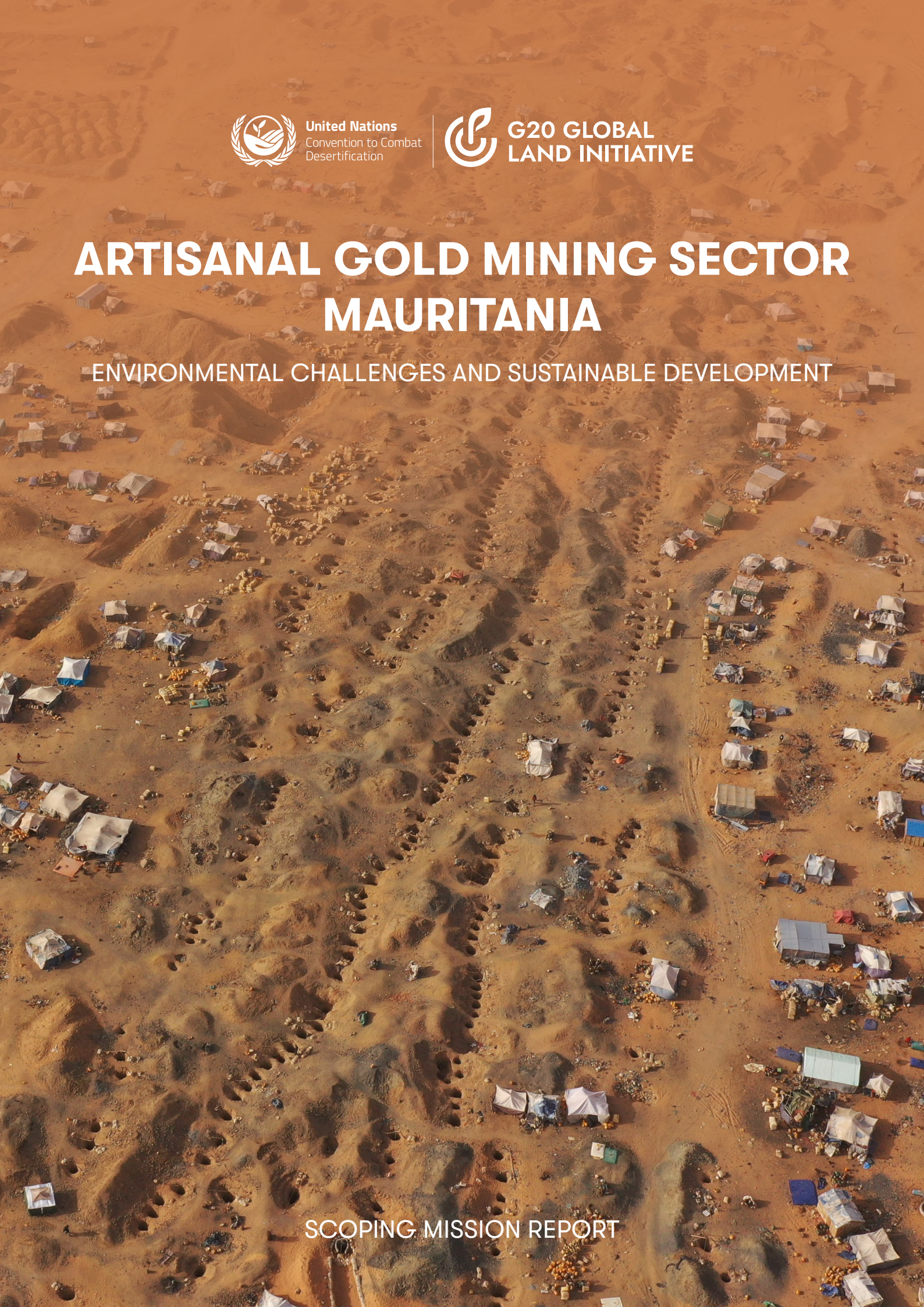
United Nations
Convention to Combat
Desertification

G20 GLOBAL
LAND INITIATIVE

ARTISANAL GOLD MINING SECTOR MAURITANIA

ENVIRONMENTAL CHALLENGES AND SUSTAINABLE DEVELOPMENT



SCOPING MISSION REPORT

G20 Global Land Initiative
Coordination Office
United Nations Convention to
Combat Desertification
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1. EXECUTIVE SUMMARY

1.1 Overview of the Mission Objectives

The West African nation of Mauritania is currently undergoing an unprecedented gold rush, driven largely by artisanal and small-scale mining (ASM). Armed with rudimentary tools and minimal technological support, thousands of independent miners scour vast areas—particularly in the northern regions and the southern border zones—in search of gold deposits. Once veins are discovered, entire communities often converge in a matter of days, rapidly establishing makeshift camps and extraction points. This unregulated activity leaves behind widespread environmental damage: scarred landscapes, and the accumulation of unmanaged human waste. A particularly alarming aspect of this gold rush is the manual processing phase, where mercury-based amalgamation techniques are commonly used to extract gold from ore. These methods not only threaten the health of miners but also result in mercury pollution that leaches into waterways and coastal zones. The long-term ecological and health risks are considerable, particularly in fragile ecosystems already vulnerable to desertification and climate change.

While the sector offers critical economic opportunities, especially for youth and unemployed populations, it also contributes to internal migration pressures. The ongoing gold rush is significantly influencing cross-border migration dynamics, intensifying both environmental and social pressures. Rapidly growing mining boomtowns such as Tijirit, Chami, and areas within the Inchiri region are experiencing sudden surges in population, placing immense strain on already limited sanitation and water infrastructure. According to observations and stakeholder input during the mission, an estimated 30,000 to 50,000 foreign miners, primarily from Mali, Senegal, and Sudan, have migrated to artisanal mining sites in these regions. It was further noted by the team that migrant labourers may constitute up to 40% of the artisanal and small-scale mining (ASM) workforce in less inhabited deserts of northern Mauritania. However, most of these migrant workers operate outside formal legal frameworks, as Mauritania's 2023 Artisanal Mining Formalization Decree lacks provisions for monitoring and regulating cross-border labour. As a result, migrant labour remains a significant regulatory blind spot.

Current estimates and inputs received indicate that Artisanal and Small-Scale Mining (ASM) is active in over 200 sites across the above mentioned northern and southern Mauritania, employing nearly 100,000 people. While comprehensive revenue data is scarce, industry reports suggest the sector generates hundreds of millions of dollars annually (e.g., a 2022 study by the Extractive Industries Transparency Initiative (EITI) estimated Mauritania's informal gold trade at $200–400 million per year). These figures, however, remain approximate due to the unregulated nature of ASM.

In response to the uncontrolled expansion of the ASM sector, the Mauritanian government established Maaden Mauritania in 2020. The entity was created to regulate artisanal mining, support formalization efforts, and mitigate environmental and social risks. However, with the pace and scale of ASM outstripping regulatory capacity, Maaden sought international support and contacted UN Convention to Combat Desertification (UNCCD) to provide them with support to minimise environmental impacts.

The G20 Global Land Initiative, hosted by the United Nations Convention to Combat Desertification (UNCCD), is mandated to reduce land degradation by 50% by 2040. The Global Mechanism of the UNCCD supports countries in mobilizing resources for sustainable land management. In alignment with the mandates of both the G20 Global Land Initiative and the Global Mechanism, a joint mission was undertaken to Mauritania in response to a request from Maaden. The purpose of the scoping mission was to assess the extent of current mining activities, evaluate their environmental footprint, and engage with key stakeholders. It is important to note that a review of the social context and implications of artisanal and small-scale mining (ASM) activities was not included in the scope of this mission.

The scoping mission took place from 17 to 27 February 2025. Over the two-week period, the mission team, accompanied by Maaden representatives, travelled approximately 4,000 kilometres by road, visiting four major artisanal and small-scale mining (ASM) sites and several illegal ASM operations including both manual and semi-industrial extractions in the northern region of Tiris Zemmour, the northwestern town of Chami, and the southern region around Brakna.

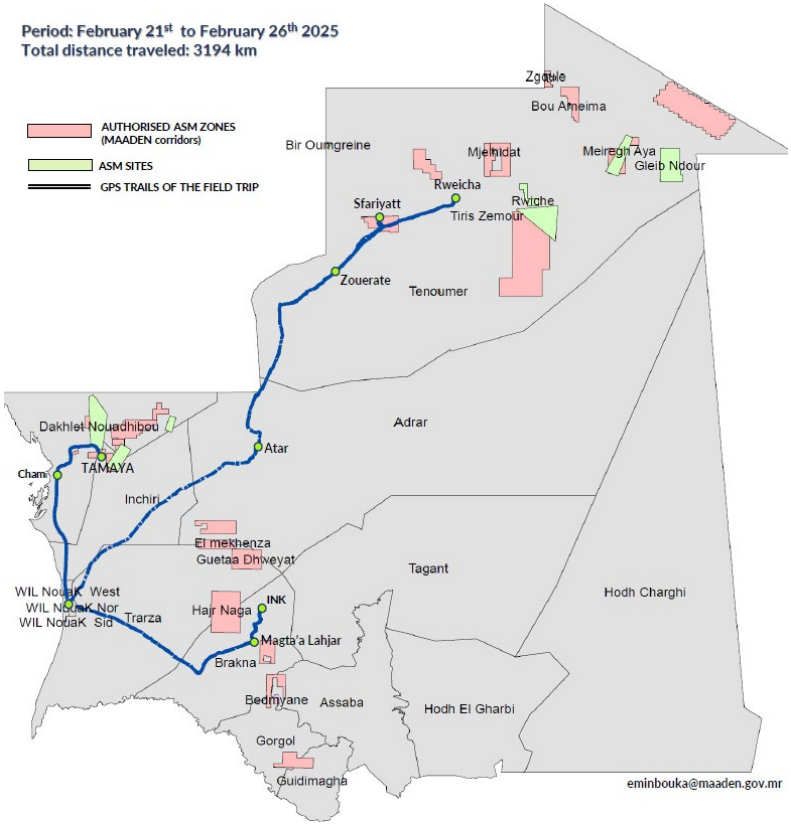

***Figure 1:** Map of the regions of Mauritania*

The team engaged with a broad range of stakeholders, including ministers, senior regional government officials, representatives from various United Nations agencies based in Mauritania, the World Bank, non-governmental organizations, local communities, and the full staff of Maaden Mauritanie.

Maaden Mauritanie showcased its ongoing efforts to formalize ASM operations, including the restructuring and relocation of informal miners, and the diversion of primary raw materials to designated secondary treatment centers (like in the Town of Chami). These centers extract gold in a more controlled manner, from which Maaden receives a share of the output. This approach supports the development of regulated ASM activities, helping to curb uncontrolled land degradation and limit the environmental impact of illegal gold extraction.

1.2 Key findings of the Mission

1. Artisanal and small-scale gold mining (ASGM) is actively expanding across multiple regions in Mauritania. This expansion is largely unplanned and reactive, with government entities including Maaden and other Environment agencies often becoming aware of new mining sites only after operations have already commenced. The current system lacks proactive land-use planning or pre-emptive regulatory oversight, which has led to haphazard development and increasing pressure on land and local ecosystems.
2. Mining sites, often linear in formation and covering only a few hectares, are being established without any environmental controls or rehabilitation plans. Typical pits are 100–200 cm wide and dug using handheld tools. Some reach depths of 50 to 100 meters, and the spoil materials (waste rocks) are dumped nearby with no containment or disposal strategy. It is estimated that approximately 70% of excavated material is discarded on-site. Once mining ceases, there is no effort to rehabilitate the land—leaving behind unfilled pits, unstable ground, and potential hazards for people, livestock, and local biodiversity.
3. As gold prices rise and subsurface gold remains relatively accessible in Mauritania, more medium-scale operators equipped with mechanized tools are entering the ASM sector. These operations have larger environmental footprints, causing deeper excavation and broader land degradation. Despite the scale of these operations, there is no post-mining landscape restoration, compounding the environmental impact and increasing the risk of long-term ecological degradation.

4. Extracted materials from ASM sites are transported by the diggers to Maaden-designated processing centers, often located closer to urban areas. These semi-permanent processing sites typically cover 35 to 50 hectares, hosting 700 to 1,000 workers per site per day. While Maaden provides electricity and water services within designated parcels, mercury is used during gold processing without sufficient personal protective equipment (PPE) or environmental safeguards. There is a high risk of mercury contamination in the air, soil, and water, raising serious concerns for both occupational health and the surrounding environment.
5. Maaden is taking strong efforts in formalizing and regulating ASM activities, recognizing the need for improved environmental management and social safeguards. However, their efforts are currently constrained by limited technical capacity. To develop and implement an effective framework for responsible ASM management, targeted technical assistance including expertise in environmental assessment and monitoring, land-use planning, and social safeguards is urgently required.
6. Various government agencies, with whom the mission team held consultations, expressed awareness of the growing challenges associated with ASM and showed willingness to engage. However, they also acknowledged the need for comprehensive regulatory frameworks, as well as institutional capacity-building, before they can play an effective role in managing the sector in a structured and sustainable way.
7. Local communities and civil society organizations—both in the capital and in mining and processing regions—expressed deep concern over the social and environmental impacts of ASM. Nevertheless, they also emphasized the significant livelihood opportunities the sector provides, particularly in remote and economically marginalized areas like in the northern regions. There is a broad recognition of the need for a balanced approach that addresses environmental degradation while preserving socioeconomic benefits.
8. While the UN system and other development partners currently have limited direct involvement in ASM issues in Mauritania, they are aware of the growing challenges. Several agencies expressed strong support for the scoping mission and indicated a willingness to engage in follow-up activities, including the provision of technical, institutional, and policy support, should a coordinated approach be developed.

1.3 Summary of Recommendations

1.3.1 Revising the Mining Strategy

The rapid expansion of artisanal mining in Mauritania underscores the significant potential of the sector as a driver of economic activity and rural livelihoods. However, the scale of operations, combined with the environmental and social impacts, raises important questions about the sustainability of the current, largely informal model dominated by small-scale miners who often operate without organization, formal training, or technical standards.

To unlock the full potential of the sector while minimizing harm to people and the environment, a strategic shift is needed. This includes:

- Providing technical assistance to help local miners organize into cooperatives, improving both operational efficiency and accountability.
- Encouraging the participation of medium- and large-scale actors who can operate under stricter environmental and labor standards.
- Introducing modern technologies that improve extraction efficiency, reduce environmental damage, and promote occupational safety.

A hybrid model that combines the livelihood benefits of artisanal mining with the structure, oversight, and innovation of formal operations will be critical to shaping an inclusive future for the current ASM mining sector in Mauritania.

1.3.2 Understanding the whole ASM Situation in the country

One of the key challenges in Mauritania is the lack of comprehensive and systematic data on the full extent of artisanal and small-scale mining (ASM) activities. Given the vast geographic scale of the country and the rapidly changing nature of ASM operations, traditional monitoring approaches are insufficient.

To effectively capture the scope of ASM, there is a pressing need to deploy modern geospatial technologies, including remote sensing and satellite imagery, supplemented by existing administrative data and ground-truthing through field verification. Each identified site must be visited to confirm its current status whether it is active, dormant, or abandoned. The development of a national ASM georeferenced database is a foundational step for any follow-up interventions, particularly in addressing the environmental and social impacts of the sector.

The second phase of this assessment involves a site-specific analysis of land degradation. This includes degradation caused by:

a. The extraction process itself (e.g., pit formation, spoil piles)
b. The spread of informal settlements, and
c. The development of unplanned infrastructure (such as access roads, generators, bore-holes, and waste disposal sites).

All of these elements must be mapped and analyzed individually at each site to provide a clear understanding of the extent and drivers of environmental degradation. This evidence base is critical for designing targeted remediation strategies, enforcing environmental safeguards, and guiding future policy and planning efforts.

1.3.3 Understanding the Mercury Use

The use of mercury in gold processing is one of the most significant off-site environmental and public health impacts associated with artisanal and small-scale gold mining (ASGM) in Mauritania. Despite its widespread use, there is currently no comprehensive or systematic assessment of the scale of mercury usage, nor of its environmental fate and impacts.

To effectively address this issue, a scientific and multidisciplinary investigation is urgently required. This should include:

a. Quantifying current mercury usage patterns across ASM sites,
b. Assessing the historical accumulation of mercury in soil, surface water, and groundwater,
c. Evaluating airborne mercury emissions, especially near processing centers in Chamai and Zouerat,
d. Investigating the exposure risks to miners and nearby communities, including potential bioaccumulation in food chains,
e. Identifying hotspots of contamination requiring immediate remediation.

Understanding the full extent of mercury contamination is critical for designing targeted interventions. It also lays the groundwork for Mauritania to align with its obligations under the Minamata Convention on Mercury, which seeks to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds.

1.3.4 Deploying best practices for Artisanal Mining

As Mauritania looks toward shaping a future-oriented mining strategy, it is imperative that current artisanal and small-scale mining (ASM) practices are brought under improved management frameworks, aligned with best practicable approaches at all operational levels. This includes comprehensive site planning—such as the proper allocation of areas for worker camps, sanitation facilities, solid waste disposal, generators, overburden/spoil management, and where applicable, Tailings Storage Facilities (TSFs). The inclusion of TSFs is particularly important in ASM contexts where mercury amalgamation is used for gold processing. This method leaves behind a residual "cake"—a potentially toxic waste product containing mercury and other heavy metals. Without proper storage and containment, this material poses a significant risk to soil, water, and public health. Well-designed TSFs are necessary to safely manage and isolate these residues, prevent leaching, and allow for potential future remediation or recovery efforts.

For new ASM sites, standardized modular site plans should be adopted to ensure organized, safe, and environmentally sound development. Encouragingly, Maaden has already begun envisioning the use of such modular layouts as part of its strategy for formalizing ASM operations. These plans can serve as templates to integrate infrastructure, environmental controls, and service provision in a scalable manner.

At existing sites, efforts should focus on consolidating individual miners into cooperatives or community-led structures. Such models promote a shift from fragmented individual activity to coordinated collective efforts, both physically and economically. This not only improves site management and safety but also enables shared investment in equipment, access to financing, and better positioning for downstream value addition—such as secondary processing, refining, and formal market access.

Globally recognized best practices in ASM that safeguard worker health, ensure environmental protection, and increase operational efficiency should be localized into a national ASM guidance framework. These efforts must be complemented by capacity-building programs, technical support, and ongoing training to support the sector's transition toward sustainable, inclusive, and regulated mining practices.

1.3.5 Deployment of Mercury-Free Gold Extraction

There are viable alternatives to mercury-based gold extraction that have been successfully implemented in other parts of the world, offering safer and more environmentally sustainable methods of gold processing. Introducing these alternatives in Mauritania will require targeted technical assistance, as well as transitional support to facilitate uptake among artisanal and small-scale miners who rely on traditional mercury amalgamation techniques.

The identification, testing, and adaptation of mercury-free gold extraction technologies such as gravity concentration, borax-based methods, or other chemical-free processes should serve as a practical interim measure. These alternatives can bridge the gap between current artisanal practices and more modern, industrial-grade gold recovery methods envisioned in the longer term.

Notably, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) is already actively supporting initial efforts in this area. Through its work with local stakeholders, GIZ is helping to pilot mercury-free technologies, build awareness among miners, and explore feasible models for wider adoption.

1.3.6 Land Rehabilitation and Remediation

Currently, there are no existing regulations or standard practices in Mauritania for site decommissioning following the conclusion of artisanal and small-scale mining (ASM) activities. As a result, many abandoned mining sites are left as open hazards, often becoming death traps for camels and livestock, while also accumulating human and solid waste. These sites are further exposed to wind erosion, contributing to ongoing land degradation.

There is an urgent need to develop a locally appropriate approach to land rehabilitation and remediation, including methods to fill and stabilize abandoned pits, manage waste rock and spoil materials, and reduce environmental hazards. A financing strategy will also be essential to support these activities, particularly for informal or under-resourced mining groups.

In addition, the management of waste water and mercury-contaminated soil from gold extraction is a growing concern. To prevent soil , surface and groundwater contamination, lined pits or containment systems should be established for the safe storage of both liquid and solid residues. In areas where processing is concentrated, properly designed Tailings Storage Facilities (TSFs) will be required to contain the residual tailings or “cake” left after mercury amalgamation. Without these measures, toxic materials may leach into surrounding environments, creating long-term ecological risks.

A dedicated financial and operational plan should be put in place to support the construction, monitoring, and maintenance of such containment and rehabilitation systems, ensuring environmentally sound closure of ASM sites and promoting sustainable land use practices in these Post-ASM mining areas.

1.3.7 Develop a realtime Geo-Monitoring System

Leverage advanced technologies such as satellite imagery, drone-based mapping, and AI-powered data analytics to establish a real-time monitoring system for tracking both legal and illegal artisanal and small-scale mining (ASM) activities across Mauritania. Special emphasis should be placed on enabling the timely detection of artisanal mining activities, as well as rapid response and mitigation of associated environmental and health hazards.

This system should also support data-driven decision-making by providing actionable insights to government agencies, regulators, and partners. Integration with national land and environmental information systems will enhance the transparency and coordination of mining oversight.

Alongside improved monitoring, it is essential to strengthen regulatory frameworks and enforcement mechanisms to effectively curb illegal mining operations and the unauthorized use of mercury.

1.3.8 Alternative Livelihoods

Artisanal mining, while a source of income for many, is not a sustainable long-term livelihood due to its health, safety, and environmental risks. As Mauritania moves toward modernizing its mining sector, a planned and inclusive transition strategy is essential for those currently dependent on artisanal and small-scale mining (ASM).

This transition should include the development of socio-economic programs that offer alternative, resilient livelihoods for artisanal miners and their families. Potential areas for livelihood diversification include:

a. Agroforestry and climate-smart agriculture,
b. Export-oriented livestock management,
c. Rural entrepreneurship and vocational training, and
d. Expanded roles within the formalized mining sector through the advancement of the ongoing ASM formalization process.

These programs should be designed to align with local capacities and market opportunities, while reducing dependency on unsustainable and hazardous mining practices.

1.3.9 Strengthen Governance and Stakeholder Engagement

Effective governance and inclusive stakeholder engagement are essential to the long-term success of sustainable mining practices and land restoration efforts in Mauritania. Building transparent, participatory, and accountable systems will help ensure that reforms are both equitable and resilient:

- Community Involvement: Engage local communities in decision-making processes, ensuring their needs and concerns are addressed. This can be achieved through participatory workshops, community-led monitoring programs (citizen science approach), and benefit-sharing mechanisms. Like mentioned above consider forming co-operatives of the individual miners so that the members can work in a collaborative manner through a system would be more sustainable and beneficial for all.
- Multi-Stakeholder Platforms: Establish platforms for dialogue and collaboration among stakeholders, including government agencies, mining companies, civil society organizations, and international partners.
- Policy Alignment: Work with national and international policymakers to align Mauritania's mining regulations with global sustainability standards.

1.4 The Role of Maaden Mauritania

Maaden Mauritania plays a central role in the governance of artisanal and small-scale mining (ASM) and the sustainable management of mineral resources in the country. For the majority of the recommendations outlined above, Maaden will carry operational responsibility for implementation, coordination, and oversight.

The rapid and unregulated expansion of ASM presents a range of complex social and environmental challenges, including land degradation, mercury use and contamination, and informal labour practices. Addressing these challenges effectively requires Maaden to adopt a robust, science-based strategy that integrates:

a. Advanced technologies (e.g., remote sensing, real-time monitoring),
b. International best practices in ASM formalization and environmental management, and
c. Inclusive, multi-stakeholder collaboration with government, communities, and development partners.

To fulfil this critical mandate, it is essential to build the institutional and technical capacity of Maaden Mauritania. Priority areas include:

a. Environmental monitoring and compliance,
b. Community engagement and conflict resolution,
c. Occupational health and safety oversight, and
d. Sustainable site management and rehabilitation.

Investing in Maaden's capacity will ensure the organization is equipped to lead a just and sustainable transition in the ASM sector, safeguarding both natural resources and livelihoods.

1.4.1 Next Steps

Improving the environmental and social footprint of artisanal and small-scale gold mining operations, as well as supporting the long-term development of the gold mining sector in Mauritania, will require the involvement of multiple national agencies. Several international organizations have already expressed interest in contributing to this effort, and it will be important to coordinate and leverage this potential support effectively.

The following approach is recommended as the next steps:

1. Presentation of the findings of the scoping mission to key stakeholders in Mauritania, including Maaden senior management, relevant government ministries, United Nations agencies, the World Bank, and potential donor countries, including G20 members.

2. Development of targeted follow-up work packages covering areas such as national strategy development, geospatial mapping, the introduction of best practices in mining and gold extraction, land restoration, monitoring of mercury contamination, remediation of contaminated land and groundwater (if required), and frameworks for occupational safety and public health.
3. Costing of the proposed work packages and identification of potential funding sources, both domestic and international, including in-kind support from technical agencies and development partners.
4. Establishment of a dedicated coordination unit within Maaden to oversee implementation, alongside the formation of a multi-stakeholder group to monitor progress and ensure transparency and accountability.
5. Initiation of specific priority activities outlined in Appendix I, focusing on interventions with high potential for immediate impact and scalability.

1.4.2 Monitor and Evaluate Progress

To ensure the effectiveness of the proposed recommendations, Maaden Mauritania should establish a comprehensive monitoring and evaluation (M&E) framework, developed in collaboration with key national stakeholders and supported by international partners. This framework will enable ongoing assessment, adaptive management, and accountability throughout the implementation of follow-up activities.

The M&E system should be embedded within the dedicated coordination unit to be established within Maaden and closely linked to the work of the proposed multi-stakeholder monitoring group, ensuring transparency and inclusive oversight.

Key components of the monitoring framework should include:

- Key Performance Indicators (KPIs): Develop a set of clear and measurable KPIs to track progress across all follow-up work packages, including areas such as land restoration, mercury emission reduction, community well-being, formalization of ASM operations, and occupational health and safety.
- Regular Reporting: Prepare and disseminate periodic progress reports on the implementation of specific work packages and priority actions (as outlined in Appendix I). These reports should be made publicly accessible to promote transparency and encourage continued engagement from stakeholders and donors.
- Third-Party Audits and Technical Reviews: Commission independent assessments by qualified third parties to evaluate compliance with environmental, health, and social standards. These audits should also provide recommendations for course correction, where needed, and support alignment with international best practices.
- Stakeholder Feedback Loops: Incorporate community-level feedback and inputs from civil society, technical agencies, and donors through participatory mechanisms, such as community-led monitoring, consultations, and structured review meetings within the multi-stakeholder platform.

2

INTRODUCTION

2. INTRODUCTION

2.1 Background, Rationale and Scope of the Mission

Artisanal and semi-industrial gold mining has expanded significantly across key strategic sites in the wilayas of Dakhlet Nouadhibou, Brakna, Inchiri, Trarza, and Tiris Zemmour, raising pressing environmental concerns. This mission aims to conduct field assessments to gain a comprehensive understanding of the environmental impacts associated with these mining activities, with a particular focus on land/soil degradation, ecosystem disruption, and the underlying causes of environmental stress.

A critical outcome of this scoping mission is the development of a much required five-year action plan envisioned to address these challenges through effective strategies, targeted technical assistance, and capacity-building efforts for local stakeholders. The plan will emphasize long-term, sustainable restoration solutions that align with the unique environmental characteristics of each region while integrating innovative and eco-friendly approaches to rehabilitation.

To enhance the efficiency and impact of these interventions on a short-term and long-term basis, the mission will leverage Earth observation data and geospatial tools for improved monitoring and restoration efforts. By utilizing modern tracking technologies, the project will map affected areas, monitor site evolution, and optimize restoration strategies, ensuring a more data-driven and adaptive approach to environmental recovery.

This holistic strategy aims to mitigate the adverse effects of ASGM, promote sustainable land management practices, and support the resilience of local ecosystems in the face of ongoing mining activities.

2.2 The Gold Rush in Mauritania and West Africa, why and how it's happening?

The geology here makes gold surprisingly easy to find. Unlike deep, hard-to-reach deposits in other parts of the world, much of West Africa's gold is sitting close to the surface, waiting to be discovered.

West Africa's gold practically jumps out of the ground compared to other regions, and there are four key reasons why. First, nature has done half the work—centuries of erosion have brought gold deposits remarkably close to the surface, with laterite soils acting as natural gold traps (World Bank, 2021). Second, the arid landscape reveals its secrets: quartz veins stand out visibly (Hirdes & Davis, 2002), while seasonal wadis concentrate placer gold (UNEP, 2019). Third, artisanal miners serve as human prospecting tools—their small-scale operations consistently identify deposits before industrial miners (World Gold Council, 2023). Finally, the region's geology provides a perfect roadmap—the Birimian greenstone belts and shear zones channeled gold-bearing fluids along ancient fault lines (Goldfarb et al., 2017), creating exceptionally rich deposits. This unique combination makes West Africa one of Earth's most accessible gold regions.

Countries like Mauritania, Mali, and Burkina Faso sit on top of these gold-rich zones. In Mauritania, the Tiris Zemmour and Akjoujt regions (North and Northwest) have attracted major mining companies because the gold is not only abundant but also accessible.

Artisanal and small-scale miners in West Africa employ a sophisticated blend of traditional knowledge and modern adaptations to locate gold deposits. Drawing on generations of accumulated wisdom, they first survey the landscape for telltale signs like exposed quartz veins (which often host gold), rust-colored iron stains indicating mineralized zones, and even specific vegetation patterns that grow over gold-rich soils. Miners frequently examine termite mounds, as these insects bring up mineral-laden soil from depth. When investigating hard rock sources, they crush quartz veins with hammers and pan the powder, sometimes using mercury to form amalgams (despite its health risks). Modern adaptations include using affordable metal detectors to scan shallow soils, sharing GPS coordinates through mobile networks, and occasionally referencing satellite imagery. Before committing to large-scale digging, miners rigorously test sites by panning multiple samples, checking for gold's distinctive heaviness and luster, and observing whether mercury successfully extracts gold from sediments.

The high-grade nature of many deposits (often exceeding 10g/ton) makes gold relatively easy to detect compared to other regions (Tremblay et al., 2019). This combination of traditional expertise and selective adoption of technology allows ASM miners to successfully identify gold-rich areas, sometimes even preceding large-scale mining operations.

2.3 Geographic profile of the regions visited

Category	Tiris Zemmour (North)	Inchiri (Northwest)	Brakna (Southwest)
Geographic Location	Northernmost region, borders Western Sahara & Algeria	Northwest, inland but near Atlantic coast	Southwestern region along the Senegal River, borders Senegal
Landscape	Desert plateaus, rocky outcrops, Saharan plains	Rocky hills, sand plains, semi-desert terrain	Semi-arid lowlands, fertile river valleys
Climate	Hyper-arid, extreme temperatures, minimal rainfall	Arid to semi-arid, occasional flash floods	Hot and dry, but more humid with seasonal rains
Hydrological Aspects	Extremely limited surface water; deep aquifers under pressure; high groundwater salinity	Occasional seasonal wadis; flash floods impact access; limited recharge potential	Proximity to Senegal River provides seasonal irrigation; flooding risk during rainy season
Main Economic Activities	Iron ore mining (Zouérat), growing informal gold mining	Gold and copper mining (Akjoujt), emerging ASM hotspots	Agriculture, livestock, emerging ASM activities
Mining Context	Transient gold panners, informal mining expansion	Mix of industrial and ASM operations	ASM emerging alongside traditional agriculture
Environmental Concerns	Water scarcity, desertification, land pressure	Dust, land degradation, contamination risks	Land competition, erosion, environmental trade-offs
Infrastructure	Sparse, focused around major mines like Zouérat	Better access near mining zones, but rural gaps remain	Limited, particularly in remote or agricultural areas
Social Dynamics	Youth-driven migration, informal settlements	Mixed local and migrant mining populations	Strong community structures, traditional livelihoods
Opportunities	ASM formalization to stabilize the workforce	Pilot site for sustainable ASM practices	Integrated mining-agriculture land use planning
Key Challenges	Regulation, mobility, environmental impact	Oversight of unregulated mining, ecosystem fragility	Technical capacity, balancing resource use

***Figure 2:** Comprehensive Geographic Profile of the Scoping Visite Region (Own table)*

3

SCOPING MEETINGS AND STAKEHOLDER PERSPECTIVE ENGAGEMENTS

3. SCOPING MEETINGS AND STAKEHOLDER PERSPECTIVE ENGAGEMENTS

3.1 Scoping Mission Team and the ASM Areas Visited

The scoping mission was conducted by a joint team comprising members from the G20 Global Land Initiative (G20 GLI), the Global Mechanism of the UNCCD, and Maaden Mauritania. The team was led by Dr. Mohamed Abd salam El Vilaly (G20 GLI | UNCCD), with key contributions from Mr. Dennis Eapen Pulimittathu (G20 GLI | UNCCD) and Mr. Gilles Amadou Ouedraogo (Global Mechanism | UNCCD).

The mission was supported by senior Maaden Mauritania officials, including Mr. Yahya (Deputy Director), Mrs. Zeinabou Tandia, Mr. Emin Bouka, and Mr. Sherif, who led the team on the ground, providing critical local insights and logistical assistance throughout the fieldwork. Their expertise and guidance were instrumental in ensuring the mission's success and deepening the team's understanding of the challenges and opportunities in Mauritania's mining sector.

Mission Scope and Coverage: The scoping mission focused on key mining districts across Mauritania, including the wilayas of Dakhlet Nouadhibou, Brakna, Inchiri, Trarza, Tiris Zemmour, These regions were selected due to their significant mining activities, environmental challenges, and socio-economic impacts, providing a comprehensive overview of the artisanal and small-scale mining (ASM) sector and its implications for sustainable development.

This collaborative effort ensured a holistic assessment of the challenges and opportunities in Mauritania's mining sector, laying the groundwork for actionable recommendations and long-term solutions.

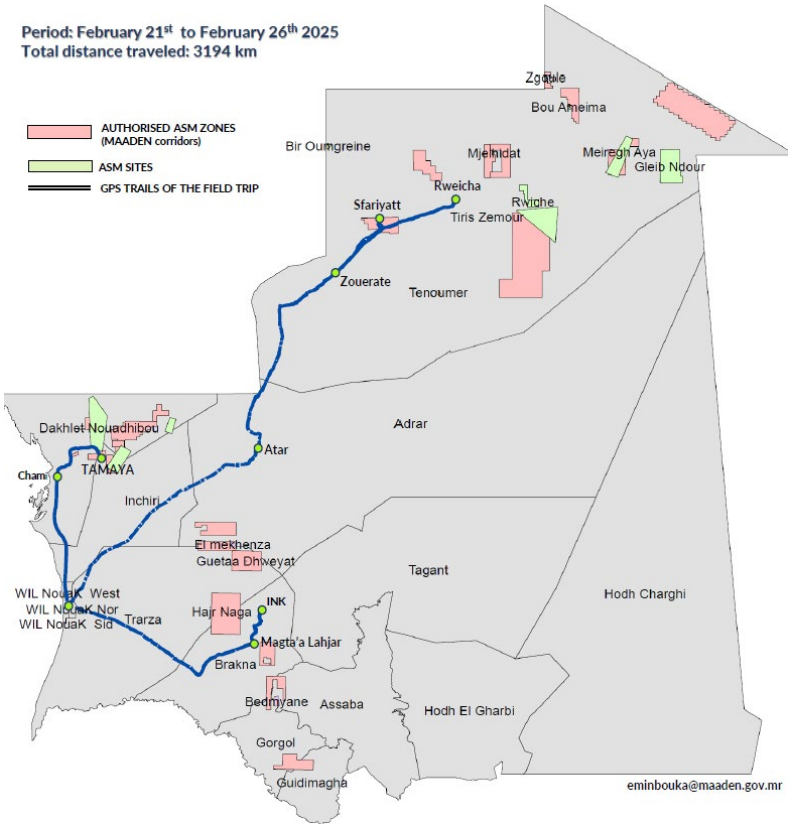

***Figure 3:** Map of Mauritania with its different administrative regions called Wilayas and the UNCCD Scoping Mission route*

3.2 General field observations

Mauritania's gold rush is unfolding faster than the systems meant to govern it. Across eight ASM sites, a clear pattern emerges: informality dominates, environmental damage is escalating, and most gold escapes through untaxed, untraceable channels.

Despite formal processing centers and growing state attention, the sector remains split between promising formal hubs and sprawling informal zones marked by unsafe labor, mercury use, and weak oversight.

Yet there is opportunity: sites like INK and Chami's Maaden center show that with the right support, responsible ASM is possible.

3.3 Field Visit 1: Chami Town and Maaden ASM Processing Center – Key Aspects & Observations

Chami Town and the adjacent Maaden Artisanal and Small-Scale Mining (ASM) Processing Center. The area has rapidly transformed into a high-intensity gold mining zone, drawing thousands of miners, primarily artisanal operators, from across the region.

Aspect	Observations	Current Status
Mining Activity	Hundreds of artisanal pits encircle the formal Maaden center. New excavation sites appear daily, often without regulatory oversight.	Rapidly Expanding
Environmental Landscape	The terrain is heavily degraded due to unregulated digging. Numerous abandoned pits have turned into stagnant water reservoirs, posing health and safety hazards.	Severely Degraded, No Remediation Efforts Noted
Maaden Processing Center	Mercury-free processing technology is in place, but current operations run at approximately 50% of capacity. Sometimes long queues of miners suggest logistical and operational inefficiencies.	Functional but Underutilized
Water Access	As per input from Maaden local groundwater tables are visibly receding. Communal wells are under strain, with increasing competition between domestic and industrial use.	Emerging Crisis
Migrant Presence	An influx of thousands of artisanal miners—predominantly from Mali—has resulted in the growth of unregulated, makeshift camps with limited access to basic services.	Unregulated Growth
Gold Trade Dynamics	While licensed gold buyers operate within the Maaden center, most extracted gold bypasses probably official channels and enters informal markets towards Middle East.	Persistent Revenue Leakage
Community Impact	Chami's population has more than tripled since 2020. Local infrastructure has not scaled accordingly, solid waste accumulation, informal housing sprawl, and land erosion are becoming critical issues.	Severely Overstretched Infrastructure

3.4 Field Visit 2: Tamaya ASM Site closer to Chami

The Tamaya ASM site, located near Chami, represents one of the fastest-growing informal mining zones in the region.

Aspect	Observations	Current Status
Mining Activity	Dozens of newly opened pits scattered across a wide area, often less than 10 meters apart. Mining occurs around the clock, with little regard for safety protocols.	Unregulated & Intensifying
Environmental Conditions	Severe land disturbance is evident. Open pits and heaps of tailings dominate the landscape. No evidence of environmental mitigation or pit closure practices.	Highly Degraded
Workforce Composition	The site is dominated by male artisanal miners, including both Mauritanian nationals and West African migrants. Minors were observed participating in manual labour.	Largely Informal and Unprotected
Living Conditions	Miners live in makeshift shelters with no access to clean water, sanitation, or medical services. Food and basic supplies are sourced from informal vendors.	Precarious and Unhygienic
Use of Chemicals	From explanations and visual evidence suggest the use of mercury in gold recovery processes. No protective equipment observed.	Unregulated Chemical Use

3.5 Field Visit 4: Zouerate Maaden ASM Processing Centre – Key Aspects & Observations

The Zouerate Maaden ASM Processing Centre, located in the northern mining town of Zouerate, serves as a formalized processing hub designed to attract artisanal miners from across the Tiris Zemmour region. While the facility represents a significant investment in ASM formalization, the site faces considerable challenges related to poorly managed infrastructure, no professional staff underutilization, and parallel informal economies.

Aspect	Observations	Current Status
Processing Infrastructure	The center is equipped like in Chami with all basic infrastructure for the operation of processing units at designated parcels of space. Designated zones for material sorting and weighing. However, usage remains low relative to installed capacity.	Modern Equipment, Underutilized
Operational Efficiency	Delays in service delivery, long wait times, and limited technical support discourage consistent use by miners. Maintenance and spare parts access appear problematic.	Inefficient Operations
Miner Engagement	While some local miners bring ore to the center, many prefer to process independently or use informal services outside the regulated system. Trust and convenience play key roles.	Low Buy-In from ASM Operators
Gold Trade Oversight	Official buying stations are present but reportedly struggle to compete with better prices offered by mobile informal buyers. Some miners bypass the center entirely.	Leakage to Informal Markets

Aspect	Observations	Current Status
Regulatory Presence	A formal presence exists through Maaden agents and local authorities, but enforcement is reactive rather than preventive. Site monitoring is inconsistent.	Partial Oversight, Limited Enforcement
Environmental Practices	On-site practices are cleaner than in informal areas, with no visible mercury use. However, waste management and runoff control remain insufficient.	Improved Practices, Gaps Remain
Community Linkages	There is limited integration between the center and the surrounding community. Few services or benefits reach the local population, contributing to skepticism.	Weak Community Relations

3.6 Field Visit 5: Sfariyatt ASM site – Key Aspects & Observations

The Sfariyatt ASM site is an expansive and heavily exploited informal mining zone situated in the desert interior, distant from urban oversight and formal infrastructure. It is marked by intense artisanal activity, high environmental degradation, and minimal regulatory presence. The site typifies the challenges associated with large-scale informal gold rushes

Aspect	Observations	Current Status
Mining Activity	Hundreds of artisanal miners operate in tightly packed pits, some exceeding safe depths. Mining is continuous, with shifts extending into night hours under poor lighting.	Extremely Active, Unregulated
Site Organization	The site is chaotic, with no spatial planning. Tents, pits, waste dumps, and paths overlap, increasing risks of cave-ins, accidents, and conflict.	Disorganized and High-Risk
Demographics	Predominantly male workforce, including many migrants from neighboring countries. Reports of underage workers and individuals trafficked into labor roles were shared anecdotally.	Vulnerable and Unprotected Workforce
Environmental Impact	The area shows extreme land degradation, with vast networks of open pits, contaminated soil, and displaced topsoil. No remediation or containment measures are present. Now a days very high illegal Semi Industrial interferences for extraction pushing boundaries	Severely Degraded Environment
Water and Sanitation	Water is transported in drums from distant sources and is rationed. No sanitation facilities exist, and open defecation is widespread. Health risks are escalating.	Critical Sanitation and Health Risk

Aspect	Observations	Current Status
Use of Mercury	Mercury is openly used on-site in rudimentary amalgamation and burning processes. No safety equipment is observed. Mercury-contaminated tailings are discarded into the environment.	Active Mercury Use, No Controls
Gold Trade	Gold is sold to itinerant buyers, often in cash and without documentation. Prices vary widely, and miners lack access to reliable market information.	Fully Informal, Exploitative Trading

3.7 Field Visit 6: Rweicha – Key Aspects & Observations

Rweicha is a relatively remote but increasingly active artisanal gold mining site located in the desert plains beyond major infrastructure corridors. The site is known among miners for its high-grade ore, attracting a steady influx of informal diggers. While not as densely populated as sites like Sfariyatt or Tamaya, Rweicha is expanding rapidly and remains beyond the reach of consistent state oversight.

Aspect	Observations	Current Status
Mining Activity	Artisanal miners are spread across a wide area, focusing on shallow to mid-depth pits. Activity levels are steadily increasing as word of rich deposits spreads.	Rapidly Growing, Loosely Organized
Geographic Accessibility	The site is reachable only via off-road tracks, requiring 4x4 vehicles. Poor access limits service delivery, enforcement, and formal engagement.	Remote and Isolated
Demographics	Miners are mostly young men, including Mauritanians and West African migrants. No visible organizational structure or leadership among the workforce.	Transient, Unregulated Workforce
Site Infrastructure	No formal infrastructure exists. Temporary shelters and informal trade points (selling food, fuel, and basic goods) have emerged. No medical, water, or sanitation services observed.	Basic, Makeshift Infrastructure
Environmental Impact	Early signs of land degradation are evident, including scattered pits and disrupted topsoil. Dust and particulate exposure is high due to dry conditions and mining activity.	Moderate Degradation, Increasing Risk
Security & Conflict	No visible security presence. Miners manage disputes informally. No major incidents were reported during the visit, but competition over new finds could increase tensions.	Informally Managed, Low-Level Tensions

3.8 Field Visit 8: INK ASM Site in Magta Lahjar – Key Aspects & Observations

The INK ASM site is a medium-scale artisanal gold mining area in southern Mauritania, near Magta Lahjar. Unlike the arid northern regions, this site lies in a semi-arid Sahelian zone with more vegetation, and its closeness to larger population centers sets it apart from other ASM locations in the country. While this accessibility ensures better supply chains and labor availability, it has also heightened competition over natural resources, particularly land and water. The site exhibits densely packed, informal mining operations, a significant influx of migrant workers, and an unstructured support economy that has developed around the needs of miners and trader.

Aspect	Observations	Current Status
Mining Activity	Moderate-scale operations with both shallow and mid-depth pits. Some use of mechanical equipment (e.g., compressors), though most mining is still manual.	Active, Semi-Organized
Site Organization	The site is loosely structured, with visible paths, basic zoning, and informal coordination among mining groups. Less chaotic than other unregulated zones.	Partially Self-Regulated
Demographics	A stable workforce of Mauritanian miners, with limited migration. Strong local presence and some signs of community cohesion and informal leadership.	Predominantly Local, Stable Labor Force
Environmental Impact	Land disturbance is visible but relatively contained. Waste piles and tailings are present but better managed than at high-density sites. No visible remediation efforts yet.	Moderate Degradation, Manageable Scope
Living Conditions	Miners reside in basic but more established shelters. Small-scale vendors operate on site. Water is available, though sanitation remains minimal.	Basic Services, Emerging Stability
Gold Trade	Informal buyers operate in the area, but some coordination exists among miners to share information and negotiate prices. Gold is still traded outside official channels.	Informal Trade with Signs of Collective Action
Security & Governance	Local authorities occasionally visit the site. Disputes are often resolved through customary mechanisms, with few reports of major incidents.	Low Conflict, Some Oversight

3.9 Maaden Mauritania – Its role in the Mining Sector of the country

Maaden Mauritania, officially recognized as *Société Mauritanienne des Hydrocarbures et de Patrimoine Minier* (SMHPM), is a leading player in the country's extractive sector. As Mauritania continues to position itself as a major hub for mining in West Africa, By formalizing and regulating ASGM activities, Maaden is not only trying curbing environmental degradation but also fostering economic growth and community development. With over 30 designated mining zones, the company has licensed more than 10,000 artisanal miners till date, ensuring adherence to environmental and safety standards (Maaden Mauritania, 2023). To further streamline operations, Maaden has established ASM gold processing centers, such as the one in Chami, Zouérat and more professional centre's upcoming, offering miners access to safer and more efficient gold extraction methods (World Bank, 2022)

***Figure 3:** Secondary ASGM Processing Center in Zouerate*

Mauritania boasts abundant mineral resources, including iron ore, gold, copper, gypsum, and phosphate. The country is home to SNIM (Société Nationale Industrielle et Minière), one of the world's leading iron ore exporters. Additionally, numerous multinational companies, such as Kinross Gold, First Quantum Minerals, and MCM (Mauritanian Copper Mines), operate in the country, making mining one of Mauritania's most significant economic drivers.

A cornerstone of Maaden's efforts is its mercury reduction initiatives. By promoting gravity concentration and borax-based techniques or any other feasible less harmful techniques, the company is steering miners away from harmful mercury use. Over 500 miners have already been trained in these mercury-free methods, resulting in a 30% reduction in mercury use in pilot areas (UNEP, 2021). Additionally, Maaden intends a mercury detector network to monitor air quality and mitigate health risks in mining zones (Ministry of Environment Mauritania, 2023).

The economic and social impact of Maaden's initiatives is profound. ASGM activities supported by the company provide livelihoods for over 50,000 people, with 70% of mining jobs filled by local communities, ensuring economic inclusivity (International Labour Organization, 2023). These formalized activities contribute $50 million annually to Mauritania's economy through taxes and royalties (African Development Bank, 2023). Central to Maaden's strategy are the Maaden Corridors — strategically designated areas aimed at concentrating mining activities, enhancing monitoring, and promoting sustainable practices. These corridors have already achieved a 40% reduction in illegal mining, restored over 1,000 hectares of degraded land, and brought essential infrastructure like health clinics, schools, and water supply systems to mining communities (Maaden Mauritania, 2023).

Despite these successes, challenges remain, including limited resources for monitoring remote areas and resistance from informal miners (OECD, 2022). Looking ahead, Maaden aims to expand its corridors to cover 50% of ASGM sites by 2030, train 10,000 miners in sustainable practices (Maaden Mauritania, 2023).

Maaden Mauritania serves as a bridge between the state and private sector stakeholders, ensuring that mineral wealth contributes to national development. In collaboration with the *Ministère du Pétrole, des Mines et de l'Énergie* (Ministry of Petroleum, Mines and Energy), the company enforces policies that promote sustainability, local employment, and economic diversification.

Vision and Strategic Objectives

Maaden Mauritania envisions transforming the mining sector into a responsible, profitable, and environmentally sustainable industry. The company's strategic objectives include:

1. Sustainable Resource Management: Ensuring responsible extraction through compliance with environmental regulations and the introduction of best practices in mineral processing.
2. Strengthening the Artisanal and Small-Scale Mining (ASM) Sector: The formalization of artisanal gold mining has been a priority. By legalizing and structuring this sector, Maaden Mauritania has increased economic opportunities while reducing the risks of illicit mining and environmental degradation.
3. Promoting Transparency and Governance: Mauritania is a member of the Extractive Industries Transparency Initiative (EITI), and Maaden Mauritania plays a key role in ensuring that mining revenues are transparently collected and reinvested in national development.
4. Enhancing Local Processing Capacity: Instead of exporting raw materials, the government aims to develop domestic processing facilities for gold, iron, and other minerals. Maaden Mauritania is spearheading initiatives to improve local refining and beneficiation of minerals.

3.9.1 Current Projects and Initiatives

Maaden Mauritania is involved in several ongoing projects designed to modernize the mining sector, integrate local communities, and maximize economic benefits.

3.9.2 Artisanal Mining Regulation and Processing Centers

Mauritania has witnessed a rapid expansion of artisanal gold mining, particularly in the Tasiast and Chami areas. To mitigate the environmental and social challenges associated with small-scale mining, Maaden Mauritania has:

- Created designated mining zones with government oversight.
- Established processing centers (grillages) north of Chami to improve gold extraction efficiency while reducing mercury pollution.
- Licensed over 30 gold tailings processing companies to ensure responsible waste management.

These efforts align with recommendations from scientific studies on mining's environmental and social impact in the Sahel region, which highlight the dangers of heavy metal contamination and uncontrolled land, and ecosystem degradation linked to gold extraction.

3.9.3 Environmental Protection and Sustainability

Mauritania's mining industry, while lucrative, poses significant environmental risks, including land degradation, water contamination, and habitat destruction. To address these concerns, Maaden Mauritania:

- Enforces strict environmental impact assessments (EIA) for all new mining projects.
- Encourages rehabilitation programs to restore degraded mining sites.
- Promotes the adoption of mercury-free gold extraction techniques.

According to the official's scientific research has been conducted in Nouakchott and Nouadhibou universities has demonstrated the importance of water management in mining regions, prompting Maaden Mauritania to introduce initiatives that reduce water consumption in mineral processing.

3.9.4 Investment in Human Capital and Local Content Development

Mining is one of the largest employment sectors in Mauritania. However, skills gaps in engineering, metallurgy, geoscience and georesource remain a challenge. To address this, Maaden Mauritania plans to:

- Supports technical training programs in collaboration with universities and vocational institutes.
- Implements policies that require multinational mining companies to prioritize local employment.
- Encourages knowledge transfer through partnerships with experienced international firms.

3.9.5 Future Prospects and Expansion Plans

Looking ahead, Maaden Mauritania is set to play a crucial role in expanding Mauritania's mining potential while ensuring sustainability and economic inclusivity.

- New Exploration Projects: With growing international interest in rare earth elements (REEs), Mauritania is exploring the potential of lithium, cobalt, and other minerals critical for the renewable energy sector. The Taoudenni Basin has been identified as a promising site for further geological surveys.
- Continued Integration with the Great Green Wall Initiative: To combat desertification, Maaden Mauritania is developing green mining zones that integrate reforestation and land rehabilitation programs as per the vision of the UNCCD.
- Expansion of Local Refining Capacity: Plans to build new smelters and refineries will reduce Mauritania's dependence on raw mineral exports, increasing value-added production within the country.

Maaden Mauritania is at the forefront of Mauritania's mining transformation, ensuring that mineral wealth translates into socioeconomic progress and environmental sustainability. Through strategic investments, regulatory reforms, and sustainable practices, the company is shaping the future of mining in West Africa.

3.10 Observations: Challenges for Artisanal and Small-scale Mining (ASM) in Mauritania

Artisanal and small-scale mining (ASM) plays a significant role in Mauritania's economy, providing livelihoods for thousands of individuals and communities. However, recent scientific studies and expert reports have shed light on critical challenges associated with ASM that demand urgent attention. These issues not only undermine the sector's potential but also pose severe risks to the environment, public health, and socioeconomic stability. Addressing these challenges requires a holistic, collaborative approach to ensure ASM becomes a sustainable and equitable contributor to national development.

- **Environmental Degradation – A Threat to Ecosystems and Livelihoods:** ASM activities often come at a steep environmental cost. The removal of vegetation and topsoil for mining operations leads to widespread soil erosion and degradation, rendering once-fertile land unusable for agriculture or rangelands for grazing. This degradation disrupts local food systems and exacerbates ecological imbalances, threatening the long-term sustainability of natural resources.

  Moreover, the use of hazardous chemicals like mercury and cyanide in gold extraction processes contaminates water sources, poisoning drinking water and devastating aquatic ecosystems. These practices not only harm biodiversity but also jeopardize the health and livelihoods of communities dependent on these resources. The encroachment of mining operations into natural habitats further accelerates biodiversity loss, pushing vulnerable plant and animal species toward extinction.

- **Health and Safety Risks – A Human Cost of Informal Mining:** The health and safety of miners and surrounding communities are often overlooked in ASM operations. Miners frequently work in perilous conditions without adequate protective equipment, exposing them to life-threatening accidents, toxic substances, and respiratory illnesses caused by prolonged dust inhalation. The widespread use of mercury in gold processing poses an additional grave risk, leading to mercury poisoning, which can cause severe neurological and developmental disorders.

  Compounding these risks is the lack of accessible healthcare in remote mining areas. Miners often face delayed or inadequate medical care, exacerbating the impact of occupational hazards and preventable illnesses. This neglect of basic health infrastructure underscores the urgent need for systemic interventions to protect vulnerable populations.
- **Informality and Regulatory Gaps – A Barrier to Progress:** The informal nature of many ASM operations presents significant regulatory challenges. Without formal recognition or oversight, these activities often operate outside legal frameworks, perpetuating unsafe practices and environmental harm. This lack of regulation also results in substantial tax revenue losses for the government, depriving the nation of resources that could be reinvested into community development and environmental restoration.

  Unregulated mining frequently leads to conflicts over land and resources, both among artisanal miners and between ASM operators and large-scale mining companies. These disputes not only hinder economic progress but also create social tensions that are destabilizing communities.
- **Socioeconomic Vulnerabilities – Exploitation and Instability:** The ASM sector faces various socioeconomic challenges, especially for the most vulnerable. Communities reliant on ASM often face economic instability, as their income is tied to the volatile prices of minerals and unpredictable yields. Additionally, mining activities can displace traditional livelihoods, erode cultural heritage, and disrupt social cohesion, leaving communities fractured and disempowered.
- **Technological and Educational Deficiencies – Hindering Progress:** The lack of access to training and modern technology severely limits the efficiency and safety of ASM operations. Many miners rely on rudimentary tools and techniques, which not only reduce productivity but also increase physical strain and environmental damage. Furthermore, the absence of reliable geological data and market information hampers miners' ability to plan effectively, optimize operations, and secure fair prices for their products.
- **Understanding the Dynamics of Artisanal and Small-Scale Mining in Mauritania – Who, Why, and Where?:** To fully address the challenges posed by artisanal and small-scale mining (ASM) in Mauritania, it is essential to understand the human dimension of this sector—specifically, the individuals involved, their origins, and the factors driving their migration to mining sites. This deeper insight can inform more targeted and effective interventions to formalize and regulate ASM while addressing its root causes.

The ASM sector in Mauritania is a mosaic of diverse individuals and groups, each with distinct backgrounds and motivations. These Include, Local Artisanal Miners: Many ASM participants are local Mauritanians, often from rural communities with limited economic opportunities. For these individuals, mining represents a lifeline—a way to escape poverty and provide for their families. However, the lack of alternative livelihoods forces them into informal and often hazardous mining practices. Regional Migrants: A significant portion of ASM workers are migrants from neighbouring West African countries, including Sudan, Mali, Senegal, Guinea, and Burkina Faso. These individuals are often drawn to Mauritania's gold-rich regions, such as the Tasiast and Akjoujt areas, by the promise of economic opportunity. Many come from regions plagued by political instability, climate change, and economic hardship, making ASM one of the few viable options for survival. Transient Workers: The ASM sector also attracts transient workers who move between mining sites across West Africa in search of better yields. These individuals often lack formal ties to the communities where they work, contributing to the transient and informal nature of ASM operations. *Vulnerable Populations:* Women and children are disproportionately represented in ASM, often performing some of the most labour-intensive and hazardous tasks. Women frequently work in ore processing, while children are exploited for their ability to access narrow and dangerous mining shafts. These groups are particularly vulnerable to exploitation and abuse.

The movement of individuals to Mauritania's artisanal and small-scale mining (ASM) sites is driven by a combination of economic hardship, displacement, seasonal labor patterns, and the allure of new gold deposits. Economic downturns, loss of livestock, and failed harvests push many toward mining as a survival strategy, while political instability and conflict in neighbouring countries, such as Mali and Sudan, force displaced populations to seek stability and income in Mauritania. Additionally, many miners follow a cyclical pattern, engaging in agriculture during planting and harvest seasons and turning to mining during off-peak periods. The discovery of new gold-rich areas further accelerates migration, creating an everchanging landscape of informal mining camps and communities.

***Figure 5:** UNCCD on ground discussion with diverse Stakeholders*

A crucial but often overlooked aspect of this migration dynamic is the role of Sudanese miners in shaping ASM practices in West Africa, including Mauritania. Sudanese migrants, with deep-rooted expertise in gold mining, have played a key role in transferring mining techniques across the region. Coming from a country with a long history of gold extraction, particularly in the arid landscapes of the Red Sea Hills and Nubian Desert, they have developed methods well-suited to dry and resource-scarce environments—techniques that have become instrumental in Mauritania's ASM sector.

***Figure 6:** Arial View of an Illegal ASM gold extraction site close to Chami*

Figure 7: *Close View of Illegal ASM gold extraction shafts at Zoerat Region*

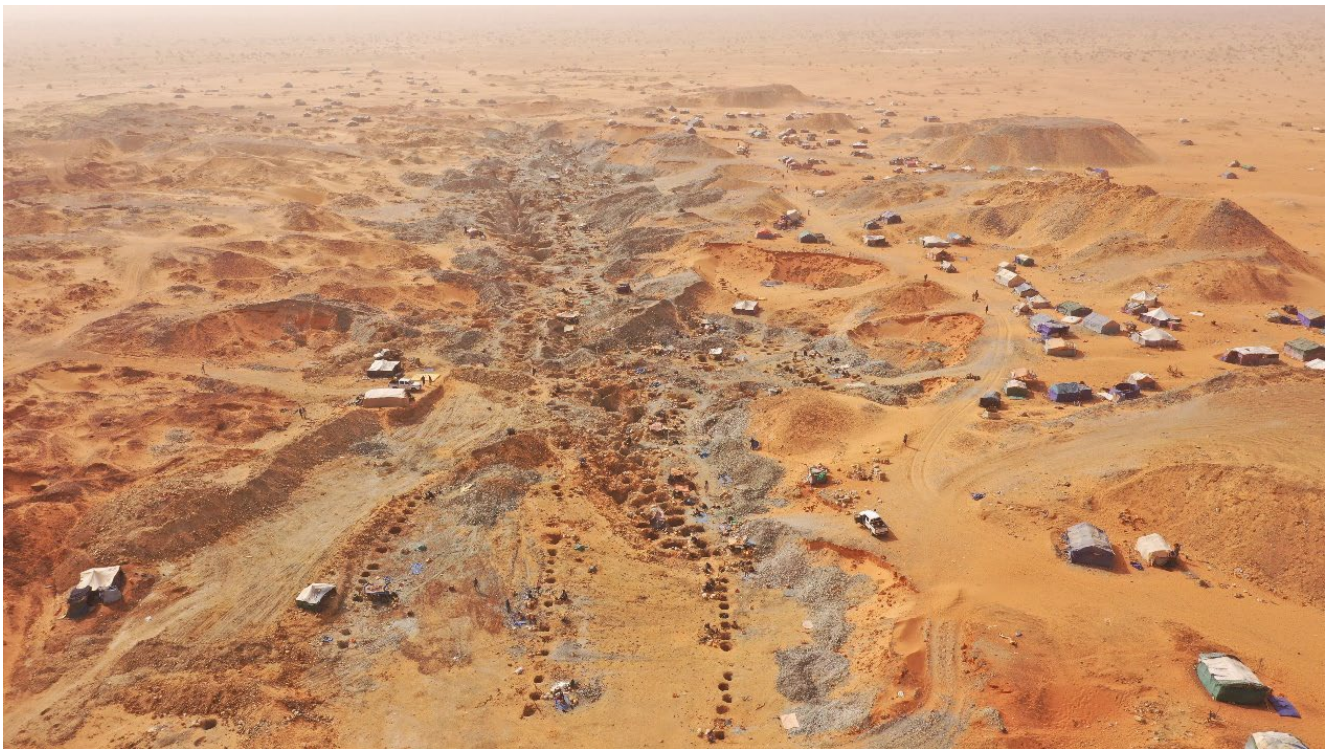

Figure 8: *Wide Arial View of Illegal ASM gold extraction shafts at Zoerat Region*

This movement of miners and knowledge is not random; it follows well-established historical trade routes and migration networks that have long connected Sudan and West Africa. For centuries, these trans-Saharan routes facilitated the exchange of goods, ideas, and expertise, particularly in gold trading and metalworking. Today, these same pathways have been repurposed for ASM activities, enabling a steady flow of miners and their extraction techniques across the region. The resilience of these networks ensures that Sudanese mining expertise is continuously disseminated, shaping ASM practices far beyond Sudan's borders.

Among the most **notable techniques** introduced by **Sudanese artisanal miners is dry washing and panning** a method of gold extraction that significantly reduces water use, making it particularly well-suited for semi-arid regions such as those found in West Africa. This technique has proven advantageous in regions where water is scarce or seasonal. Additionally, the use of mercury amalgamation despite its well-documented environmental and health risks has been widely adopted by local miners due to its relatively high gold recovery efficiency, especially when no other technology is accessible.

Manual ore processing techniques, including crushing and grinding with basic tools such as mortars, pestles, and hand-operated mills, also reflect the practical adaptability of Sudanese mining knowledge to low-resource, informal settings.

This transfer of mining expertise has been largely facilitated by the migration of Sudanese miners across the African continent in search of new gold prospects. While precise data on these movements is limited, field observations and anecdotal reports suggest that Sudanese miners have influenced not only extraction techniques, but also organizational structures, labour arrangements, and even informal trade networks within the artisanal and small-scale gold mining (ASGM) sector.

While ASGM practices vary significantly depending on country context, geological formations, and geomorphology, the basic sequence of operations is generally consistent:

1. Ore Extraction: The miner extracts gold-bearing rock typically hard quartz-rich ore, in the case of Mauritania.
2. Ore Processing: The extracted ore is crushed and milled to liberate the gold, which is then separated from waste material through techniques such as gravity separation or amalgamation. The leftover material from this step is known as tailings.
3. Tailings Management: Tailings may be:
    a. Reprocessed by the same miner to recover residual gold,
    b. Sold or transferred to processing centers or middlemen for further recovery, or
    c. Simply discarded, often without environmental controls.

In most informal settings, the disposal of tailings is unmanaged, contributing to land degradation and pollution, especially in cases where mercury or other chemicals have been used during processing.

The following diagramm provides an overview of the current methods and processes used by ASGM operators to get hold of the gold.

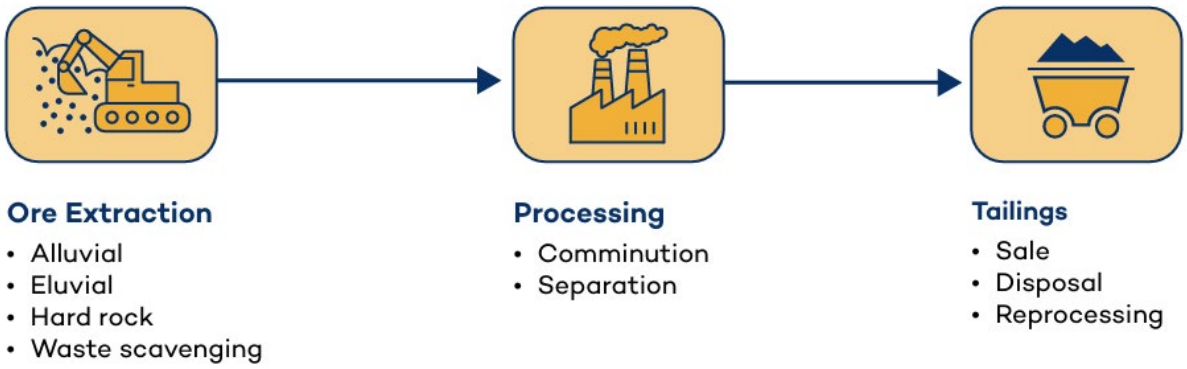

***Figure 9:** ASGM Process (Source IISD: ASGM Tailings Management and Reprocessing Governance: Global trend 2024)*

***Figure 10:** The quartz-rock containing gold*

***Figure 11:** : The manual amalgamation process using mercury*

3.11 Semi-Industrial Mining Developments in Mauritania – Rights, Challenges, and the Role of Maaden Mauritania

While large-scale industrial mining, led by companies like Mauritania's National Industrial and Mining Company (SNIM), dominates the sector, semi-industrial mining has emerged as a critical but understudied component. During the Scoping Visit the development of semi-industrial mining in Mauritania, we have observed the topics around the rights granted by the government, the challenges posed by illegal semi-industrial mining, and the potential role of Maaden Mauritania in supporting this sector. Drawing on some of scientific literature, government reports, and insights from organizations like GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit), this chapter provides a comprehensive analysis of the opportunities and challenges in this evolving space.

***Figure 12:** Remaining Landscape after illegal Semi-Industrial gold extraction*

Semi-industrial mining in Mauritania occupies a critical middle ground between artisanal and large-scale industrial operations, providing an alternative that combines structured extraction methods with more accessible investment requirements. On the ground, it is evident that this sector holds significant potential to bridge the gap between informal artisanal and formalized industrial mining, creating economic opportunities while reducing the risks associated with unregulated ASM. Recognizing its importance, the Mauritanian government has implemented regulatory frameworks, such as the Mining Code of 2008 (revised in 2012), to bring semi-industrial mining into the formal economy. Licenses are granted under strict conditions, aiming to balance economic development with environmental and social safeguards. Policies encouraging local employment, community engagement, and tax incentives have been introduced to further integrate semi-industrial miners into a regulated framework.

***Figure 13:** Landscape completely degraded after illegal Semi-Industrial gold extraction*

The Expanding Threat: Despite these efforts, illegal semi-industrial mining remains a significant and rapidly growing concern, undermining state regulations and leading to severe environmental, economic, and social consequences. Firsthand observations from the field reveal that in Mauritania's vast desert, the sheer scale of unmonitored mining operations is staggering—entire landscapes are transformed within months, with once-pristine terrain reduced to barren wastelands. The use of heavy machinery, unchecked excavation, and hazardous chemicals such as mercury and cyanide accelerate land degradation, contaminating soil and water sources. These chemicals infiltrate underground aquifers, creating long-term ecological damage that extends beyond immediate mining areas, affecting communities reliant on these water sources.

The absence of proper land-use monitoring has allowed miners to displace and degrade large tracts of land in record time, particularly in regions where enforcement is weak or non-existent. Satellite imagery comparisons from just a few years ago to now confirm the rapid encroachment of unregulated mining operations into previously untouched desert areas. This unchecked expansion has resulted in land degradation, habitat destruction, and a decline in biodiversity, threatening fragile desert ecosystems that take centuries to recover.

***Figure 14:** Arial view of illegal semi-industrial gold extraction with heavy equipments visited by the Scoping Visit Team of UNCCD and Maaden Mauritanie*

Beyond environmental impacts, the economic losses associated with illegal semi-industrial mining are substantial. By operating outside legal frameworks, these entities evade taxation, depriving the government of critical revenue needed for infrastructure, healthcare, and education in mining communities. Additionally, disputes over mining rights are increasingly common, as licensed operators and local communities struggle against the encroachment of illegal miners, escalating tensions and fuelling conflicts over access to mineral-rich land.

***Figure 15:** Arial view of a abandoned gold extracted mine*

A key factor enabling the persistence of illegal semi-industrial mining is the challenge of enforcement in such an expansive and remote terrain. The vast desert landscapes of Mauritania make surveillance and regulation particularly difficult, as operations can swiftly relocate to avoid detection. Site visits to affected areas highlight the difficulty of policing these activities effectively—many illegal mining sites operate far beyond the reach of regulatory agencies, making enforcement efforts sporadic at best.

Additionally, many miners lack awareness of, or access to, legal frameworks, creating further disincentives for compliance. Without stronger institutional support and outreach, the formalization of semi-industrial mining will continue to be a slow and uneven process.

The expansion of illegal semi-industrial mining in Mauritania presents an urgent challenge that demands a coordinated response from regulatory bodies, industry leaders, and mining communities. The G20 GLI Scoping Mission's observations make it clear that without stronger enforcement mechanisms and proactive intervention, vast areas of Mauritania's landscape will continue to be lost to unchecked mining activities.

By strengthening regulatory oversight, expanding monitoring efforts, and leveraging industry expertise through players like Maaden Mauritania, Mauritania can turn semi-industrial mining from an environmental liability into a driver of sustainable development. The window for action is narrowing, and the need for decisive, expert-driven strategies to formalize the sector has never been more critical.

3.12 Meetings with diverse stakeholders like Maaden Mauritania, Ministries, UN Missions to understand the perspectives and current situations, challenges faced and existing level playing fields

Meetings with key stakeholders in the country revealed a shared commitment to addressing the challenges of ASM and semi-industrial mining while leveraging opportunities for sustainable development. Below is a summary of the perspectives and initiatives discussed.

Meetings with Mr. BA Ousmane, Director General of Maaden Mauritania and the whole management team on 18.02.2025

Key Insights:

Maaden Mauritania operates within a dynamic regulatory landscape shaped by the country's Mining Code (2008, revised 2012), which aims to regulate artisanal and small-scale mining (ASM) as well as semi-industrial mining. However, despite these frameworks, enforcement remains a significant challenge, particularly in remote areas where informal mining activities persist. Recognizing the need for reform, Maaden has been actively supporting efforts to formalize ASM operations through licensing programs, training initiatives, and improved access to technology. These steps are critical to transforming the sector into a more sustainable and economically viable industry.

Perspectives vs. Actions

Perspectives	Actions Taken	Gaps/Challenges
Need to formalize ASM	Licensing programs for semi-industrial miners have been introduced.	Limited capacity to monitor and enforce regulations in remote areas.
Mining as a driver of economic growth	Tax incentives for semi-industrial mining have been implemented to attract investment.	Revenue losses due to illegal mining activities persist.
Importance of local content	Policies to promote local employment and sourcing have been established.	Limited implementation of these policies in remote areas due to infrastructure gaps.

Meetings with Mr. Thiam Tidjani, Minister of Mines, Petroleum and Energy on 18.02.2025

***Figure 16:** Meeting with Hon. Minister Mr. Thiam Tidjani (second from left) accompanied by the Director General of Maaden Mauritanie Mr. BA Ousmane (second from right)*

Key Insights:

- Current Policies and Regulatory Framework: The Ministry has implemented the Mining Code (2008, revised 2012) to regulate ASM and semi-industrial mining. However, enforcement remains a challenge.
- Strategy for ASM Formalization: Efforts are underway to formalize more ASM operstions through licensing, training, and access to technology.
- Mining Sector Contribution to National Economy: Mining contributes over 25% of GDP, but ASM's contribution remains underreported due to informality.

Perspectives vs. Actions

Perspectives	Actions Taken	Gaps/Challenges
Need to formalize ASM	Licensing programs for semi-industrial miners	Limited capacity to monitor and enforce regulations
Mining as a driver of economic growth	Tax incentives for semi-industrial mining	Revenue losses due to illegal mining
Importance of local content	Policies to promote local employment and sourcing	Limited implementation in remote areas

Meetings with Mrs. Messouda Baham Mohamed Laghdaf (right to the Mauritanian national flag), Minister for Environment and Sustainable Developments on 18.02.2025

Key Insights:

- Environmental Implications of Mining Activities: Unregulated mining leads to land degradation, land degradation, soil erosion, and water contamination.
- Mercury Use and Contamination in ASM: Mercury use in gold extraction poses severe health and environmental risks.
- Rehabilitation and Restoration of Degraded Lands: Limited resources and technical capacity hinder restoration efforts.

Perspectives vs. Actions

Perspectives	Actions Taken	Gaps/Challenges
Need to reduce environmental degradation	Awareness campaigns on mercury use. In touch with Minimata Convention	Lack of enforcement and alternatives to mercury
Importance of land restoration	Pilot projects for land conservation	Limited funding and technical expertise
Monitoring of mining impacts	Environmental impact assessments (EIAs) for some projects	Inadequate monitoring of illegal mining activities

Meetings with Mrs. Lila Pieters Yahia (in the middle), UN Resident Coordinator on 17.02.2025

Key Insights:

- UN's Role in Mauritania's Mining and Environmental Agenda: The UN supports Mauritania in aligning mining activities with the Sustainable Development Goals (SDGs).
- Multilateral Cooperation on Sustainable Mining: Partnerships with international organizations and donors are key to addressing mining challenges.

Perspectives vs. Actions

Perspectives	Actions Taken	Gaps/Challenges
Aligning mining with SDGs	Integration of SDGs into national mining policies	Limited awareness of SDGs among local stakeholders
Strengthening multilateral cooperation	Collaboration with GIZ, UNDP, and other UN agencies	Coordination challenges among multiple stakeholders

Meetings with Mr. Adame Coulibaly, resident Representative (third from left in the group photo) of the United Nations Development Programme (UNDP) on 17.02.2025

Key Insights:

- Sustainable Development Goals (SDGs) and Mining: UNDP supports Mauritania in integrating SDGs into mining policies.
- Governance and Institutional Strengthening: Capacity-building programs for government agencies and local communities.
- Support for Environmental Management: Technical assistance for reducing mercury use and rehabilitating degraded lands.
- No focal point from Minimata Convention is available

Perspectives vs. Actions

Perspectives	Actions Taken	Gaps/Challenges
Promoting sustainable mining practices	Training programs on mercury-free gold extraction	Limited adoption of alternative technologies
Strengthening governance	Workshops on mining regulation and enforcement	Resistance from informal miners

Meeting with Mr. Idrissa Sompare, Resident Representative (first from the right) International Organization for Migration (IOM) on 17.02.2025)

Key Insights:

- Migrant Workers in ASM and Mining Operations: Migrants, particularly from Mali and Senegal, play a significant role in ASM.
- Social and Economic Impacts of Mining on Local and Migrant Communities: Migrants face exploitation and lack access to basic services.

Perspectives vs. Actions

Perspectives	Actions Taken	Gaps/Challenges
Protecting migrant workers	Advocacy for migrant rights in mining communities	Limited legal protections for migrants
Addressing social impacts	Community engagement programs	Lack of funding for long-term initiatives

Meetings with a representative of Food and Agriculture Organization (FAO) on 17.02.2025

Key Insights:

- Land Degradation from Mining Activities: Mining reduces arable land, affecting food security.
- Impacts on Agricultural Productivity: Contamination of soil and water harms crop yields.
- Strategies for Ecosystem Restoration: FAO promotes agro-forestry and sustainable land management.

Perspectives vs. Actions

Perspectives	Actions Taken	Gaps/Challenges
Reducing land degradation	Pilot projects for agroforestry and land restoration	Limited adoption by local communities
Promoting sustainable agriculture	Training on sustainable farming practices	Lack of funding for scaling up initiatives

Stakeholder engagements reveal a shared recognition of the challenges and opportunities in Mauritania's mining sector. While progress has been made in formalizing ASM and addressing environmental and social impacts, significant gaps remain. Collaborative efforts between the government, UN agencies, and international organizations are essential to achieving sustainable mining practices.

Meetings with representatives of GIZ Mauritanie on 17.02.2025

Key Insights

- GIZ Mauritanie, the German development agency, plays a pivotal role in supporting sustainable development in Mauritania.
- With a focus on governance, economic development, and environmental sustainability, GIZ works closely with the Mauritanian government, private sector, and local communities to address key challenges and promote inclusive growth.

Perspectives vs. Actions

Perspectives	Actions Taken	Gaps/Challenges
Need to formalize ASM	Supported licensing programs and training for artisanal miners jointly with Maaden.	Limited enforcement capacity and resistance from informal miners.
Promoting sustainable mining practices	Introduced mercury-free technologies and environmental rehabilitation initiatives.	High costs of technology adoption and lack of awareness among miners.
Economic inclusion and job creation	Implemented programs to create jobs and promote local content in mining areas.	Limited infrastructure and resources in remote mining communities.

ENVIRONMENTAL & HEALTH CHALLENGES IN THE MAURITANIAN MINING SECTOR

4. ENVIRONMENTAL & HEALTH CHALLENGES IN THE MAURITANIAN MINING SECTOR

This chapter provides a comprehensive background literature analysis of these issues, supported by the latest available data and scientific evidence, to highlight the urgent need for sustainable ASM mining practices. The interconnectedness of these challenges extends beyond Mauritania, affecting the Senegal River Basin, the Atlantic Ocean, and the broader Sahel region.

4.1 Mercury and Heavy Metal Contamination and Its Impacts on Health and Eco-systems

In the arid expanses of Mauritania, artisanal and small-scale gold mining (ASGM) has become a prevalent economic activity. This sector heavily relies on mercury for gold extraction, with over 90% of artisanal miners utilizing this toxic substance. Annually, an estimated 10 to 15 tons of mercury are released into the environment, contaminating air, water, and soil (UNEP, 2022).

4.1.1 Mercury's Pathway to the Senegal River Basin

Mercury released from ASGM activities can travel considerable distances through atmospheric and hydrological processes, potentially impacting regions far from the original source. For e.g. in northern Mauritania, mercury is emitted into the atmosphere as vapor during the amalgamation process. This vapor can then be transported by wind currents and deposited onto land and water bodies, including those feeding into the Senegal River Basin (Mulenga et al., 2024).

Once deposited, mercury can enter aquatic systems, where it undergoes microbial transformation into methylmercury, a highly toxic form that bioaccumulates in aquatic organisms (Niane et al., 2019). This process poses significant risks to both wildlife and human populations relying on these water resources.

4.1.2 Evidence of Transboundary Mercury Pollution

While direct studies tracing mercury from northern Mauritania's ASGM activities to the Senegal River Basin are limited, research in neighboring regions provides insight into the potential for transboundary mercury pollution:

- **Senegal:** A study in southeastern Senegal found dangerously high levels of mercury and methylmercury in soils, sediments, and rivers near artisanal gold mines, indicating that mercury from ASGM is entering both terrestrial and aquatic ecosystems, where it is converted to methylmercury (Nicholas School of the Environment, Duke University, 2023).
- **Sub-Saharan Africa:** A comprehensive review highlighted that aquatic mercury pollution from ASGM is a significant concern across sub-Saharan Africa, affecting both environmental and human health (Mulenga et al., 2024).

In August 2024, Senegal suspended all mining activities along its side of the Falémé River, a major tributary of the Senegal River, to protect the environment and support local communities affected by artisanal gold mining (Reuters, 2024). This decision underscores the regional challenges posed by mercury pollution and the need for collaborative efforts to mitigate its impact..

In addition to mercury, other toxic heavy metals—including lead, cadmium, and arsenic—are released as byproducts of both large-scale mining (LSM) and ASGM activities in Mauritania.

The Akjoujt mining region, known for its copper and gold extraction, has recorded alarming levels of heavy metal contamination:

- Lead concentrations exceed WHO safety limits by 300%.
- Cadmium levels are 200% above permissible exposure levels (*Ministère de l'Environnement, 2020*).

Chronic exposure to heavy metals poses severe health risks, particularly in mining communities where children and pregnant women are most vulnerable. These risks include:

- Neurological disorders, kidney damage, and cardiovascular diseases from lead and cadmium exposure.
- Increased cancer risk due to long-term arsenic ingestion from contaminated water sources.
- Weakened immune systems and developmental issues in children, as heavy metals accumulate in the bloodstream over time (*World Bank*, *2022*).

A 2022 report estimated that 30% of Mauritanian mining communities are at risk of heavy metal poisoning, underscoring the need for urgent public health interventions (*World Bank*, *2022*).

Mauritania's desert ecosystem is already fragile, with 90% of its land classified as arid or semi-arid (*FAO*, *2020*). Unlike humid ecosystems, deserts have slow biological recovery rates, meaning that heavy metal pollution can persist for decades.

The long-term impacts of unregulated ASGM and LSM activities in arid environments include:

Accelerated Soil Degradation and Erosion: Toxic heavy metals alter soil chemistry, reducing its fertility and ability to retain moisture. Loss of topsoil from mining pits leads to permanent land degradation.

Collapse of Vegetation and Biodiversity: Contaminated soil and acid mine drainage prevent native desert plants, such as *Acacia tortilis* and Ziziphus mauritiana, from growing. The disappearance of vegetation destabilizes local food chains, affecting species such as Saharan rodents, fennec foxes, and desert gazelles.

Increased Climate Vulnerability: Without vegetation, the land absorbs more heat, contributing to regional warming and disrupting rainfall cycles. This increases the risk of extreme droughts, making land even less hospitable for human habitation.

Rehabilitating contaminated sites requires backfilling abandoned mining pits, covering them with non-toxic topsoil to curb erosion, and employing phytoremediation techniques using plants capable of extracting heavy metals. Given the desert's vulnerability, restoring vegetation is crucial—reintroducing native species such as Acacia tortilis to stabilize soil and establishing windbreaks with drought-resistant shrubs can help combat land degradation and desert encroachment. To protect water resources, strict tailings management systems must be implemented to prevent toxic runoff, alongside regular water quality monitoring to detect heavy metal pollution before it spreads.

4.2 Water Contamination and Groundwater Depletion

The widespread use of cyanide and mercury in gold processing has led to severe water contamination, with 40% of surface water sources near mining sites testing positive for toxic pollutants (*GIZ*, *2021*). These contaminants, particularly cyanide, persist in aquatic ecosystems for decades, bioaccumulating in fish and posing serious health risks to local populations dependent on these water sources. In the Senegal River Basin, cyanide spills from mining operations have been linked to mass fish die-offs, disrupting fisheries and endangering the livelihoods of thousands who rely on fishing for sustenance and economic stability.

Beyond pollution, over-extraction of groundwater for mining operations has significantly depleted water reserves, with water tables dropping by 20-30% in some regions (*UNDP*, *2022*). This depletion is particularly alarming in Mauritania and the broader Sahel region, where climate change and prolonged droughts are already exacerbating water scarcity. As mining companies pump vast quantities of groundwater to sustain operations, local agriculture and drinking water supplies are increasingly at risk, deepening the existing water crisis in rural and semi-arid areas.

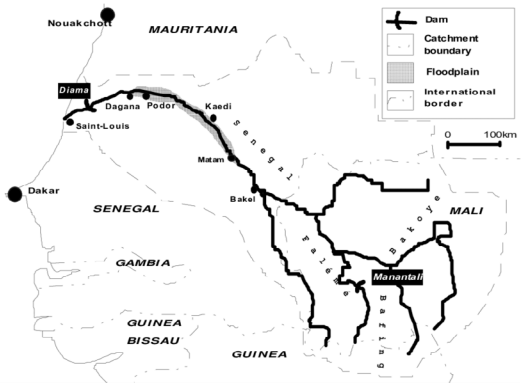

***Figure 16:** Senegal River Basin*

The Senegal River Basin, spanning 300,000 km² across Guinea, Mali, Mauritania, and Senegal, serves as a lifeline for millions. The river originates in Guinea, flows northwest through Mali, and then forms the Mauritania-Senegal border before emptying into the Atlantic Ocean. Its main tributaries—the Bafing, Bakoye, and Falémé Rivers—are particularly vulnerable to mercury and heavy metal contamination from upstream mining activities. These pollutants travel hundreds of kilometers downstream, impacting drinking water, agriculture, and aquatic biodiversity in Senegal and beyond. The transboundary nature of this pollution underscores the urgent need for regional cooperation, with Mauritania, Senegal, and Mali needing to strengthen water governance policies, enforce stricter mining regulations, and invest in cross-border water protection initiatives to safeguard this vital resource for future generations.

4.3 Air Pollution from Mining Dust and Processing Facilities

Mining activities in Mauritania generate vast amounts of dust and airborne pollutants, with particulate matter (PM2.5) concentrations exceeding WHO safety guidelines by 400% in some regions (*Ministère de l'Environnement, 2021*). This fine dust, often laden with heavy metals, silica, and toxic compounds, poses severe health risks to both miners and nearby communities. Prolonged exposure to these pollutants has been directly linked to respiratory diseases, lung cancer, and cardiovascular issues.

Among miners and surrounding populations, respiratory illnesses are alarmingly common. A 2020 study found that 50% of miners in Mauritania suffer from chronic respiratory conditions, including silicosis, asthma, and chronic obstructive pulmonary disease (COPD), underscoring the urgent need for better protective measures, improved ventilation in mining areas, and stricter air quality monitoring (*WHO, 2020*).

Beyond human health, air pollution from mining has wider environmental consequences. The release of dust and greenhouse gases contributes to climate change, while the deposition of metal-laden particles alters soil composition, affecting plant growth and biodiversity. In the Akjoujt region, for example, mining dust has been directly linked to the decline of native desert plant species, further accelerating land degradation and desertification. As vegetation loss intensifies, soil becomes more vulnerable to erosion, reducing its ability to retain moisture—a critical factor for sustaining ecosystems in Mauritania's arid landscapes.

Given the far-reaching impacts of mining-related air pollution, urgent interventions are needed. Implementing dust suppression techniques, enforcing emission regulations, providing protective respiratory equipment for miners, and restoring vegetation in degraded areas are essential steps in mitigating both health risks and environmental damage in mining-affected regions.

4.4 Soil Degradation and Desertification

All types of Mining activities in Mauritania have vastly different environmental consequences depending on the geographical region. The north of the country, characterized by hyper-arid desert landscapes with minimal vegetation, experiences severe dust storms, land degradation, and transboundary pollution. In contrast, southern Mauritania, where semi-arid lands transition into the Sahelian zone, faces agricultural decline, water contamination, and ecosystem disruption due to mining activities.

Northern Mauritania, home to vast mining hubs like Zouérat and Chami, is dominated by the Sahara Desert's extreme conditions. Here, mining intensifies desertification as the removal of topsoil and vegetation exposes the land to wind erosion. This process amplifies dust storms, which are not only a local hazard but also contribute to transcontinental dust movement.

- Mining activities contribute to dust storms, with PM2.5 levels exceeding WHO limits by 400% (*Ministère de l'Environnement, 2021*).
- Mauritania is one of the largest sources of Saharan dust, which travels across the Atlantic Ocean, affecting regions as far as West Africa, the Caribbean, and even North and South America (*NASA, 2023*).
- Dust from mining sites contains heavy metals and silica, which worsen respiratory diseases in both miners and surrounding populations (*WHO, 2020*).
- The transport of dust-laden air masses can deposit mercury, arsenic, and lead into the Senegal River Basin, affecting downstream communities in Mauritania, Senegal, and Mali.

Without intervention, northern Mauritania will continue to experience worsening desertification and air pollution, with regional and transcontinental consequences.

In contrast, southern Mauritania, which encompasses rural agricultural zones along the Senegal River Basin, faces a different set of environmental threats from mining:

- Water contamination is a major concern, with 40% of surface water near mining sites testing positive for cyanide and mercury (*GIZ, 2021*).
- Mining-induced groundwater depletion has lowered water tables by 20-30%, affecting farmlands and local drinking water supplies (*UNDP, 2022*).
- The loss of vegetation due to mining disrupts traditional farming and grazing lands, leading to food insecurity and the displacement of communities.
- Soil erosion and sedimentation from mining sites are contributing to river pollution, affecting the Senegal River and its tributaries. This sedimentation is also flowing into the Atlantic Ocean, where it disrupts marine ecosystems and coastal fisheries.

Mauritania is part of the Saharan dust belt, which has a profound impact on global climate systems and public health. Mining activities in northern Mauritania worsen dust storm intensity, further contributing to the massive plumes of Saharan dust that:

- Travel across continents, depositing heavy metals and fine particulate matter over West Africa, Europe, and the Americas (*NASA, 2023*).
- Affect global air quality, increasing the prevalence of respiratory diseases in urban centers as far as Miami, Havana, and Mexico City.
- Alter weather patterns, influencing Atlantic hurricane formation by cooling ocean surfaces and reducing rainfall in West Africa (*Nature Climate Change, 2022*).

Given the global consequences of Mauritania's mining-induced land and air degradation, international collaboration is critical. Countries across West Africa, Europe, and the Americas must engage in joint monitoring efforts to track and mitigate Saharan dust pollution.

5

STRENGTHENING MAADEN MAURITANIA TROUGH UNCCD PARTNERSHIP

5. STRENGTHENING MAADEN MAURITANIA TROUGH UNCCD PARTNERSHIP

5.1 Developing a Long-Term Master Plan for Sustainable Mining

Maaden Mauritania has already begun integrating environmental and social responsibility into its operations, but more robust measures are needed to ensure long-term sustainability. A leg-islative and regulatory framework that enforces environmental impact assessments (EIA), sustainable land management (SLM), and social safeguards is essential. These measures should align with the UNCCD's Land Degradation Neutrality (LDN) Framework, which aims to combat desertification and restore degraded land.

Currently, Maaden Mauritania conducts EIAs for new projects and has initiated community development programs. However, the company must go further by implementing strict guidelines for mine closure and post-mining rehabilitation. For example, Maaden could adopt a policy where 5% of mining revenues are allocated to a Mining Rehabilitation Fund, ensuring that degraded land is restored and repurposed for sustainable uses such as agroforestry or eco-tourism.

Additionally, Maaden Mauritania should expand its corporate social responsibility (CSR) programs to support local employment, healthcare, and education initiatives in mining-affected communities. For instance, the company could partner with local NGOs to provide vocational training for miners transitioning to alternative livelihoods, such as renewable energy or sustainable agriculture.

5.2 Strategic Planning for Sustainable ASM and Semi-Industrial Mining

To formalize ASM and semi-industrial mining, Maaden Mauritania must develop a redefined strategic roadmap that balances economic development with land restoration goals. The following key actions are essential:

I. Continue Establishing Designated ASM Zones:

- Maaden Mauritania, in collaboration with the government, should identify and demarcate specific areas for ASM activities. These zones would reduce environmental destruction in protected areas and ensure that mining activities are concentrated in regions with lower ecological sensitivity.
- For example, the Inchiri and Zouérat region, known for its gold deposits, could be designated as an ASM zone, with strict environmental monitoring and enforcement mechanisms in place.

II. Providing Technical Training and Equipment:

- Maaden Mauritania should provide ASM workers with training on mercury-free gold extraction techniques, such as gravity concentration and cyanide leaching. This would reduce mercury contamination and improve miners' health and safety. GIZ is testing such new technics on pilot scales.
- The company could also distribute low-cost, environmentally friendly equipment, such as retorts for mercury capture, to minimize environmental impacts.

III. Enforcing Mine Rehabilitation Regulations:

- Maaden Mauritania must ensure that all mining operations, including ASM and semi-industrial mining, adhere to mine rehabilitation regulations. This includes restoring degraded land post-mining and replanting native vegetation to combat desertification.
- For instance, in the Akjoujt region, Maaden could pilot a land restoration project, using native plants to stabilize soil and prevent erosion.

IV. Introducing Semi-Industrial Models:

- Semi-industrial mining can bridge the gap between ASM and large-scale mining by using modern, environmentally friendly processing techniques. Maaden Mauritania should promote these models by providing access to financing and technology for small and medium-sized mining enterprises.
- For example, the company could partner with international organizations like GIZ to introduce semi-industrial processing units that use renewable energy and minimize waste.

5.3 Addressing Informal and Unregulated Mining in Mauritania

The expansion of informal artisanal and small-scale mining (ASM) in Mauritania poses both environmental and social challenges but also highlights the economic importance of the sector. A constructive, inclusive approach is needed—focusing on formalization, environmental restoration, and community engagement.

When unregulated sites are identified, the priority should be to redirect mining activities to designated ASM zones. This includes supporting miners during relocation by offering transitional assistance, such as temporary access to basic services or livelihood support, to minimize economic disruption and reduce the likelihood of miners returning to informal operations.

Following relocation, affected sites should undergo environmental assessment and rehabilitation. Evaluations of soil, water, and vegetation conditions can inform tailored restoration plans, including soil stabilization, native replanting, and water quality improvement measures. A basic monitoring system should track progress and guide follow-up interventions.

At the community level, success depends on active engagement and awareness. Outreach through dialogues, radio, and local meetings can build understanding of the risks of unregulated mining. Providing training in mercury-free extraction and alternative income skills such as agriculture or artisanal crafts can help broaden livelihood options. Involving local leaders also ensures cultural relevance and community ownership.

Community participation should also extend to monitoring and oversight. Tools such as reporting hotlines or mobile apps can empower residents to share information on informal activities. Regular public updates on actions taken and progress achieved will help strengthen trust and transparency.

Finally, the long-term goal is to facilitate miners' transition into the formal sector. Simplifying licensing processes, providing access to tools and technical guidance, and offering incentives like microfinance or cooperative support can encourage miners to operate legally and sustainably.

5.4 Integration of Geospatial Monitoring for Environmental Oversight

To address these issues, Maaden Mauritania must adopt a strategic, long-term approach that integrates state-of-the-art technologies and advanced methodologies into its operations. This chapter outlines how Maaden Mauritania can leverage geospatial technologies, artificial intelligence (AI), and real-time monitoring systems to enhance environmental oversight, promote sustainable mining practices, and strengthen institutional capacities. By incorporating these innovations, Maaden Mauritania can lead the transformation of the mining sector into a model of sustainability and resilience.

5.4.1 Application of GIS and Remote Sensing for Land Degradation Tracking

Geographic Information Systems (GIS) and remote sensing are pivotal tools for detecting and analyzing land degradation caused by mining activities. These technologies enable precise monitoring, assessment, and management of environmental impacts.

I. Mapping Land Use Changes:

- High-resolution satellite imagery and spatial data can identify alterations in vegetation cover, soil erosion, and surface disturbances caused by mining operations. For example, the Sentinel-2 satellite provides multispectral imagery that can detect land-use changes with a resolution of up to 10 meters (European Space Agency, 2023).
- Case Study:In the Inchiri region, GIS mapping revealed a 15% loss of vegetation cover between 2018 and 2022 due to unregulated ASM activities (GIZ, 2021).

II. Evaluating Soil Erosion:

- GIS can analyze topographical changes to determine areas susceptible to erosion. For instance, the Revised Universal Soil Loss Equation (RUSLE) model uses GIS data to predict soil erosion rates and identify high-risk zones (FAO, 2020).
- Impact: In the different ASM sites, RUSLE modeling identified erosion hotspots, enabling targeted soil stabilization measures such as terracing and reforestation.

5.4.2 Real-Time Monitoring Using Drones and Satellite Data

The integration of unmanned aerial vehicles (UAVs) and satellite data enhances real-time environmental monitoring, providing comprehensive insights into mining impacts.

I. Drones (UAVs):

- Drones equipped with high-resolution cameras and multispectral sensors can capture detailed aerial imagery of mining sites. This enables the detection of environmental changes, such as illegal mining activities, water contamination, and habitat destruction.
- Example: In the Chami region, drones were used to map illegal mining sites, leading to the identification and rehabilitation of 10 hectares of degraded land (World Bank, 2022).

II. Satellite Data:

- Platforms like Copernicus, Sentinel, and Landsat provide large-scale environmental data for free of charge, including land degradation rates, water quality, and land-use changes. For instance, the Sentinel-1 radar satellite can monitor ground subsidence caused by underground mining activities (European Space Agency, 2023).

5.4.3 AI and Machine Learning for Predictive Environmental Assessments

Artificial Intelligence (AI) and Machine Learning (ML) algorithms can analyze complex datasets to predict environmental impacts and inform decision-making which is called Predictive Modeling.

I. Forecasting Environmental Changes:

- AI models can analyze historical and real-time data to forecast potential environmental changes, such as land cover change , soil erosion, and water contamination. For example, Google Earth Engine uses AI to predict environmental risks in mining regions (Google, 2023).

II. Anomaly Detection:

- ML algorithms can detect unusual patterns in environmental data, such as sudden drops in vegetation health or spikes in water pollution. These anomalies may indicate illegal mining activities or environmental hazards.
- Example: In the Rosso region, ML algorithms detected a 30% increase in water turbidity, leading to the discovery of illegal gold processing activities upstream (UNDP, 2022).

5.4.4 Early Warning Systems for Vegetation Change, Erosion, and Desertification

Developing early warning systems tailored to arid and semi-arid environments is critical for enabling timely and targeted responses to environmental threats such as land degradation, erosion, and desertification. In Mauritania, where these issues are increasingly pressing, the following tools and approaches are particularly relevant:

1. Vegetation Change Monitoring: A powerful tool for environmental monitoring is Google Earth Engine (GEE), a cloud-based platform that enables customized temporal analysis of vegetation and land surface conditions. By using vegetation indices such as the Normalized Difference Vegetation Index (NDVI) which tracks vegetation health and the Normalized Difference Water Index (NDWI) which detects changes in moisture and water stress GEE is particularly effective for conducting before-and-after assessments of ASM zones. This allows for the detection of progressive vegetation loss and land degradation associated with mining activities. Furthermore, monitoring can be automated at monthly or seasonal intervals, making GEE a cost-effective and scalable solution for use by national agencies, researchers, and land management authorities.
2. Soil Erosion Risk Assessment: Regional tools supported by the Sahara and Sahel Observatory (OSS) help identify erosion-prone areas through geospatial modelling and land use analysis. These systems enable early interventions such as terracing, stone lines, or vegetative barriers to reduce soil loss.
3. Water Productivity and Stress Monitoring: FAO's WaPOR platform (Water Productivity through Open-access Remotely sensed data) offers valuable insights for managing water resources and crop productivity in water-scarce regions. It can support planning for sustainable land and water use in agropastoral zones prone to degradation.

5.4.6 Strengthening Institutional and Technological Capacities

Capacity Building for Maaden and Ministry Officials in Geospatial Technologies

Investing in training programs ensures that personnel are proficient in the subject matter and are in a position to utilize and interpret advanced geospatial tools.

1. Technical Training:

- Conduct workshops on GIS, remote sensing, and data analysis for Maaden Mauritania staff and government officials.

2. Certifications:

- Encourage personnel to obtain certifications in geospatial technologies, such as the Esri Technical Certification or Google Earth Engine Certification, to standardize skill levels and ensure high-quality data analysis.

Establishing a Centralized Environmental and Mining Data Platform

Creating a unified data repository enhances data accessibility and collaboration.

1. Data Integration:

- Consolidate environmental and mining data into a single platform, such as the Mauritania Mining and Environment Data Hub (MMEDH) or on the Geospatial Hub of the G20 GLI. Such platform would integrate satellite data, drone imagery, and ground-based monitoring data.
- Example: The MMEDH could provide real-time updates on land degradation, water quality, and soil erosion, enabling stakeholders to make informed decisions.

2. User Access:

- Provide stakeholders, including government agencies, NGOs, and local communities, with appropriate access levels to facilitate data-driven decision-making. For instance, local communities could use the platform to report illegal mining activities or monitor environmental restoration projects

5.5 Leveraging UNCCD's Global Mechanism for Sustainable Land Management

The UNCCD Global Mechanism offers a unique opportunity for Maaden Mauritania to access funding and technical expertise for sustainable land management (SLM) and ecosystem restoration. By tapping into this mechanism, Maaden can implement innovative solutions to address the environmental impacts of mining.

Blended Finance Models: The UNCCD Global Mechanism promotes blended finance models that combine public funds with private sector investments. Maaden Mauritania can use this approach to fund large-scale land rehabilitation projects. For instance, a blended finance initiative could involve Maaden Mauritania, the Mauritanian government, and international investors cofunding a $10 million reforestation project, where mining has caused significant degradation. This model ensures sustainable funding while sharing risks and rewards among stakeholders, making it an attractive option for Maaden's management.

Green Bonds and Environmental Impact Investments: Maaden Mauritania can issue green bonds to raise capital for environmental restoration projects. These bonds attract investors focused on environmental, social, and governance (ESG) criteria. For example, a $5 million green bond could fund the rehabilitation of mining-affected areas in for instance the Akjoujt an Zoerat region. Green bonds not only provide funding but also enhance Maaden's reputation as a socially responsible company, aligning with global ESG trends.

Climate Adaptation Grants: The UNCCD Global Mechanism offers climate adaptation grants to support projects that enhance ecosystem resilience. Maaden Mauritania can use these grants to implement evidence-based rehabilitation that could follow with ecological restoration. An estimated $2 million grant could for instance fund the construction of water retention systems in the Tasiast region, reducing water scarcity and supporting local agriculture. These projects mitigate the effects of climate change while restoring degraded lands, providing immediate and long-term benefits.

5.6 Integrating G20 Global Land Initiative's Expertise and Resources

The G20 Global Land Initiative (G20 GLI) strengthens the UNCCD's mission by championing sustainable land use and restoration, empowering Maaden Mauritania to drive long-term, evidence-based transformation. Through this collaboration, Maaden can integrate best practices and cutting-edge technologies, ensuring a resilient and responsible approach to resource extraction.

Empowering Maaden Through Capacity Building: The G20 GLI offers specialized training programs designed to enhance sustainable land management, geospatial technologies, and environmental monitoring. G20 GLI could equip Maaden and government officials with expertise in GIS, remote sensing, and AI-powered environmental analytics. Strengthening technical capabilities will enable Maaden to implement sustainable mining strategies effectively, providing its leadership with the tools to achieve long-term success.

Building a Centralized Environmental & Mining Data Hub: To advance data-driven decision-making and

transparency, the G20 GLI can support the development of the Maaden Environmental Data Hub—a centralized platform aggregating critical environmental and mining data. This system will deliver real-time insights into land degradation, water quality, and biodiversity, enabling proactive environmental management and ensuring compliance with international sustainability benchmarks.

Driving Innovation Through Global Research Collaborations: By connecting Maaden Mauritania with renowned international research institutions, the G20 GLI fosters innovation, ensuring local mining practices align with global sustainability standards. These collaborations will unlock state-of-the-art solutions, equipping Maaden with the latest advancements in sustainable mining and environmental conservation.

Leading the Future of Responsible Mining: By tapping into the expertise and resources of the UNCCD and G20 GLI, Maaden Mauritania has the opportunity to redefine its mining sector, positioning itself as a global leader in sustainable resource extraction. This strategic alliance not only addresses today's challenges but also lays the foundation for a resilient and sustainable future—where economic growth and environmental stewardship go hand in hand.

6

CONCLUSION AND RECOMMENDATIONS

6. Conclusion and Recommendations

The artisanal and small-scale mining (ASM) sector in Mauritania is at a pivotal crossroads. While it holds immense potential to drive economic growth and create livelihoods, it also poses significant environmental, health, and social challenges. The findings from this scoping mission underscore the urgent need for a coordinated, multi-stakeholder approach that prioritizes sustainability, inclusivity, and innovation. To unlock the sector's potential while mitigating its risks, key interventions must focus on continued ASM formalization, environmental regulation, health and safety, community empowerment, and technological advancement.

ASM Formalization is the bedrock of transforming the ASM sector into a regulated and sustainable industry. Establishing a robust legal framework to integrate informal operations into the formal economy is essential. This will improve regulation, enhance access to support services, and increase accountability.

The environmental impact of ASM, particularly from mercury use and land degradation, demands immediate attention. Stricter environmental standards, coupled with rigorous monitoring, are critical to mitigating these effects. Initiatives such as mercury-free technologies, land restoration projects, and sustainable water management systems must be scaled up.

Key Recommendations:

- Promote and scale up alternative gold extraction techniques, such as gravity concentration and borax-based methods, to eliminate mercury use.
- Expand land restoration projects in heavily degraded areas through soil stabilization, and phytoremediation.
- Strengthen regional cooperation with Senegal and Mali to address transboundary pollution risks, particularly in the Senegal River Basin and towards the Atlantic Ocean.

The health and safety of miners must be a top priority. Many ASM workers operate in hazardous conditions without adequate protective equipment, leading to chronic illnesses and severe occupational hazards. Structured capacity-building programs, which have already trained over 1,000 miners in sustainable practices, demonstrate the potential of such interventions.

Key Recommendations:

- Expand training programs for miners on occupational health, safety protocols, and sustainable mining techniques.
- Provide miners with protective equipment and regular health screenings to reduce exposure to hazardous substances.
- Partner with organizations like the World Health Organization (WHO) to assess and mitigate health risks associated with mercury exposure and other mining-related illnesses.

Empowering local mining communities is essential for the long-term sustainability of the ASM sector. Programs that support alternative livelihoods, education, and community development can reduce dependence on mining and foster economic resilience.

Key Recommendations:

- Continue expand infrastructure projects to provide essential services, including healthcare, clean water, and education, to mining communities.
- Support alternative livelihood programs, such as agroforestry, livestock management, and small-scale entrepreneurship, to diversify income sources.
- Promote local employment opportunities within the formal mining sector to ensure equitable distribution of economic benefits.

Technological advancements offer unprecedented opportunities to improve governance in the ASM sector. The integration of geospatial technologies, artificial intelligence, and real-time environmental monitoring can enhance oversight and enforcement. Maaden Mauritania's collaboration with the G20 GLI to introduce satellite-based environmental monitoring sets a strong precedent for advanced regulatory frameworks.

Key Recommendations:

- Deploy remote sensing technologies and drone-based monitoring systems to track illegal mining activities and assess environmental damage in real-time.
- Utilize AI-driven predictive models to forecast environmental risks, such as land degra-dation , erosion, and water contamination.
- Establish a centralized mining and environmental data platform to facilitate transparent reporting and regulatory compliance.

The transformation of Mauritania's ASM sector is not just an economic imperative but a moral responsibility. Without immediate action, the combined impacts of ASM and large-scale mining (LSM) activities risk permanently degrading Mauritania's desert ecosystems, disrupting regional water systems, and increasing health burdens on mining communities.

End of report

7. Appendices

Appendix I: Short Term Plans

Initiative	*Objective*	*Key Activities*
1. Capacity Building Training Program on Rehabilitation and Restoration	Equip Maaden with skills to restore abandoned mining sites using best practices.	Conduct comprehensive workshops.
2. Case Study: Mercury Concentration Assessment in Chami Town	Assess mercury contamination and its impacts for actionable environmental management.	Measure mercury levels in soil, water, and air; analyze health and ecological impacts.
3. Remote Sensing-Based Monitoring System for ASM Detection	Detect and track new artisanal mining activities using satellite imagery and AI.	Integrate geospatial tools and machine learning for real-time monitoring.
4. Study Tour: Learning Global Best Practices in ASM Management	Facilitate knowledge exchange on global best practices for ASM monitoring and management.	Visit countries with successful ASM programs; adapt strategies to Mauritania's context.
5. Technical Assistance: Rehabilitating the Chami Gold Processing Center	Develop a concept to Rehabilitate and decontaminate the Chami center to mitigate environmental and health risks.	Suggest mercury-free gold extraction technologies; facilitate restore any contaminated project site and suggest SOPs.
6. Mercury Detector Network for Air Quality Monitoring	Monitor and mitigate mercury pollution in ASGM sites for safer environments.	Deploy sensors to measure mercury levels in real-time; use data for interventions.

Appendix II: Long-term Support Plan – Comprehensive Land Restoration Program with Advanced Geospatial Monitoring

Objective: Establish a long-term support mechanism for Mauritania, focusing on large-scale land restoration, advanced geospatial monitoring, and sustainable mining practices to address the environmental crisis caused by ASM and large-scale mining (LSM).

Initiative	*Objective*	*Key Activities*
1. Drafting a Holistic Land Restoration Plan	Develop strategies to rehabilitate degraded lands caused by ASM and LSM activities.	Integrate sustainable land management practices; utilize global best practices.
2. Advanced Geospatial Monitoring and Alert System	Deploy a system to detect and report mercury and pollutant spread in real-time.	Leverage AI, remote sensing, and IoT sensors for data collection and predictive modeling.
3. Holistic Environmental Monitoring	Utilize remote sensing technologies to monitor mining sites for environmental and atmospheric degradation.	Use satellite imagery and drones for real-time monitoring of land, water, and air quality.
4. Capacity Building and Institutional Strengthening	Train stakeholders in using geospatial tools and implementing restoration practices.	Strengthen regulatory frameworks; build local capacity for sustainable mining.
5. Stakeholder Engagement and Collaboration	Foster collaboration with multilateral organizations and local communities.	Establish partnerships for technical expertise and resources; engage communities in decision-making.
6. Research and Evidence-Based Solutions	Conduct research to refine restoration strategies and improve monitoring effectiveness.	Use evidence-based insights to promote nature-based solutions for ecosystem recovery.
7. Scalability and Replication	Design the program for scalability and replication in other regions.	Share best practices and lessons learned with other countries facing similar challenges.

Recommended collaborative approach and stakeholder engagement strategy with Maaden Mauritania

To address the multifaceted challenges of artisanal and semi-artisanal gold mining, a structured and participatory methodology will be employed. This approach will integrate scientific analysis, stakeholder collaboration, and international best practices to ensure sustainable resource management and land restoration. The methodology is divided into three key components:

1. Comprehensive Report

An in-depth analysis will be conducted to assess the environmental, social, and economic impacts of artisanal and semi-artisanal gold mining. This report will leverage geospatial data, environmental modeling, and socio-economic surveys to identify critical challenges, such as land degradation, water contamination, and health risks to local communities.

Scientific Recommendations:

a. Environmental Monitoring: Utilize remote sensing technologies (e.g., satellite imagery and/or drones) to monitor mining sites in real-time, enabling early detection of environmental and atmospheric degradation
b. Land Restoration: Propose phytoremediation techniques, using native plant species to rehabilitate and stabilize contaminated soils, its structures and restore ecosystem functions.
c. Sustainable Practices: Introduce mercury-free gold extraction methods, such as gravity concentration or borax-based techniques or any other feasible techniques, to reduce environmental and health hazards.

The report will culminate in actionable recommendations for improving site monitoring, enforcing regulatory frameworks, and implementing sustainable land management practices.

2. Stakeholder Workshop

A synthesis workshop will be organized in Nouakchott to engage national and international stakeholders, including government agencies, mining companies, local communities, and environmental experts. This participatory forum will build on insights from field visits and case studies to develop strategies for strengthening Maaden's role in managing artisanal gold mining.

Scientific Engagement:

a. Impact Assessment Tools: Introduce stakeholders to tools like the Environmental Impact Assessment (EIA), Social Impact Assessment (SIA) frameworks and Cartographic based assessment to evaluate, mitigate and re-imaging mining impacts.
b. Data-Driven Decision-Making: Promote the use of GIS-based platforms for collaborative mapping and resource allocation, ensuring transparency and inclusivity in decision-making processes.

The workshop will define concrete actions for sustainable site management, including community-led monitoring programs, capacity-building initiatives, and integrated land restoration plans.

3. International Exchange Visits

A study trip to a G20-member country with workable practices in sustainable mining and land management will be organized. This exchange will focus on learning innovative solutions, such as circular economy models, renewable energy integration in mining operations, and community-based rehabilitation and/or Livelihood restorations programs.

Scientific Knowledge Transfer:

a. Best Practices: Explore the application of biochar for soil remediation and carbon sequestration in degraded mining areas.
b. Technology Transfer: Adapt advanced monitoring technologies, such as IoT-enabled sensors for Air/Water quality and soil health, to the Mauritanian context.
c. Capacity Building: Train local stakeholders in sustainable mining techniques and participatory governance models to ensure long-term implementation.

The insights gained from this exchange will be tailored to the Mauritanian context, fostering cross-country collaboration and enhancing the capacity of local stakeholders to implement sustainable practices.

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9. Further Impressions

Visiting Secondary Treatment Centers of Maaden Mauritania in Zoureat

These photos further document the site visit to various secondary treatment facilities operated by Maaden Mauritania within the country. These facilities form part of Maaden's broader strategy to formalize the informal gold extraction sector. Basic infrastructure - including electricity, water supply, land allocation, and gold offtake possibilities - has been established to support artisanal miners. As part of the formalization process, artisanal miners are allocated individual land parcels where they are encouraged to invest in basic, proven machinery and rudimentary extraction techniques. This approach aims to improve productivity, safety, and environmental management, while offering miners a more stable, legal framework to operate within.

The photos also capture impressions from the extensive scoping mission into the Sahara Desert, where artisanal mining sites emerge spontaneously whenever new gold veins are discovered. These often informal activities mark the early stages of settlement formation and are typically accompanied by significant environmental impacts, including landscape degradation and unregulated waste accumulation.

This evolving dynamic highlights the urgent need for structured interventions that can guide the growth of artisanal mining communities towards more sustainable practices, preventing long-term environmental scarring while providing economic opportunities for local populations. The visit provided valuable insights into both the challenges and opportunities associated with managing the artisanal mining sector at scale — insights that are essential for developing more comprehensive support and governance mechanisms in Mauritania and similar contexts worldwide.















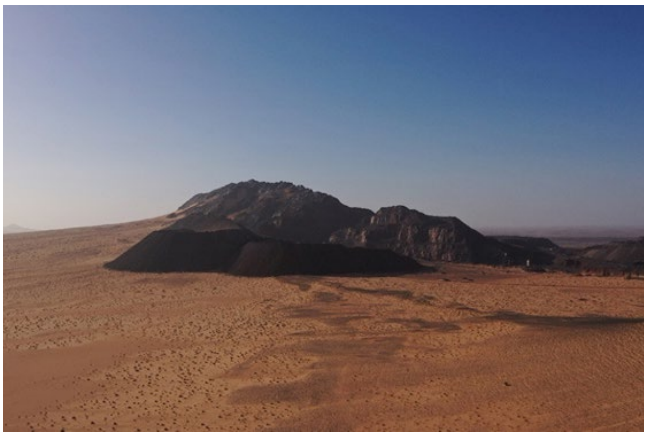






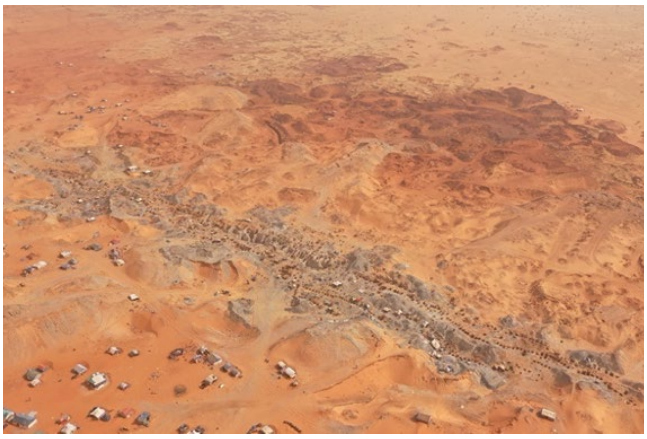

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