopedia of Toxicology,* 4 (6) 117–122.

[19] Cappelletti, S., Piacentino, D., Fineschi, V., Frati, P., D'Errico, S., and Aromatario, M. (2019). Mercuric chloride poisoning: symptoms, analysis, treatments, and post-mortem findings. A review of the literature. https://doi.org/10.1080/10408444.2019.1621262 [accessed 12 July 2026 at 10:52]. *Critical Reviews in Toxicology*, 49(4), 329–341.

publicly disclosing laboratory results or assessing risks to communities that use these rivers for human consumption and other subsistence activities.

The report does not provide a detailed account of the water quality results for the rivers analysed, nor does it set out the respective short-, medium- and long-term measures for the environmental restoration of water resources that are important to the communities. Furthermore, the reference to the Mussapa, Lucite and Púngue rivers, which are said to have their sources in Zimbabwe and to flow into Mozambique in a polluted state, should be accompanied by scientific evidence substantiating such cross-border pollution. A more detailed clarification of the state of the water is essential for the affected communities.

The report also mentions the Minamata Convention, but it lacks concrete implementation measures such as an effective ban on mercury use, supply chain monitoring, accountability for users and suppliers, awareness campaigns, and reporting channels. Given the continued use and circulation of mercury, the CPI could refer the matter to SERNIC for further investigation. This could clarify issues such as who supplies the mercury, how it circulates in mining areas and what measures have been taken to prevent its use. It could also establish who has been held accountable.

Another critical issue identified in the report is the physical degradation of rivers resulting from excavation, soil disturbance, riverbed and bank exploitation, dredging and watercourse diversion – practices which increase sedimentation, reduce riverbed depth, alter flow rates and compromise the hydrological balance of sub-basins. While these impacts are acknowledged, the analysis does not sufficiently examine the responsibilities of ARA-Centro and the other relevant authorities. Nor does it provide detailed information on diverted rivers, their impact on communities and ecosystems, or concrete measures to halt illegal mining and restore natural watercourses, riverbanks and riparian vegetation.

The report's reference to a decline in fish populations requires more in-depth analysis, as this may be the result of various factors, including reduced water flow due to river diversion and water pollution. This situation poses a threat to public health, food security, and the livelihoods of communities that depend on fishing and agriculture. However, the report does not provide information on fish quality, heavy metal contamination, risks to human health, the state of fish stocks, economic losses to communities, compensation measures, or strategies for restoring affected livelihoods. It also fails to mention risk communication strategies aimed at potentially exposed communities. Similarly, while it acknowledges situations in which natural resource extraction companies fail to comply with environmental standards, the report does not present an analysis of key documents such as environmental inspection reports, environmental management and rehabilitation plans, and environmental and mining licences. Nor does it include reports monitoring the quality of water, air, soil and noise levels, which could strengthen the basis for the conclusions and identification of responsibilities.

Analysis of occupational health and safety issues for small-scale miners is also inadequate. The 22 deaths resulting from mine collapses should have been analysed as occupational health and safety failures. An occupational risk assessment in gold mining is essential in order to identify, prevent and reduce accidents, occupational diseases and deaths associated with mining activities. Such an analysis would enable hazards such as cave-ins, burial, the misuse of mercury, cyanide and other toxic substances, a lack of Personal Protective Equipment (PPE), exposure to dust, noise, explosives and contaminated water, and working in unstable areas to be assessed. Measures such as specific and concrete prevention strategies, geotechnical monitoring, the mandatory use of PPE, training for gold miners and holding operators to account are crucial for safeguarding occupational health and safety.

Limitations in the institutional response are highlighted by the lack of technical capacity in Sussundenga, the limited response in Macate, and the infrequent submission of laboratory results to the Technical

Commission. It is essential to strengthen district-level technical capacity immediately by training local technicians, providing sampling equipment, analysis kits, GPS devices, transport and an adequate monitoring budget, and ensuring access to certified laboratories.

While the report acknowledges the difficulties of monitoring and the inadequacy of logistical, human and operational resources, it does not explore the causes, consequences and responsibilities in depth. The lack of resources cannot merely be used as an excuse for the government's poor performance, particularly when there are serious environmental, economic and social risks at stake. Instead, this issue should form the basis for immediate and effective recommendations, including increased funding, improved coordination between institutions, and the establishment of permanent mechanisms for environmental monitoring and enforcement.

Effective environmental management requires robust oversight and accountability. Merely acknowledging limitations on oversight is insufficient. In light of these limitations, the government must clarify the extent to which it is prepared to address public health problems resulting from predatory mining and whether the fines imposed on environmental offenders can effectively address these issues.

3. Conclusion

While the report by the Parliamentary Committee of Inquiry provides a political and institutional record of gold mining in Manica, it falls short as a technical and scientific document that provides evidence to support its conclusions.
The report is a useful starting point for understanding the scale of gold mining in Manica and the associated environmental governance issues. However, given the serious nature of the environmental problems in Manica, the report does not always substantiate the serious issues it identifies with sufficient depth. It recognises environmental and health risks, but does not provide sufficient data to gauge their magnitude. It refers to institutional responsibilities, but does not explore them in depth. It proposes recommendations, but some lack greater specificity, deadlines, costs, designated responsible parties and monitoring mechanisms. Ultimately, the report should move beyond generalised descriptions of the facts and ensure that they result in concrete measures for prevention, environmental restoration, institutional accountability, and the protection of affected communities and biodiversity.

It is recommended that the Government read the report to guide corrective measures, strengthen enforcement and improve coordination between the environment, mineral resources, water, health and agriculture sectors; that the Attorney General’s Office conduct a more in-depth investigation into environmental, criminal and administrative liabilities; to civil society organisations, to support monitoring, advocacy and the protection of affected communities; to the press, to inform the public and monitor the implementation of the recommendations; and to students and researchers, for critical analysis of environmental governance, mining, public health and the protection of water resources.

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