

The Unregulated Frontier: A Legal Analysis of the Environmental Impacts of Artisanal and Small-Scale Mining (ASM) In Eastern Cameroon and the Inadequacy of the 2023 Mining Code.

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ABSTRACT: The dense forests and mineral-rich river systems of Eastern Cameroon are experiencing an environmental crisis driven by the largely unregulated expansion of Artisanal and Small-Scale Mining (ASM). While ASM provides a critical livelihood for hundreds of thousands, its operational practices characterized by mercury amalgamation, deforestation, and river siltation pose a severe threat to ecosystems and human health. This paper argues that Cameroon's 2023 Mining Code, despite its intent to modernize the sector, remains inadequate in addressing the root causes of environmental degradation. Through an analysis of the Code's provisions on formalization, environmental management, and enforcement, this paper concludes that the legal framework fails to provide a coherent, practical, and sufficiently robust mechanism to mitigate the environmental externalities of ASM, thereby perpetuating a state of ecological and social vulnerability.

Keywords: Environmental Degradation, Ecological Vulnerability, Social Vulnerability, Artisanal and Small-Scale Mining (ASM), Eastern Cameroon.

1. Introduction

Eastern Cameroon presents a complex and critical paradox, a landscape where immense subterranean wealth exists in direct tension with profound surface-level vulnerability. This region, an integral part of the Congo Basin forest ecosystem the world's second-largest tropical rainforest serves as a vital carbon sink and a bastion of global biodiversity¹. Yet, beneath this ecological treasure lies a geology rich with alluvial gold, diamonds, and strategic minerals, creating a powerful magnet for human activity. The Artisanal and Small-Scale Mining (ASM) that has proliferated here is not merely an economic sector; it is a multifaceted crisis of governance, a socio-ecological dilemma where informal livelihood strategies collide with fragile ecosystems and weak state institutions. This introduction delineates the intricate contours of this crisis, exploring the geological drivers, the complex human topography of the mining zones, the profound chasm between legal frameworks and lived reality, and the consequent environmental externalities that threaten regional stability.

The foundational element of this dynamic is the region's specific geological endowment. Eastern Cameroon is situated within the Pan-African Belt, a formation known for its significant mineralization. This has positioned the region as a primary target for mineral extraction, with deposits of gold, diamonds, cassiterite, and coltan attracting both international corporate interest and, more pervasively, a vast, decentralized network of artisanal miners². Unlike capital-intensive industrial mining, ASM is defined by its labor-intensive nature, low technological input, and fundamental informality. It operates largely as a poverty-driven economy, a sector of last resort for populations with limited access to formal employment or sustainable agricultural land³. Its recent exponential growth can be attributed to a confluence of global market forces, including rising commodity prices, and regional instability, which has pushed displaced populations into the Cameroonian frontier in search of subsistence, transforming ASM from a niche activity into a dominant feature of the local economy⁴.

The demographic landscape of these mining areas is a testament to regional dislocation and fluidity. The mining camps are heterogeneous agglomerations, drawing not only from local indigenous communities but also from a wide catchment area of economic desperation. They have become a crucible for internal migration from within Cameroon, as well as a destination for cross-border flows of individuals from the crisis-ridden Central African Republic, Chad, and Nigeria⁵. This transnational character

¹ De Wasseige, C., Flynn, J., Louppe, D., Hiol Hiol, F., & Mayaux, P. (2014), *The Forests of the Congo Basin: State of the Forest 2013*, Weyrich, Belgium, p. 27.

² Suh, C. E., (2008), *The Geology and Mineral Resources of Cameroon, Episodes*, vol. 31, no. 3, pp. 373-381.

³ Hilson, G. & McQuilken, J. (2014), *Four decades of support for artisanal and small-scale mining in sub-Saharan Africa: A critical review*, *The Extractive Industries and Society*, vol. 1, no. 1, p. 104

⁴ Banchirigah, S. M. (2006), *How Have Reforms Fuelled the Expansion of Artisanal Mining? Evidence from Sub-Saharan Africa*, *Resources Policy*, vol. 31, no. 3, p. 167.

⁵ World Bank (2019), *Cameroon - Artisanal and Small-Scale Mining Sector*, World Bank Group, p. 25.

fundamentally complicates the governance equation. It creates a transient population with weak allegiances to local norms and minimal accountability to the Cameroonian state apparatus. Within this migrant stream are individuals who may qualify for international protection under refugee law, having fled conflict or persecution, yet their presence in mining zones is almost universally irregular, leaving them in a legal limbo that fosters vulnerability and exploitation⁶. This demographic complexity strains local social structures, fuels competition over resource access, and presents a nearly insurmountable challenge for a state attempting to impose order and regulation from the center.

At the core of the predicament is the systemic informality that defines the sector. Cameroon's 2016 Mining Code represents a legislative attempt to bring order to ASM, formally recognizing it and establishing a pathway to legality through permits (*autorisations d'exploitation artisanale*) and designated mining zones (*zones d'exploitation artisanale*). However, the implementation of this framework is critically deficient. The formalization process is often labyrinthine, entailing significant transaction costs, bureaucratic delays, and a lack of transparency that effectively excludes the very people it is meant to serve.⁸ For the average artisanal miner, operating on a day-to-day economic margin, the rational choice is to bypass this unattainable legality. Consequently, scholarly and institutional assessments consistently indicate that the overwhelming majority likely exceeding eighty percent of ASM activity in Eastern Cameroon is unlicensed and operates beyond the reach of state regulation and fiscal oversight⁹. This is not a simple defiance of law but a pragmatic adaptation to a system that is perceived as exclusionary and unresponsive.

This entrenched informality, driven by a "survival first" imperative, leads directly to the catastrophic externalization of environmental costs. When the horizon of economic planning is the next meal, long-term ecological integrity becomes an unaffordable abstraction. The resulting operational methods are inherently destructive. The most visually stark impact is the rampant deforestation, where large tracts of primary rainforest are cleared for open-pit mines, leading to habitat fragmentation, soil erosion, and the disruption of delicate hydrological cycles¹⁰. More pernicious is the reliance on mercury for gold processing. The amalgamation process, wherein mercury is used to bind fine gold particles, culminates in the heating of the amalgam, releasing neurotoxic mercury vapor into the atmosphere and allowing residual mercury to contaminate soils and waterways¹¹. The river systems of Eastern Cameroon, which are tributaries to the Sangha and ultimately the Congo River, thus become conduits for a transboundary pollutant, elevating a local public health hazard into a regional ecological and food security threat, in direct contravention of Cameroon's commitments under the Minamata Convention on Mercury¹².

Ultimately, these interconnected challenges are symptomatic of a profound governance vacuum. The Cameroonian state's authority is diffuse and often absent in these remote territories. Logistical constraints, inadequate funding, institutional corruption, and a lack of political will converge to create an environment where enforcement of mining, environmental, and labor laws is negligible¹³. This vacuum is not empty; it is filled by informal power structures and complex patronage networks. These networks, often involving local elites, security forces, and non-state middlemen who control access to capital and markets, entrench a shadow economy that is resistant to formalization¹⁴. Therefore, the ASM sector in Eastern Cameroon must be understood as a complex, self-reinforcing system where economic precarity, weak institutional capacity, cross-border mobility, and environmental degradation are inextricably linked. Addressing this crisis requires moving beyond simplistic enforcement to a nuanced understanding of these systemic drivers, for the fate of the region's people and the integrity of the Congo Basin ecosystem hang in the balance.

2. The Environmental Impacts of ASM: A Multi-faceted Crisis

The environmental consequences of unregulated Artisanal and Small-scale Mining (ASM) in Eastern Cameroon are both profound and multidimensional, revealing a crisis that touches every aspect of the region's ecological balance. Because the sector is largely driven by a "survival-first" logic, miners often prioritise immediate economic needs over long-term environmental

⁶ The 1951 Convention relating to the Status of Refugees, Article 1A(2).

⁷ The Law No. 2016-017 of 14 December 2016, enacting the Mining Code of Cameroon, Articles 2, 92.

⁸ African Development Bank (2019), "Cameroon Country Strategy" Paper 2019-2023, p. 17

Suh, C. E., (2008), *The Geology and Mineral Resources of Cameroon, Episodes*, vol. 31, no. 3, pp. 373-381.

⁹ International Institute for Environment and Development (IIED) (2013), *Artisanal and Small-Scale Mining in Cameroon: A Policy Research Project*.

¹⁰ The Law No. 94-01 of 20 January 1994 to lay down forestry, wildlife and fisheries regulations, Article 9.

¹¹ United Nations Environment Programme (UNEP) (2012), *Global Mercury Assessment 2013: Sources, Emissions, Releases and Environmental Transport*, p. 45.

¹² The Minamata Convention on Mercury, Article 7.

¹³ Kelly, J. (2019), *Governance and the Artisanal Mining Sector in Central Africa*, in "African Artisanal Mining from the Inside Out," Routledge, p. 112.

¹⁴ Global Witness (2015), *The Cameroonian Connection: Exploitation and Secrecy in Cameroon's Forests and Mining Sectors*, pp. 18-22.

considerations. This mindset leads to the routine externalisation of environmental costs, meaning that the true ecological damage is borne entirely by the landscape, forests, water bodies, and local communities rather than the miners themselves¹⁵. The cumulative effect is a pattern of widespread, systemic degradation that not only disrupts local ecosystems but also undermines national commitments to sustainability and responsible natural resource management.

2.1. Deforestation and Land Degradation

One of the most dramatic and visible consequences of ASM activities is the rapid and indiscriminate deforestation that takes place across mining zones. Large sections of pristine rainforest some of the most biologically diverse territories in Cameroon are cleared to create access routes, open mining shafts, and establish makeshift settlements where miners and traders reside. This form of forest clearing results in the immediate and often irreversible destruction of habitats that support a wide range of species, including those that are both endemic (found nowhere else) and classified as endangered by conservation authorities¹⁶. The loss of these habitats disrupts ecological stability, eliminates breeding grounds, and alters food chains that have evolved over centuries within the rainforest ecosystem.

The removal of forest cover also has serious geomorphological consequences. When trees, undergrowth, and root systems are stripped away, the soil loses its natural binding structure and becomes extremely vulnerable to erosion. During heavy rainfall which is frequent in Eastern Cameroon the exposed soil is washed away at alarming rates, creating deep gullies and destabilising the terrain. The eroded soil is carried into nearby rivers and streams, causing significant siltation. This accumulation of sediment alters the physical characteristics of watercourses: rivers become shallower, their paths shift unpredictably, and water clarity diminishes. These changes directly affect aquatic species whose survival depends on stable water temperatures, oxygen levels, and flow patterns¹⁷. Local communities downstream, who depend on these rivers for drinking water, domestic use, and artisanal fishing, face declining water quality and reduced fish stocks, thus compounding the socio-economic vulnerabilities already present in the region.

The aftermath of these activities is a devastated landscape characterised by patches of bare, nutrient-depleted earth, abandoned mining pits filled with stagnant, often contaminated water, and a near-total collapse of natural vegetation. These water-filled pits become breeding grounds for mosquitoes, contributing to public health challenges such as malaria outbreaks. Beyond the immediate impacts, the long-term effects include a drastic reduction in biodiversity, decreased soil fertility, and the interruption of natural regeneration cycles essential for forest recovery. Such outcomes stand in direct contradiction to the fundamental principles of sustainable land and forest governance articulated in Cameroonian legislation, particularly Law No. 2024/008 of 24 July 2024 to lay down forestry and wildlife regulations to amend and supplement Law No. 94-01 of 20 January 1994 to lay down forestry, wildlife and fisheries regulations. This law places an explicit duty on the State and resource users to ensure the rational, sustainable utilisation of forest resources, a duty that is routinely violated in ASM-affected zones¹⁸.

2.2. Water Pollution and Mercury Contamination

Beyond the visible destruction of forests and land, ASM introduces a far more insidious layer of environmental harm through widespread chemical contamination. Water systems in Eastern Cameroon face profound and long-lasting pollution primarily because the dominant technique used by miners to extract gold from ore is mercury amalgamation. In this rudimentary but inexpensive method, liquid mercury is poured onto crushed ore or sediment, where it quickly bonds with fine gold particles to create a dense amalgam. This amalgam is subsequently heated typically over makeshift fires or open flames—to separate the gold. During this heating process, the mercury evaporates directly into the atmosphere, exposing miners and surrounding communities to toxic vapours without any form of protective equipment or regulated procedure¹⁹. Mercury inhalation is known to cause severe health conditions, including neurological impairment, tremors, cognitive decline, kidney dysfunction, and developmental disorders in children. These risks are magnified in ASM zones where miners often live and raise families near the sites of exposure.

However, the most devastating environmental consequences occur once waste from the amalgamation process enters the waterways. Tailings and slurry contaminated with residual mercury are routinely discharged into nearby rivers and streams, either intentionally as part of the washing process or unintentionally through runoff, especially during the rainy season. Once in aquatic environments, mercury undergoes a chemical transformation facilitated by anaerobic bacteria in river sediments, converting it into methylmercury, an even more dangerous compound. Methylmercury is a potent neurotoxin that easily accumulates in fish and other

¹⁵ Hilson, G. (2016), Farming, Small-Scale Mining and Rural Livelihoods in Sub-Saharan Africa: A Critical Overview, *The Extractive Industries and Society*, vol. 3, no. 2, p. 555.

¹⁶ World Wide Fund for Nature (WWF) (2018), *The Status of Biodiversity in the Congo Basin Forest*, p. 34.

¹⁷ Asner, G. P., Lactayo, W., Tupayachi, R., & Luna, E. R. (2013), Elevated rates of gold mining in the Amazon revealed through high-resolution monitoring, *Remote Sensing*, vol. 5, no. 11, pp. 1-14. (Illustrative of the global phenomenon).

¹⁸ Law No. 2024/008 of 24 July 2024 to lay down forestry and wildlife regulations to amend and supplement Law No. 94-01 of 20 January 1994 to lay down forestry, wildlife and fisheries regulations, Article 9.

¹⁹ United Nations Environment Programme (UNEP) (2012), *Global Mercury Assessment 2013: Sources, Emissions, Releases and Environmental Transport*, p. 45.

aquatic organisms, building up progressively through the food chain in a process known as bioaccumulation²⁰. Communities that rely on river fish as a dietary staple particularly along the Dja, Lom, and Sangha rivers face heightened exposure, often without awareness of the long-term health consequences.

The pollution of these rivers carries significant implications beyond national borders. Because they feed into the larger Congo River basin, mercury contamination from ASM in Cameroon becomes part of a wider transboundary environmental crisis affecting Central Africa. This situation undermines Cameroon's commitments under the Minamata Convention on Mercury, which requires signatory states to reduce, control, and ultimately eliminate anthropogenic mercury emissions and releases. The persistent contamination of these water systems therefore constitutes both an environmental tragedy and a breach of Cameroon's international legal obligations²¹.

2.3. Impact on Protected Areas and Biodiversity

The expansion of ASM also poses a direct threat to protected areas and critical biodiversity hotspots across Eastern Cameroon. Many mining sites emerge spontaneously within or adjacent to zones legally designated for conservation, including national parks, faunal reserves, and buffer zones administered by the Ministry of Forestry and Wildlife (MINFOF). These protected landscapes form part of the Congo Basin's ecological core and provide essential habitats for some of the world's most iconic and endangered species, such as forest elephants, lowland gorillas, chimpanzees, leopards, and a vast array of avian and plant life²². When miners move into or near these zones, the consequences are both immediate and far-reaching.

Noise from machinery, generators, and excavation activities disrupts the natural behaviour of wildlife, causing animals to flee traditional feeding grounds, nesting areas, or migration routes. In addition, ASM settlements frequently depend on bushmeat as their primary source of protein, leading to increased hunting pressure on already vulnerable species. The proliferation of footpaths, open pits, and cleared zones fragments habitats, making it harder for wildlife to move safely between different parts of the forest. Over time, these pressures produce cascading ecological effects, including reduced breeding success, genetic isolation, and localised extinctions within species that are already under threat²³. Such degradation represents a fundamental failure of Cameroon's conservation framework. It undermines not only national legislation designed to safeguard natural heritage but also weakens continental and global initiatives aimed at protecting the biodiversity of the Congo Basin one of Earth's most vital ecological frontiers. The loss of these habitats diminishes the region's biodiversity resilience, accelerates species decline, and erodes the ecological services that support both human livelihoods and broader environmental stability.

2.4. Abandonment and Lack of Rehabilitation

A defining and critically damaging characteristic of unregulated Artisanal and Small-Scale Mining (ASM) in Eastern Cameroon is the cycle of abandonment that follows mineral exhaustion. Unlike formal mining operations, which are typically legally bound to undertake environmental remediation, artisanal miners operate without such obligations or financial provisions for rehabilitation²⁴. Once a mining pit is exhausted of its economically viable ore, the prevailing practice is for miners to simply abandon the site and move on to a new location. This leaves behind a scarred and dysfunctional landscape pockmarked with open, water-filled pits, unstable slopes, and vast areas of bare, compacted earth that is incapable of supporting vegetation regrowth²⁵.

These abandoned sites represent a multi-faceted long-term liability. The water-filled pits become breeding grounds for mosquitoes, increasing the incidence of malaria and other vector-borne diseases in surrounding communities²⁶. The degraded land, stripped of its topsoil and organic matter, loses its agricultural potential and its capacity to sequester carbon, thereby undermining both local food security and global climate goals. Furthermore, the chemical contamination from mercury and other processing agents persists in the soil and water, creating an ongoing toxic legacy²⁷. The cumulative effect is a creeping environmental disaster where post-mining landscapes are rendered permanently hazardous and unproductive. This practice stands in direct violation of the "polluter pays" principle, a cornerstone of international environmental law, and highlights a critical enforcement gap in Cameroon's

²⁰ Bose-O'Reilly, S., et al. (2010), Health assessment of artisanal gold miners in Indonesia, *Science of The Total Environment*, vol. 408, no. 4, pp. 713–725.

²¹ The Minamata Convention on Mercury, Article 7 (Annex C).

²² Ministry of Forestry and Wildlife (MINFOF), Decree No. 95-466-PM of 20 July 1995 to set the list of protected animal species

²³ Poulsen, J. R., et al. (2009), Bushmeat Supply and Consumption in a Tropical Logging Concession in Northern Congo, *Conservation Biology*, vol. 23, no. 6, pp. 1597–1608.

²⁴ The Law No. 2016-017 of 14 December 2016, enacting the Mining Code of Cameroon, Chapter VII on Mine Closure and Rehabilitation. (This law places obligations on title holders, which informal miners are not).

²⁵ World Bank (2019), *Cameroon - Artisanal and Small-Scale Mining Sector* (English), World Bank Group, p. 31.

²⁶ Yelibi, N. & Okoh, F. (2022), Artisanal and small-scale gold mining and malaria: A cross-sectional and geospatial analysis, *The Extractive Industries and Society*, vol. 12, 101157.

²⁷ Hilson, G. (2016), *Farming, Small-Scale Mining and Rural Livelihoods in Sub-Saharan Africa* [United Nations Environment Programme (UNEP) (2012), *Global Mercury Assessment 2013: Sources, Emissions, Releases and Environmental Transport*, p. 45.

own legal framework, as the 2016 Mining Code contains provisions for mine closure and rehabilitation that are entirely inapplicable to the informal sector²⁸.

3. Insufficiencies of the 2023 Mining Code

The enactment of the 2023 Mining Code (Law No. 2023-07) was intended to modernize Cameroon's mining sector, enhance its attractiveness to foreign investment, and address long-standing governance challenges²⁹. While it contains progressive elements, such as the explicit formal recognition of ASM and the creation of a specific permit category the *Permis d'Exploitation de Petites Mines* (Small Mine Exploitation Permit) its provisions have proven insufficient to curb the escalating environmental crisis in Eastern Cameroon. The Code's fundamental flaw lies in its failure to bridge the gap between legislative intent and the entrenched reality of informal mining.

3.1. The Formality Gap: Failure to Integrate the Informal Sector

One of the most significant weaknesses of the 2023 Mining Code lies in its inability to meaningfully integrate the enormous informal economy that defines artisanal and small-scale mining (ASM) in Cameroon. Although the Code ostensibly creates a legal pathway for miners through the *Permis d'Exploitation de Petites Mines*, this pathway is in practice inaccessible to the vast majority of artisanal miners. The formalisation process is burdened with requirements that are far removed from the socio-economic realities of rural mining communities. Applicants must prepare and submit technical dossiers, environmental management plans, site maps, feasibility analyses, and assorted financial documents tasks that require not only literacy and specialised knowledge but also the financial capacity to hire experts to prepare them³⁰. For miners who typically operate on subsistence-level incomes and rely on rudimentary tools, these requirements represent an insurmountable barrier.

Moreover, the direct and indirect costs of applying for formal status are excessive relative to the earnings of artisanal miners. Fees linked to licence processing, environmental compliance, and administrative handling far exceed what most miners can afford. The situation is aggravated by entrenched bureaucratic inefficiencies, where applications may sit for months without resolution, and by the widespread presence of corrupt practices. Many miners report demands for unofficial payments at various stages of the application process, creating a climate where formal compliance appears not only financially burdensome but also arbitrary and unpredictable³¹. Faced with such obstacles, miners often conclude that attempting to formalise their activities is irrational, especially when informal mining though illegal remains far less costly and is rarely punished with consistent state enforcement.

As a result, the overwhelming majority of ASM operations continue to exist entirely outside the regulated sphere. This reality means that the environmental protections envisaged by the Code such as the mandatory preparation of environmental impact assessments, implementation of waste management systems, and adherence to mine closure and rehabilitation protocols are limited in practical effect. These requirements apply strictly to holders of formal mining permits and therefore have no bearing on the thousands of informal miners who account for the bulk of environmental degradation in Eastern Cameroon³². In other words, the regulatory framework is meticulously designed for the small minority of miners who manage to acquire legal permits, while the unregulated majority remains beyond the reach of state monitoring.

By conceptualising formalisation primarily as a technical, administrative process, the 2023 Mining Code fails to engage with the deeper socio-economic drivers that underpin informality in the sector. It does not provide simplified procedures tailored to low-income miners, nor does it introduce meaningful incentives financial, technical, or organizational to encourage artisanal miners to transition into the legal domain. There is no provision for mobile registration units, community-based licensing initiatives, subsidised compliance assistance, or partnerships with cooperatives that could help bridge the gap. As a result, the Code inadvertently sustains a dual system: a small, heavily regulated formal sector and a large, unregulated informal sector responsible for the most severe environmental and social harms³³. In failing to close this formality gap, the law undermines its own effectiveness and allows environmentally destructive practices to flourish unchecked.

3.2. Weak and Vague Environmental Provisions

Although the 2023 Mining Code formally requires an Environmental and Social Impact Assessment (ESIA) for mining operations, the specific provisions applicable to the *Permis d'Exploitation de Petites Mines* fall far short of what is necessary to ensure genuine environmental protection. Rather than setting out clear, measurable, and enforceable standards, the Code limits itself to broad declarations that lack operational detail. As a result, the regulatory framework appears compliant on paper but is largely

²⁸ The Rio Declaration on Environment and Development (1992), Principle 16.

²⁹ Law No. 2023-07 of 25 July 2023 to Amend and Supplement Law No. 2016-017 of 14 December 2016 on the Mining Code, Preamble.

³⁰ African Natural Resources Centre (ANRC) (2024), Analysis of the 2023 Cameroon Mining Code Reforms, African Development Bank Group, p. 22.

³¹ Transparency International (2023), Corruption Perceptions Index 2023, Regional Analysis for Sub-Saharan Africa.

³² The Law No. 2023-07 of 25 July 2023, Article 92 bis (Environmental obligations for title holders).

³³ World Bank (2023), PROFILES Artisanal Mining: A Review of Challenges and Opportunities, p. 15.

ineffective in practice, especially in the context of artisanal and small-scale mining (ASM), where technical capacity is already limited³⁴.

The core deficiency lies in the Code's failure to articulate precise pollution control requirements. It does not provide clear specifications for environmental performance, leaving both miners and regulators without concrete benchmarks. Crucial technical directives such as the mandatory use of mercury-free extraction techniques, the installation of sediment traps to prevent the heavy siltation seen across Eastern Cameroon, or the introduction of strict procedures for the containment, treatment, and safe disposal of contaminated wastewater are entirely absent³⁵. In countries facing similar ASM challenges, these measures form the basic minimum for safeguarding river systems and forest ecosystems. Yet Cameroon's new Code remains silent on these essential practices.

This vagueness creates a legal environment where even miners who attempt to comply can do so in a superficial manner, fulfilling procedural requirements without implementing meaningful environmental safeguards. An ESIA, for instance, can be approved despite lacking practical strategies for waste management, water protection, or soil conservation, simply because the law does not define what such strategies must contain. Consequently, the ESIA becomes more of an administrative formality than a tool for environmental management. Perhaps the most striking omission is the absence of a binding, technically detailed "Code of Environmental Practice" tailored to the realities of ASM. Artisanal miners, unlike industrial firms, require explicit and simplified guidance on how to mitigate environmental damage how to handle chemicals, manage tailings, rehabilitate pits, and monitor environmental quality. Without such a framework, the majority of environmental obligations remain aspirational rather than enforceable³⁶. The lack of prescribed protocols for water-quality monitoring, soil-contamination testing, and the absence of explicit bans on high-risk practices such as mercury amalgamation further weaken the regulatory architecture. What results is a system in which environmental safeguards exist in theory but rarely translate into improved practices on the ground.

3.3. Inadequate Mine Closure and Rehabilitation Framework

The 2023 Mining Code also fails to provide a coherent and practical framework for mine closure and rehabilitation in the ASM sector—one of the most persistent structural weaknesses in Cameroon's mining governance. Although the legislation acknowledges, in principle, the obligation of title holders to rehabilitate mined-out areas, it does not establish a realistic, accessible, and enforceable financial mechanism specifically adapted to small-scale operators. This stands in sharp contrast to the industrial mining sector, where stringent and pre-funded rehabilitation bonds or escrow accounts are standard practice and legally enforceable³⁷. For artisanal miners who operate informally or semi-formally, often with minimal capital and unstable income flows, the legal obligations around mine closure are vague and largely unenforceable. The Code provides no simplified bond system, no subsidised or community-based rehabilitation scheme, and no dedicated mechanism through which cooperatives could pool resources to meet closure obligations. As a result, mine rehabilitation becomes an unfunded mandate — legally required but practically impossible for most miners to fulfil.

This legislative vacuum directly reinforces the widespread "dig-and-abandon" model that characterises ASM across Eastern Cameroon. Without a mandatory and pre-funded closure bond, miners have no financial incentive to fill pits, stabilise slopes, or restore vegetation after completing extraction activities. In the absence of a collective rehabilitation fund accessible to ASM cooperatives, even responsible miners lack the means to undertake the substantial work required for safe and effective site restoration³⁸. The consequences are severe and long-lasting. Abandoned mining pits collect stagnant water, becoming breeding grounds for mosquitoes and increasing health risks for surrounding communities. Unrehabilitated landscapes erode rapidly during the rainy season, contributing to siltation in river systems and destroying arable land. Because miners typically operate on extremely thin margins, they seldom retain profits for future rehabilitation. Meanwhile, the state—already constrained by limited financial and logistical capacity is unable to shoulder the enormous cost of restoring degraded sites.

Ultimately, the burden of environmental degradation is transferred onto local communities, who must contend with degraded soils, polluted water sources, and dangerous ³⁹open pits long after mining activities have ceased. This transfer of "environmental debt" from miners to the state and the public represents a profound governance failure and reflects the broader inadequacies of the current regulatory framework. The inability of the 2023 Mining Code to establish a functional closure and rehabilitation system ensures the continuation of environmental harm that is both cumulative and intergenerational.

³⁴ The Law No. 2023-07 of 25 July 2023, Article 91 (Specifying the content of the ESIA, but allowing for simplified procedures for small-scale operations).

³⁵ The Minamata Convention on Mercury, Article 7 (Annex C) (Requiring Parties to develop and implement a National Action Plan to eliminate mercury use in ASM, a standard not explicitly transposed into the Code's mandatory technical requirements).

³⁶ International Institute for Environment and Development (IIED) (2022), *Developing Codes of Practice for Artisanal Mining: A Guide*, p. 5.

³⁷ The Law No. 2023-07 of 25 July 2023, Chapter VII. (The provisions for mine closure and financial guarantees remain geared towards large-scale operations).

³⁸ World Bank (2019), *Mine Closure and Post-Mining Transition: A Review of Global Best Practice*, p. 47.

³⁹ The Rio Declaration on Environment and Development (1992), Principle 16 (The Polluter Pays Principle).

3.4. Centralized Enforcement in a Remote Region.

A major structural weakness of the 2023 Mining Code lies in its dependence on a highly centralised enforcement system that is profoundly misaligned with the geographical realities of Eastern Cameroon. The principal responsibility for monitoring environmental compliance, inspecting mining sites, and enforcing regulatory standards rests with ministries headquartered in Yaoundé. These institutions maintain only a minimal footprint in the remote mining regions, and their decentralised offices where they exist at all are chronically underfunded, understaffed, and ill-equipped to respond to the scale of ASM activity⁴⁰. The region's vast expanses of dense rainforest, its scattered settlements, and its limited, often impassable road infrastructure render effective oversight extraordinarily difficult.

In practical terms, enforcement personnel lack basic operational resources: vehicles capable of navigating rough terrain, consistent supplies of fuel, communication equipment, and the specialised tools needed for environmental monitoring. This technological and logistical deficit weakens the capacity of the state to execute even routine inspections, let alone provide sustained regulatory oversight. What emerges is an enforcement landscape characterised by long distances between administrative posts and mining sites, making frequent and unannounced inspections virtually impossible. The consequence is a yawning enforcement deficit, where the provisions of the Mining Code despite improvements on paper remain largely theoretical. Illegal mining camps flourish, mercury continues to be used indiscriminately, and open pits are left abandoned without fear of sanction. Violations occur in full view of local populations, yet with minimal intervention from state actors. In effect, the probability of being monitored, let alone penalised, is so low that the law exerts almost no deterrent effect⁴¹.

This situation generates a classic governance vacuum, where comprehensive legal norms exist at the national level but cannot be operationalised in the regions where mining takes place. The centralised enforcement model ensures that the informal and environmentally destructive ASM sector operates beyond the reach of the state's regulatory framework. No matter how carefully crafted or ambitious the reforms enacted in Yaoundé may be, they cannot compensate for the absence of a proximate, well-resourced, and empowered enforcement presence on the ground⁴². This structural mismatch ultimately guarantees that environmental degradation continues unabated.

3.5. Lack of a Community-Centric and Rights-Based Approach

A further limitation of the 2023 Mining Code lies in its philosophical grounding, which prioritises state authority and revenue collection over a genuine rights-based framework that centres local and indigenous communities. While the Code makes reference to community involvement in mining governance, its provisions on Free, Prior, and Informed Consent (FPIC) are weakly drafted, non-binding, and substantially below international standards. They fail to provide communities with any effective legal right to grant or withhold consent to mining activities that directly threaten their land, water sources, and livelihoods⁴³. Consultation is framed as a procedural step rather than a substantive legal safeguard, enabling state authorities to proceed with land allocations regardless of community objections.

This legislative marginalisation has profound implications for the populations most vulnerable to ASM-related environmental harm. Rural and indigenous communities—whose farmland, forests, and streams are destroyed or polluted by mining—are left with no meaningful legal mechanisms to hold actors accountable. The Code does not clearly grant them standing to bring claims for environmental damage, nor does it empower them to seek injunctions to halt ongoing pollution or land destruction⁴⁴. Their relationship with the mining sector becomes one of involuntary exposure rather than participatory governance. As a result, the environmental and socio-economic burdens of the ASM sector fall disproportionately on communities that have neither authorised the mining activities nor benefited materially from them. They face contaminated drinking water, the loss of arable land, declining fish stocks, and the destruction of cultural and subsistence landscapes. Yet the law provides no adequate legal remedy to defend their interests. This failure stands in stark contrast to the guarantees contained in the African Charter on Human and Peoples' Rights, to which Cameroon is a party, which recognises fundamental rights to a healthy environment, to property, and to

⁴⁰ African Development Bank (2019), *Cameroon Country Strategy Paper 2019-2023*, p. 18. (Highlighting the challenges of governance in remote regions).

⁴¹ Global Witness (2015), *The Cameroonian Connection: Exploitation and Secrecy in Cameroon's Forests and Mining Sectors*, pp. 20-23.

⁴² Kelly, J. (2019), *Governance and the Artisanal Mining Sector in Central Africa*, in "African Artisanal Mining from the Inside Out," Routledge, p. 115.

⁴³ The Law No. 2023-07 of 25 July 2023, Article 10. (Outlines a consultation process but does not establish a right to FPIC or a community veto).

⁴⁴ African Commission on Human and Peoples' Rights (2001), *Social and Economic Rights Action Center (SERAC) and Center for Economic and Social Rights (CESR) v. Nigeria*, Communication No. 155/96 (The Ogoni Case). (Established the link between environmental degradation and human rights violations).

livelihoods that sustain human dignity⁴⁵. In its current form, the 2023 Code thus perpetuates an extractive model in which communities are treated as passive recipients of harm rather than active rights-holders. Without a robust, enforceable, and community-centred legal framework, the most affected populations remain structurally excluded from decision-making and unprotected from the cascading consequences of ASM-linked environmental degradation.

4. Recommendations for a More Effective Legal and Policy Framework

To transform Artisanal and Small-Scale Mining (ASM) in Eastern Cameroon from a pervasive environmental liability into a regulated, sustainable, and equitable economic activity, the 2023 Mining Code must be supplemented by a comprehensive and pragmatic implementation strategy. This strategy must move beyond the Code's top-down, compliance-focused approach to one that is grounded in the realities of the sector, addressing the root causes of informality and environmental degradation. The following recommendations provide a roadmap for such a transformation, focusing on simplification, specific regulation, financial mechanisms, and community empowerment.

4.1. Simplify and Decentralize Formalization

The foundational and most critical step is to dismantle the barriers to legal entry. The current system, which treats formalization as a bureaucratic prize to be won, is fundamentally flawed. Replacing the complex *Permis d'Exploitation de Petites Mines* with a streamlined, low-cost, and locally administered "Artisanal Miner Card" or "Artisanal Mining License" is essential⁴⁶. This card would not be a permit for a specific plot but a license for an individual or cooperative to operate legally within designated ASM zones. By decentralizing issuance to the divisional or communal level, the state drastically reduces the time, cost, and opportunity cost for miners to achieve legal status. Local authorities possess superior knowledge of local actors and can conduct verification more efficiently than a distant ministry in Yaoundé.

This simplified formalization is not an end in itself but the essential prerequisite for all subsequent governance. It transforms miners from anonymous actors in a shadow economy into identifiable, accountable participants in the formal sector⁴⁷. Once registered, miners can be tracked, trained, and made subject to specific environmental and safety rules. It creates a direct channel of communication between the state and the miner, enabling the provision of technical extension services, access to micro-credit, and the fair collection of taxes and royalties. Without this foundational layer of a known and legally recognized workforce, all other regulations—no matter how well-intentioned will remain unenforceable.

4.2. Develop a Specific ASM Environmental Code

The persistent vagueness of the environmental provisions contained in the 2023 Mining Code underscores the urgent need for a standalone regulatory instrument dedicated exclusively to the environmental governance of artisanal and small-scale mining (ASM). A comprehensive, technically grounded, and legally binding *Code of Environmental Practice for ASM* would serve as the operational backbone that the principal legislation currently lacks. In essence, while the Mining Code establishes broad obligations, it falls significantly short of prescribing the precise behaviours, techniques, and technologies that miners must adopt to minimise environmental harm. A subsidiary code would therefore bridge this critical gap by translating the abstract principles of sustainable mining into clear, practical, and enforceable standards that can be applied directly at mine-site level. Such a code is particularly vital in Cameroon, where the ASM sector operates in remote regions, is largely informal, and is characterised by limited literacy, inadequate technical knowledge, and a lack of affordable, environmentally friendly equipment. By setting straightforward, context-sensitive rules, the code would not only enhance environmental protection but also reduce ambiguity, strengthen compliance, and ensure that inspectors, miners, and local communities share a common understanding of what the law requires.

4.2.1. An Explicit Ban on Toxic Substances

A central pillar of the proposed ASM Environmental Code must be the categorical prohibition of mercury and cyanide, both of which are currently used extensively in gold extraction despite their well-documented ecological and public health harms. Such a ban is not only environmentally imperative but also a legal obligation flowing from Cameroon's commitments under the Minamata Convention⁴⁸. Mercury contamination, in particular, has left a discernible legacy of poisoned waterways, bioaccumulation in fish populations, and long-term neurological risks for communities effects that have been observed not only in Cameroon but across West and Central Africa. However, merely prohibiting mercury on paper would be insufficient and would almost certainly push miners further into clandestine, unsafe practices. For the ban to be effective, it must be embedded within a broader state-led strategy to provide viable alternatives. This includes the introduction and subsidisation of mercury-free technologies such as gravity concentrators, shaking tables, and sluice systems, which have already proven effective in countries like Ghana and Tanzania. Demonstration centres, mobile training units, and pilot projects would therefore be essential complements to the legal prohibition,

⁴⁵ African Charter on Human and People Right(1981), Article 24: " All people shall have the right to general satisfactory environment favourable to their development".

⁴⁶ African Natural Resources Centre(ANRC) (2024), Analysis of the 2023 Cameroon Mining Code Reforms, African Development Bank Group, p 25.

⁴⁷ Hilson, G. (2016), Faming, Small Scale Mining and Rural Livelihoods in Sub-Saharan Africa: A Critical Overview, the Extractive Industries and Society, Vol 3 no. 2, p. 560.

⁴⁸ The African Charter on Human and Peoples Rights(1981), Article 24

ensuring that miners do not perceive the ban as an attack on their livelihoods but rather as a transition towards better, more efficient, and safer extraction methods.

4.2.2. Mandatory Mitigation Measures

The proposed code must go further to mandate simple yet scientifically effective mitigation measures that significantly reduce the environmental footprint of ASM operations. One of the most critical of these is the compulsory construction of sedimentation ponds basic engineered structures designed to capture silt, clay, and suspended solids before wastewater re-enters rivers or wetlands. Without such control measures, mining-induced turbidity can devastate aquatic ecosystems by smothering fish breeding grounds, reducing oxygen levels, and disrupting the ecological balance of entire river systems. In Eastern Cameroon, high sediment loads from unregulated alluvial mining have already degraded major river networks, affecting thousands of people who rely on these waters for drinking, fishing, and agriculture. The advantage of sedimentation ponds lies in their low cost and ease of construction, making them a feasible requirement even for small-scale miners. The ASM Environmental Code must therefore set minimum engineering standards such as the required pond dimensions, retention time, and maintenance schedule so that inspectors can easily assess compliance. By prescribing these measures in explicit, technical terms, the law removes ambiguity and fosters a predictable, uniform approach to environmental protection across mining sites.

4.2.3. Clear Zoning Prohibitions

A further essential component of the Code of Environmental Practice is the establishment of clear and non-negotiable zoning restrictions. These prohibitions must identify specific categories of land that are entirely off-limits to ASM, thereby protecting ecologically sensitive and socially important areas from degradation. In practice, this means enforcing absolute bans on mining within national parks, wildlife reserves, critical biodiversity corridors, riparian buffer zones, and community forests. These zones are already under significant pressure from logging, agriculture, and infrastructure development; allowing ASM within them would accelerate ecosystem collapse and undermine Cameroon's wider environmental commitments. Zoning rules are particularly important because many miners operate without formal land-use planning knowledge and may unknowingly enter prohibited areas due to the absence of signage or boundary demarcation. By defining buffer zones around permanent water bodies and environmentally fragile landscapes, the proposed code would create a clear spatial framework that guides both miners and enforcement officers. Experience from countries such as Rwanda and Uganda shows that zoning prohibitions significantly reduce conflict between conservation authorities and miners, while also protecting key ecological assets without imposing disproportionate burdens on the ASM sector.

4.3. Establish an ASM Rehabilitation Fund

The persistence of the prevailing "dig-and-abandon" model within Cameroon's ASM sector is rooted in a fundamental economic failure: miners bear none of the long-term environmental costs associated with their activities. Once extraction is complete, pits are left open, riverbanks destabilised, and contaminated tailings abandoned, leaving communities and the state to confront the devastating aftermath. This practice continues largely because the legal framework provides no structured mechanism to internalise rehabilitation costs. Establishing a national ASM Rehabilitation Fund offers a pragmatic and economically sound response to this systemic gap. By financing the fund through a modest, ring-fenced levy either on mineral exports or on the importation of mining equipment the state can generate predictable resources without imposing an excessive burden on small-scale miners. The fund would serve a dual purpose: first, it would enable state-led remediation of abandoned historical sites, many of which currently pose serious threats to water quality, agricultural land, and community safety.

Secondly, it would act as a safeguard for future operations, ensuring that even if individual miners or cooperatives default, adequate resources exist to restore affected landscapes. Over time, the fund could be integrated with a simplified bonding or deposit system for registered ASM cooperatives, fostering a culture of responsibility and aligning miners' economic incentives with environmental stewardship. Such a mechanism has been used with success in countries such as Ghana and Mongolia, demonstrating that well-designed financial instruments can transform rehabilitation from a voluntary afterthought into a predictable and enforceable obligation.

4.4. Strengthen Decentralized Monitoring and Enforcement

The chronic enforcement gap in the ASM sector exacerbated by the remoteness of mining regions and the state's limited logistical capacity requires a fundamental rethinking of governance structures. Instead of relying on a heavily centralised model that is neither timely nor effective, Cameroon must adopt a decentralised "co-governance" approach that mobilises the capacities of local actors already embedded in mining landscapes. Local government authorities, trained community monitors, and respected traditional chiefs possess intimate knowledge of the terrain, daily visibility over mining activities, and moral authority within their communities. By equipping these actors with basic environmental oversight skills such as how to recognise mercury use, detect the absence of sedimentation ponds, or identify mining in prohibited areas they can serve as the state's immediate "eyes and ears."

Crucially, this decentralised model must be backed by a formalised reporting structure that allows verified observations to be transmitted directly to a regional inter-ministerial enforcement unit, rather than being lost in bureaucratic channels. Such an approach significantly enhances monitoring coverage at minimal cost, improves the likelihood of early detection of environmental violations, and fosters a sense of shared responsibility between communities and the state. Experiences from countries like Tanzania and Rwanda show that when community-based monitors work in tandem with regional authorities, compliance levels increase,

conflict decreases, and the enforcement apparatus becomes more adaptive and context-sensitive. By institutionalising decentralised participation in monitoring, Cameroon can build a more resilient and legitimate enforcement system that matches the realities of its mining geography.

4.5. Integrate ASM into Broader Land-Use Planning

The uncontrolled spatial proliferation of artisanal and small-scale mining across Eastern Cameroon is fundamentally a land-governance problem, and addressing it requires a shift from reactive policing to proactive, inclusive land-use planning. Although the 2023 Mining Code provides the legal basis for establishing *zones d'orpailleurs* (artisanal mining zones), this mechanism remains largely dormant, leaving miners, farmers, conservation actors, and local authorities in a state of perpetual conflict over land rights and resource access. Activating this provision demands a transparent, participatory process in which miners' cooperatives, traditional leaders, municipal councils, women's groups, agricultural authorities, and forestry agencies jointly identify and demarcate areas suitable for ASM. Such a process ensures that mining is authorised only in zones where it does not undermine vital land uses such as food production, community forests, water catchments, and biodiversity corridors.

By formally designating where ASM may occur, the state not only provides long-term spatial security for miners reducing the incentive for random expansion into protected ecosystems but also protects the legitimate interests and livelihoods of non-mining land users who have historically borne the externalities of mining without recourse. This approach mirrors successful land-use harmonisation experiences in countries like Ghana and Bolivia, where participatory zoning has reduced land conflicts and improved environmental outcomes. Crucially, integrating ASM into land-use plans operationalises Free, Prior, and Informed Consent (FPIC) as a lived practice rather than a symbolic legal requirement: communities become active co-authors of mining decisions, thereby reducing disputes, enhancing legitimacy, and safeguarding ecologically sensitive areas from irreversible degradation.

5. Conclusion

The 2023 Mining Code, despite its ambitions, represents a legislative step forward but a practical step sideways in the confrontation with the environmental devastation wrought by Artisanal and Small-Scale Mining (ASM) in Eastern Cameroon. While its recognition of the sector is a necessary acknowledgment of reality, the Code's fundamental deficiencies ensure that its impact will be marginal at best. Its inability to effectively formalize the sector through accessible pathways, coupled with its weak, vague, and ultimately unenforceable environmental clauses, means that the "unregulated frontier" that defines Eastern Cameroon will persist largely unchanged. A profound chasm remains between the law as written on paper in Yaoundé and the law as it is applied or, more accurately, not applied in the mining pits and riverbeds of the forest.

Ultimately, the environmental crisis in Eastern Cameroon is a symptom of a deeper governance failure. The state's current approach, even under the new Code, prioritizes control over facilitation and revenue over rights. Until Cameroon addresses the root causes of informality poverty, a lack of alternatives, and an exclusionary legal system and constructs a governance model capable of delivering both basic services and environmental justice at the local level, the destructive cycle will continue. The challenge is therefore not merely a technical or legal one to be solved by drafting better clauses; it is profoundly political and institutional. It demands a fundamental rethinking of the state's relationship with its citizens in the extractive frontier, moving from a punitive, distant authority to an enabling partner. Without this paradigm shift, the rich ecosystems of the Congo Basin and the communities that depend on them will continue to pay the ultimate price for the gold extracted from beneath their soil, a transaction in which they bear the costs but reap none of the sustainable benefits