



British
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UK expertise for critical mineral supply chains in Argentina, the Philippines and Zambia



UK Government
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Critical mineral supply chains

Introduction

This report identifies opportunities for UK engagement in sectors related to critical minerals across Argentina, the Philippines and Zambia. Drawing on British Geological Survey (BGS) work undertaken for the Foreign, Commonwealth and Development Office (FCDO) Growth Gateway programme in (FY) 2025 to 2026, alongside ongoing engagement with partners and companies. **All companies referenced are included as illustrative examples;** they do not constitute endorsements or recommendations by BGS, nor are they intended to be exhaustive.

Rising global demand for critical minerals, greener processing and responsible supply chains is creating openings for UK firms that supply engineering, mining, environmental, social and governance (ESG), exploration and other mining-related expertise and technologies. For each country, we present a focused shortlist of five commercial opportunities, summarising the opportunity, identifying a UK-based example partner, and describing its strategic relevance, whether through technical expertise, market footprint or potential for upstream and downstream linkages. The report also touches upon companies that have existing footprints or the potential to become engaged in multiple countries, although this is not exclusive to the companies covered in this section.

Using the mining life cycle (Figure 1), we highlight stage specific opportunities across our three priority countries for work in the Growth Gateway programme:

Zambia, Argentina and the Philippines. This approach demonstrates where UK strengths (geoscience and exploration technologies; ESG; sustainable processing, etc.) can best create impact and responsible supply chains at every stage in the mining life cycle.

The aim is to guide government, industry and investors towards potential engagements that may deliver UK economic benefits while supporting more resilient and responsible supply chains.

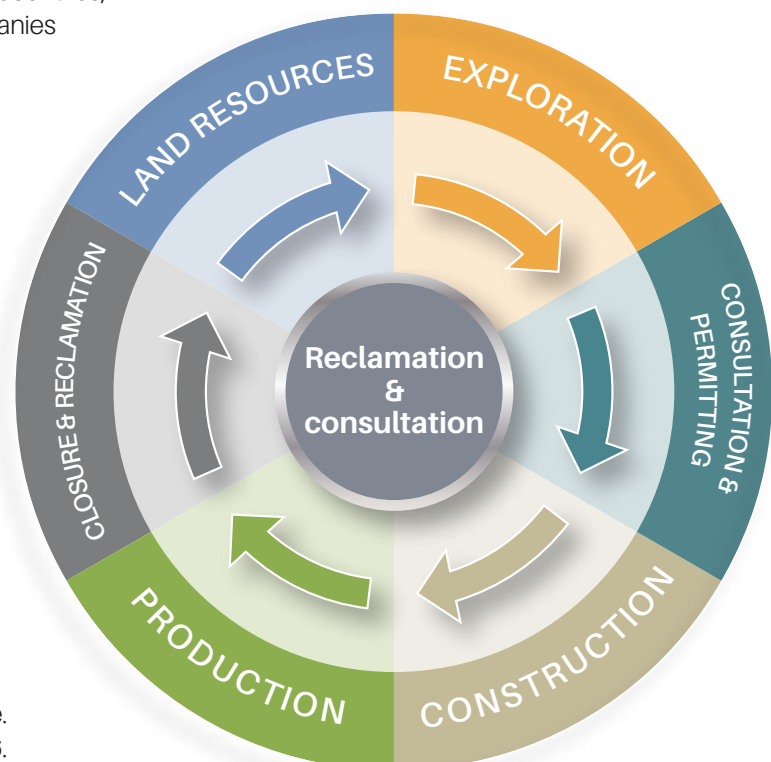


Figure 1 Mining life cycle.
BGS © UKRI 2026.

“Rising global demand for critical minerals, greener processing and responsible supply chains are creating openings for UK firms that supply engineering, mining, ESG, exploration and enabling technologies.”



Rehabilitated tailings storage facility (TSF 1), Coral Bay Nickel Corporation, Palawan, Philippines. BGS © UKRI 2026.

I Argentina

Opportunity 1: progressing lithium extraction technologies

Example: Watercycle Technologies

Direct lithium extraction and crystallisation (DLEC™) has the potential to boost production timelines, increase recoveries and unlock previously uneconomic resources.

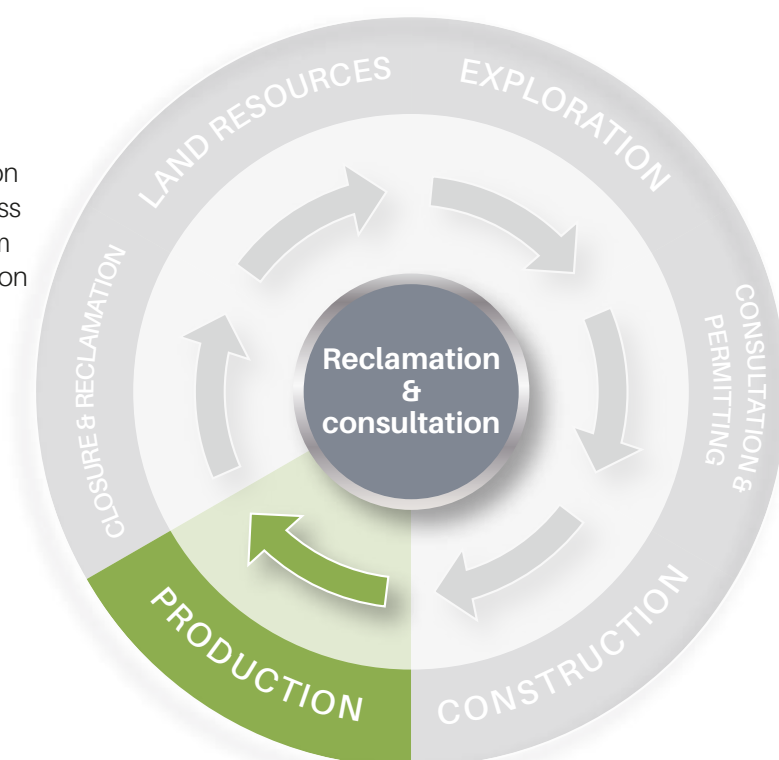
Argentina is rapidly expanding lithium brine production from salars to meet rising battery demand. Traditional evaporation methods are slow, land- and water-intensive and poorly suited to low-grade brines. Direct lithium extraction (DLE) technologies offer an alternative approach by extracting lithium directly from the brines and then re-injecting the lithium-depleted brine back into the salar.

These methods can increase recovery from dilute sources, shorten processing times and reduce land and brine use, and they are being explored for application to industrial waste water and recycling streams.

Watercycle Technologies (WT) is a University of Manchester spin-out developing a precipitation-based DLE system known as direct lithium extraction and crystallisation (DLEC™). The process is designed to selectively recover lithium from salar brines, concentrate the solution and crystallise lithium salts, with pilot-scale work reporting production of crystallised lithium in December 2023. The system integrates extraction, concentration and crystallisation modules and targets lithium recoveries above 95 per cent. Brine depleted in lithium can be re-injected, avoiding liquid waste discharge.

Reported energy use and associated emissions are substantially lower than those of many evaporation-based projects. The modular configuration is intended to allow deployment at a range of scales and can produce treated water as a by-product. With global lithium demand projected to rise significantly, potentially reaching around 3.8 Mt by 2035, WT represents one of several UK-based technology developers contributing to emerging DLE solutions for critical minerals supply chains.

SOURCE: WATERCYCLE TECHNOLOGIES 2026





Salinas Grandes salar, Jujuy and Salta provinces, Argentina. BGS © UKRI 2026.

Opportunity 2: mine waste management

Example: Paterson & Cooke

Reducing tailings risks for safer, lower-impact mining in the Andean environment.

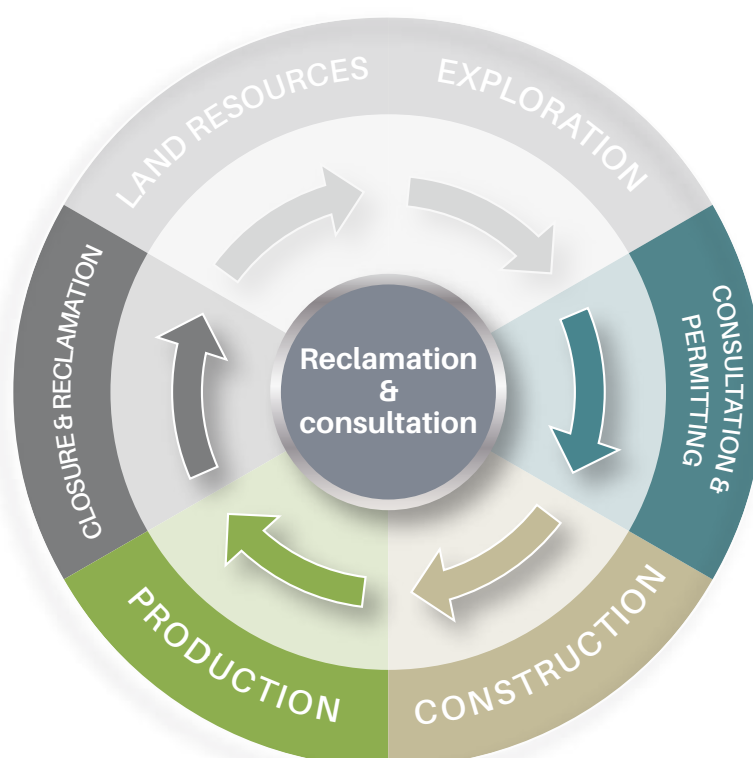
Rising demand for metals such as copper is driving increased exploration in the Argentinian Andes, with multiple advanced exploration-stage copper projects. No current exploration projects have yet moved to copper mining operations, but large-volume mine tailings from copper mining will require future management. Tailings dam failures remain a major environmental and social hazard, especially in topographically steep, seismic regions such as the Andes.

Paterson & Cooke (P&C) design filtered and paste tailings systems, an approach that can reduce water use and enable storage in compact, stackable forms. These systems can reduce the overall footprint of tailings and can be easily monitored compared with conventional slurry dams, making the system suited to the steep and earthquake-prone Andes terrain. P&C's work is supported by six laboratory facilities across the globe, including Cornwall and Chile,

that conduct sedimentation, thickening, filtration, rheology (deformation and flow) and flow-loop testing as part of individual project design.

P&C provide engineering services across the full project cycle, from early concept evaluation through to detailed design and commissioning. P&C contributed to feasibility studies, engineering and on-site commissioning in Poland, where the system was designed to transport and manage tailings over approximately 5 km. This work provides an example of UK-based technical input to large-scale tailings management infrastructure, particularly in regions prone to active seismicity.

SOURCE: PATERSON & COOKE UK LTD., 2026



“ Tailings dam failures remain a major environmental and social hazard in the Andes, making safer, lower-impact tailings systems essential for future copper developments.”



Cerro de los Siete Colores (Hill of Seven Colours),
Jujuy Province, Argentina. BGS © UKRI 2026.

Opportunity 3: low-energy, low-water copper processing

Example: Weir

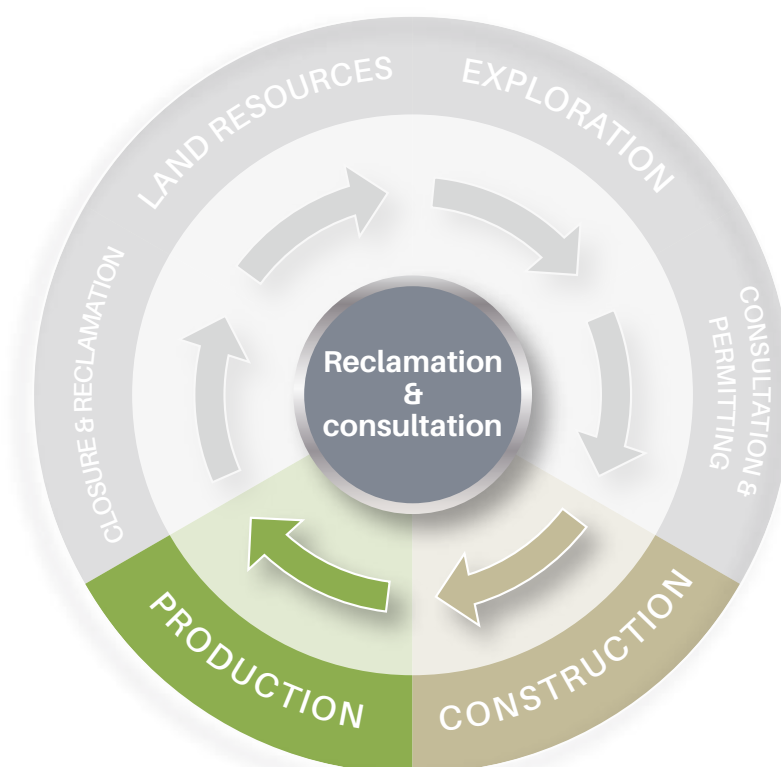
Enduron® high-pressure grinding roll (HPGR)-led technology can cut comminution power by up to 40 per cent, minimise water use and improve downstream performance.

Comminution is the process of grinding ore and it is typically the largest energy consumption at a mine site, accounting for approximately 25 per cent of total power demand. In power-constrained, greenfield Andean copper porphyry projects, such as those in Argentina, comminution efficiency is an important factor influencing project design and operating costs. These regions also face increasing pressure on water availability, making technologies that reduce water use in comminution particularly valuable.

Weir supplies mineral-processing technologies, including Enduron® HPGRs. Industry assessments reportedly indicate that HPGR circuits can reduce power consumption by up to 40 per cent and associated CO₂ emissions by up to 50 per cent,

compared to comparable conventional circuits. They also remove the need for grinding media and can operate with little to no additional water for fine grinding. HPGR-based circuits have been implemented at large projects, such as Fortescue's Iron Bridge magnetite development (Australia), providing an example of large-scale application. HPGRs have also been deployed in Argentina, where Weir Minerals supplied a KHD-licensed HPGR for Goldrock Mines' Lindero heap-leach gold project in Salta Province, demonstrating its applicability within the country.

SOURCE: WEIR GROUP PLC 2026, WEIR MINERALS (PRWEB RELEASE), 2013



Opportunity 4: data driven exploration for lithium brines and porphyry copper

Example: Viridien

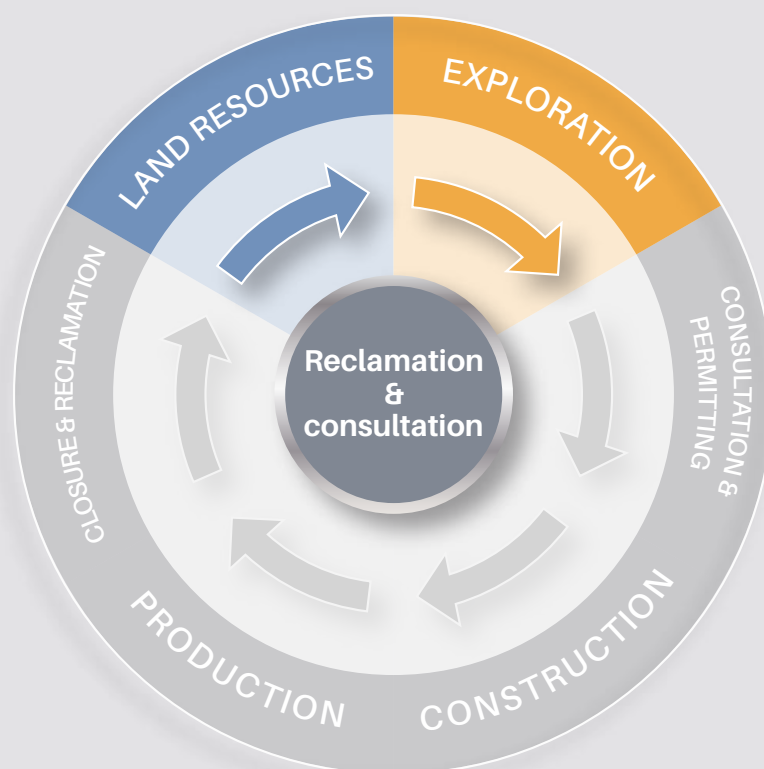
Making use of multiple datasets to screen and rank lithium and copper targets.

As exploration activity grows across Argentina and the Andean region, companies are making increased use of early-stage regional screening methods to assess large areas of prospective ground. Approaches commonly applied in these settings include satellite imagery, remote sensing datasets, airborne and ground geophysical surveys, laboratory analysis and the integration of geological and geophysical information into regional exploration models. These techniques are used to help identify areas with potential for commodities such as lithium, potash and porphyry copper.

potash and structural and satellite-based targeting for porphyry systems in northern Chile. The company uses global exploration databases alongside remote sensing and geophysical inputs to produce target areas and to support early-stage exploration decision making.

SOURCE: VIRIDIEN 2026

Viridien's Minerals & Mining group applies a mineral-systems framework and integrates multiple datasets as part of its exploration workflows. Examples of recent work include regional screening programmes in Argentina focused on lithium and



Opportunity 5: catchment-scale stewardship for lithium brines

Example: ERM

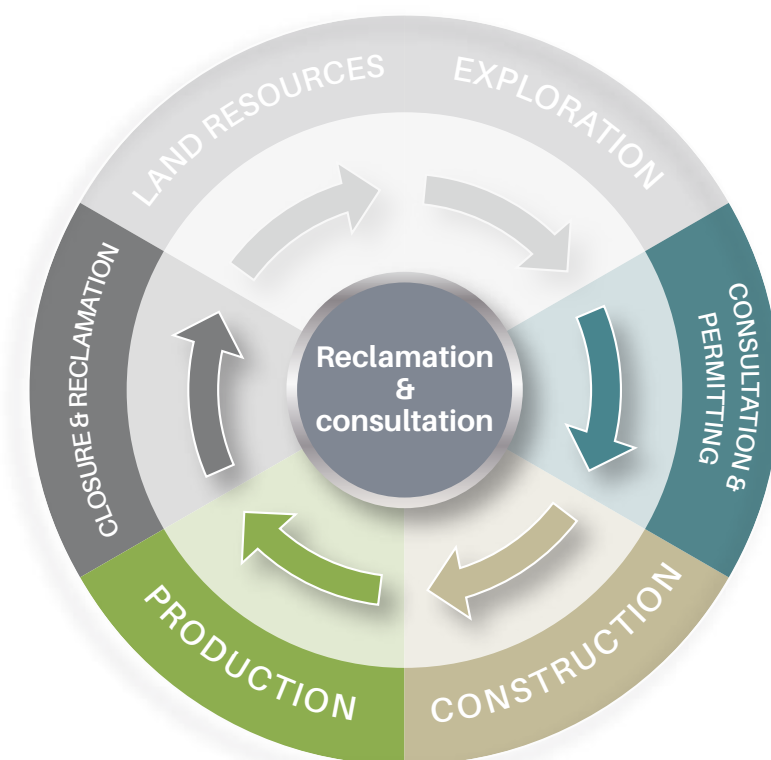
De-risking lithium brine projects through integrated water modelling.

Lithium brine developments in Jujuy, Salta and Catamarca are located in fragile high-Andean catchments, where brine extraction, freshwater abstraction and wetland health are closely linked to nearby communities and ecosystems. To address these environmental and hydrological considerations, ERM undertakes catchment-scale studies that draw on hydrological and hydrogeological baseline data. Their work typically includes the development of integrated water balance and groundwater models that represent brine and freshwater systems, estimate drawdown and recharge and evaluate a range of potential operational scenarios.

ERM also designs monitoring networks and prepares outputs for use in environmental and social impact assessments, water-management planning and

regulatory submissions. These studies are used by operators to support abstraction assessments and engagement with regulators and local communities. One example is ERM's 2011 Línea de Base Ambiental y Social — Salar del Hombre Muerto (Salta & Catamarca provinces), which has been used to inform subsequent environmental and social impact assessment processes for projects such as Sal de Vida (Argentina).

SOURCE: ERM 2026





Small-scale evaporation ponds at Salinas Grandes salar. Jujuy and Salta provinces, Argentina. BGS © UKRI 2026.

Philippines

Opportunity 1: sustainable nickel processing

Example: Altilium Group

Greener, zero-waste laterite processing to capture in-country value.

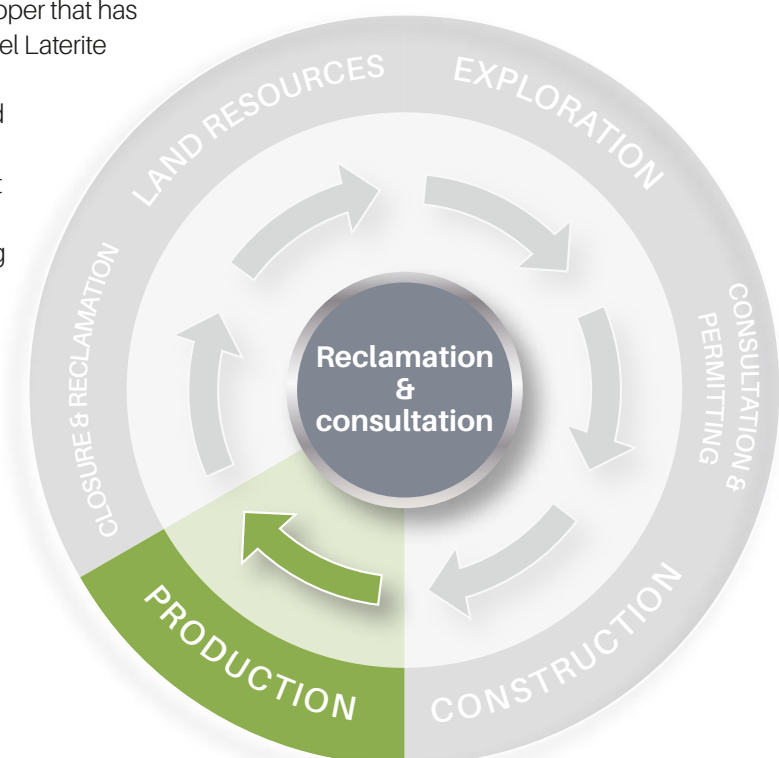
The Philippines is a major producer of nickel laterite ores, most of which are exported for processing overseas. Domestic plants use high-pressure acid leach (HPAL) technology, which dissolves nickel using acid at very high temperatures and pressures. While effective, HPAL plants are capital intensive and generate large volumes of tailings, creating environmental and permitting challenges in the country, where mines are widely dispersed and often located in areas exposed to multiple natural hazards. As the Philippines looks to expand domestic processing and retain more value in-country, there is increasing interest in lower-impact alternatives that can produce intermediate nickel-bearing products, which are used as inputs for battery-metal refining.

Altilium is a UK-based technology developer that has designed and patented the Altilium Nickel Laterite Process™, which treats the full laterite profile at near-atmospheric pressure and moderate temperatures. The process directly produces both nickel and cobalt sulfates, standard intermediate products for battery supply chains, while recycling almost all of the nitric acid used in leaching. Variations of the flowsheet have the potential to yield high-purity iron oxide (to over 97 per cent), alumina (to about 99.5 per cent) and rare earth elements, contributing to higher total metal recovery and reducing the

volume of waste to zero. The modular process is intended to support deployment at a range of scales.

The technology has progressed through pilot-scale and feasibility studies, including a licensing agreement with Queensland Pacific Metals for its TECH project in Australia. In the Philippines context, the Altilium Nickel Laterite Process™ has been discussed as a potential lower-pressure, lower-temperature alternative to existing HPAL technology.

SOURCE: ALTILIUM GROUP LTD 2026



“As the Philippines expands nickel production, there is increasing interest in lower-impact processing technologies that retain more value in-country while reducing environmental risks.”



Pineapple plantation at rehabilitated TSF 1, Coral Bay Nickel Corporation, Palawan, Philippines. BGS © UKRI 2026.

Opportunity 2: community engagement for Philippine mining

Example: Levin Sources

Timely, targeted and well-structured community engagement to strengthen social development and build trust in management programmes.

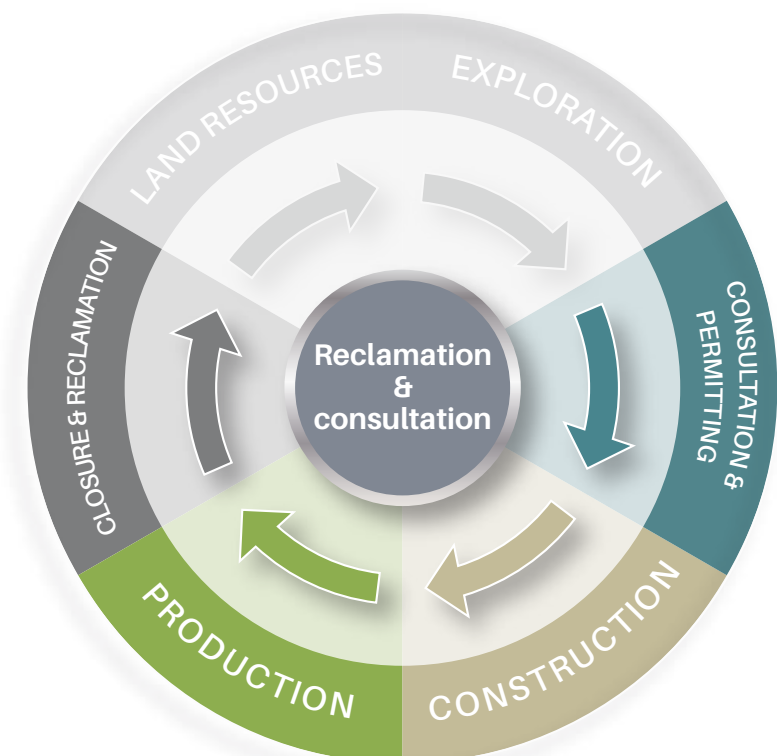
The Philippines embeds free, prior and informed consent (FPIC) in national law. Operators are also required to fund social development and management programmes (SDMP). However, implementation can be uneven, creating gaps in participation, documentation, oversight and long-term benefit. These issues can potentially be exacerbated by external corruption risks. Stronger civil society involvement and better monitoring could lift FPIC and SDMP effectiveness.

Levin Sources is a UK-based social venture and consultancy advising public and private actors on responsible mining and minerals value chains, mineral sector governance and stakeholder engagement. Its portfolio spans programme implementation and research on artisanal-scale mining (ASM) professionalisation and human rights-based community engagement.

In South-east Asia, this includes work on ASM integration into formal supply chains in the Philippines and Indonesia (planetGOLD; World Gold Council), analysis of illicit Philippine gold supply chains (UNIDO), research on mining-driven deforestation and FPIC-related accountability in Indonesia (Ford Foundation) and ASM community engagement in Myanmar.

These methodologies could be used to support more consistent FPIC implementation, strengthen mineral sector baseline data collection and interpretation, inform participatory SDMP design and improve the accessibility, accountability and transparency of grievance mechanisms linked to permitting and community benefit-sharing.

SOURCE: LEVIN SOURCES 2026



Opportunity 3: life-cycle assessment to decarbonise Philippine nickel supply

Example: Minviro

National and project-scale life-cycle assessments (LCAs) to reduce the carbon and environmental footprint of Philippine nickel supply chains.

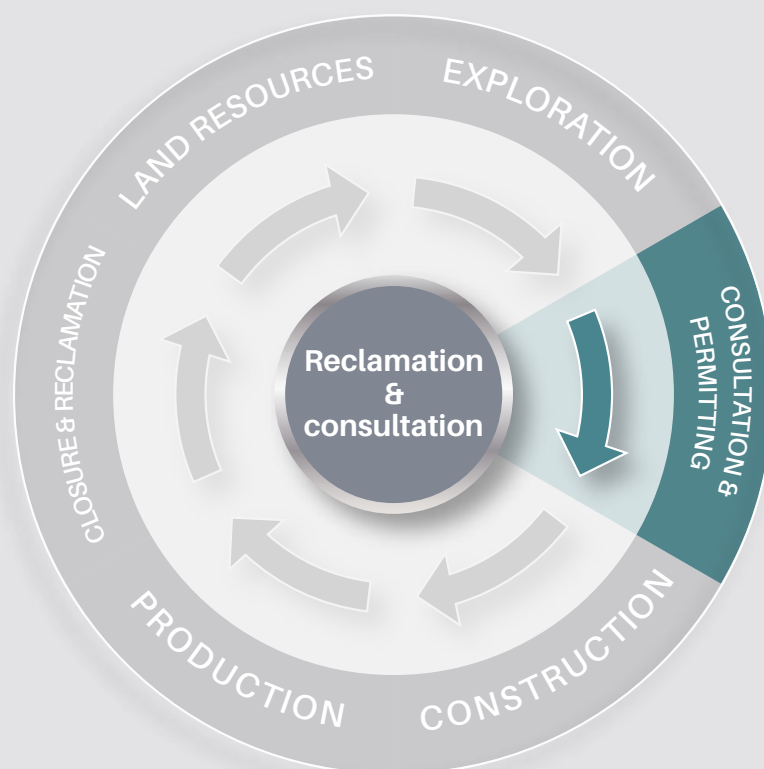
As the Philippines expands nickel production in response to the energy transition demand, there is increasing focus on understanding and quantifying environmental impacts. LCAs are one approach being used to evaluate environmental impacts across mining and processing routes for critical minerals.

Minviro is a consultancy that conducts LCAs for mineral and battery-material supply chains. The company has applied ISO-aligned life-cycle modelling to laterite-nickel operations in South-east Asia, including a study focused on Indonesian supply chains covering mining, rotary kiln-electric furnace smelting and nickel matte production. The assessment reports the main contributors to carbon emissions across these stages and evaluates a range of potential mitigation options, such as

renewable-power integration, fuel switching and combined operational measures, which could reduce emissions by up to 83 per cent.

The methods used in these assessments are applicable to Philippine laterite-nickel projects and could support national-level benchmarking or project-specific evaluations aimed at understanding the environmental footprint of emerging nickel developments, and map out pathways to impact avoidance and reduction.

SOURCE: MINVIRO 2026



Opportunity 4: biodiversity intelligence for responsible mining

Example: NatureMetrics

Environmental DNA (eDNA) intelligence for nature-smart mining.

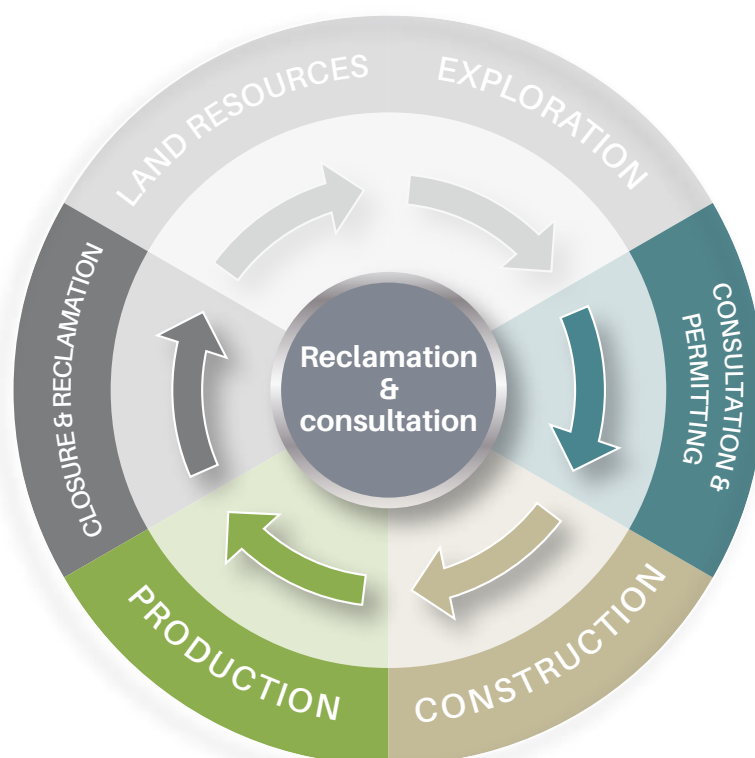
Biodiversity monitoring is becoming increasingly important for permitting, regulatory compliance and community trust. Emerging reporting frameworks, such as the Taskforce on Nature-related Financial Disclosures (TNFD) and the EU's Corporate Sustainability Reporting Directive (CSRD), require structured and auditable biodiversity data, prompting interest in monitoring approaches that are repeatable and scalable.

NatureMetrics analyses eDNA from water, soil and air to identify the species present. Its workflow combines field sampling kits, laboratory sequencing and a digital platform that collates site and multi-site biodiversity data. Mining companies have used eDNA monitoring to characterise ecological baselines, identify sensitive habitats, support

impact assessments and track changes in species composition.

NatureMetrics has also delivered work in the Philippines. Blue Finance used eDNA to assess coral-reef biodiversity in and around the Puerto Galera Marine Protected Area, generating high-resolution species data to track conservation outcomes against performance indicators. Applied to mining contexts, eDNA approaches could provide scalable biodiversity baselines aligned with TNFD and CSRD requirements and may reduce field effort and cost.

SOURCE: NATURE METRICS 2026





Cityscape of Manila, Philippines. BGS © UKRI 2026.

Opportunity 5: monitoring and governance for Philippine tailings facilities

Example: Insight Terra

Continuous monitoring for multi-hazard vulnerable tailings storage facilities (TSF).

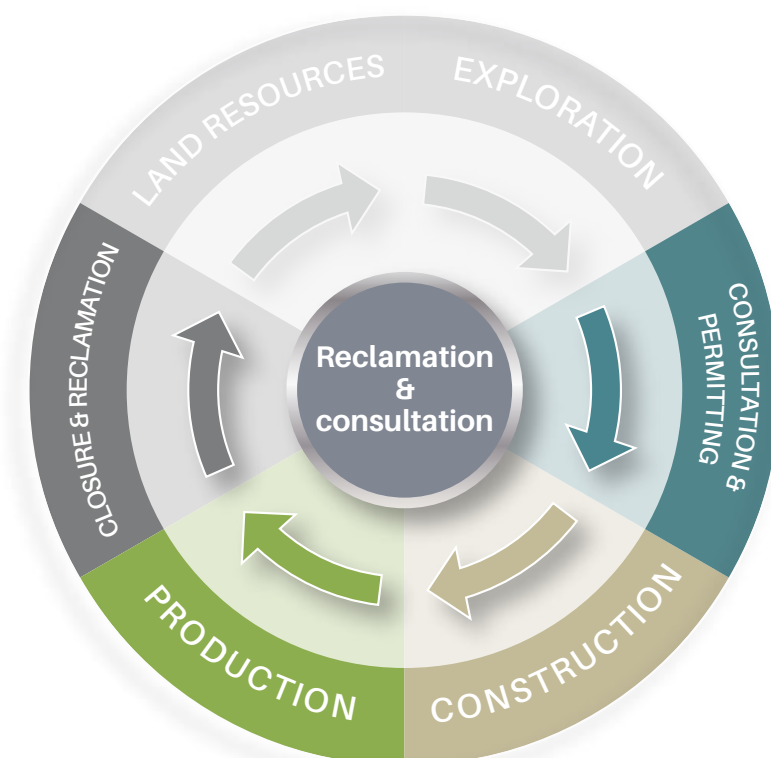
The Philippines' TSFs sit in a multi-hazard setting: earthquakes, typhoons and landslides increase failure risk and community exposure. Robust, auditable monitoring is essential for operators, regulators and local stakeholders. New standards such as the Global Industry Standard on Tailings Management (GISTM) are raising expectations for near-real-time oversight, traceable records and faster responses to anomalies at high-risk sites.

Insight Terra develops digital monitoring systems for TSFs through its cloud-based Insight Platform. The system integrates sensor networks, satellite imagery and secure data connections, which send information directly from on-site devices to the cloud, providing consolidated, near-real-time insights into TSF performance and stability.

This approach has been applied at Anglo American's El Soldado mine in Chile, where it supported

monitoring of a hydraulically dewatered stacking facility as part of the company's FutureSmart Mining™ programme. At El Soldado, the platform incorporated data from nine sensor types across more than 100 instruments and roughly 500 monitoring points, using a solar-powered edge unit and cloud-based data services. The platform displays time-series data, flags anomalies automatically and keeps records consistent with GISTM monitoring expectations. Systems of this type are relevant to and could be implemented in the Philippines, where transparent, structured monitoring and timely information flow are important for managing tailings-related risks.

SOURCE: INSIGHT TERRA 2026





Farming of fruit trees at rehabilitated TSF 1 at Coral Bay Nickel Corporation's site in Palawan, Philippines. BGS © UKRI 2026.

I Zambia

Opportunity 1: copper waste reprocessing and circular resource recovery

Example: Jubilee Metals Group

Reprocessing of legacy waste and shallow sub-economic ores, supported by a concentrator-refinery platform.

Many historical mining areas contain large volumes of legacy waste and low-grade ore that were previously uneconomic to process. Reprocessing these materials can recover metals already exposed by earlier mining, reduce new land disturbance, and, in some cases, shorten permitting compared with greenfield developments. For copper, using existing waste streams can increase local supply and limit environmental impacts linked to new pit development.

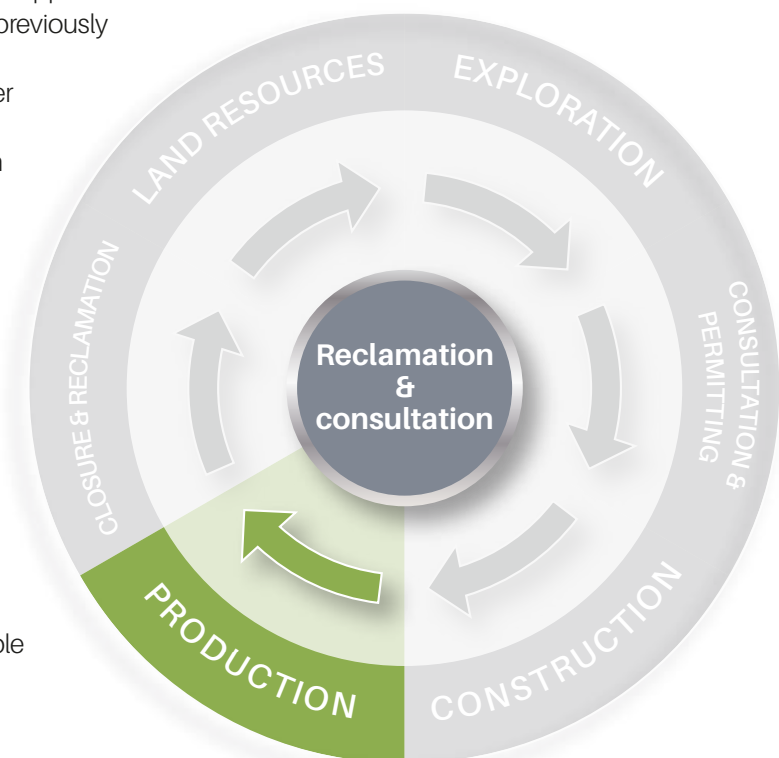
Jubilee Metals Group is advancing a copper-reprocessing programme in Zambia focused on sub-economic ore and historical waste. The Roan Copper Concentrator near Ndola, Copperbelt Province, processes waste, tailings and previously mined but unprocessed material, with work aimed at recovering the fine copper fraction that contributes significantly to processing losses. Alongside expansion of the Sable Refinery near Kabwe, Central Province, and treatment of surface stockpiles, the operations target production of about 25 000 tpa of copper. A Large Waste Project of roughly 240 Mt provides multi-year feedstock and options for modular plant deployment near the resource. Copper output increased from 568 t in Q4 (FY) 2024 to 2025 to 938 t in Q1 (FY) 2025 to 2026, with Roan supplying most feed to Sable.

Jubilee reports that the Roan facility, Sable expansion, Molefe open-pit operations and the Large Waste Project will raise

overall processing capacity. The company employs 417 permanent staff and 151 contractors, with (FY) 2024 to 2025 capital expenditure of around US\$20.8 million.

These developments highlight opportunities for UK businesses with expertise in environmental technologies, remediation, process engineering, specialist plant design and advanced process-control systems.

SOURCE: JUBILEE METALS GROUP PLC 2026



“ Re-processing legacy waste and previously sub-economic ores can increase local copper supply while reducing the environmental footprint associated with new pit development.”



Cobalt ore. BGS © UKRI 2026.

Opportunity 2: new copper project and long-life supply potential for battery metals

Example: Moxico Resources

Recovery of copper from waste and stockpiles by scaling a proven leaching-based solvent-extraction/electrowinning (SX/EW) processing methods.

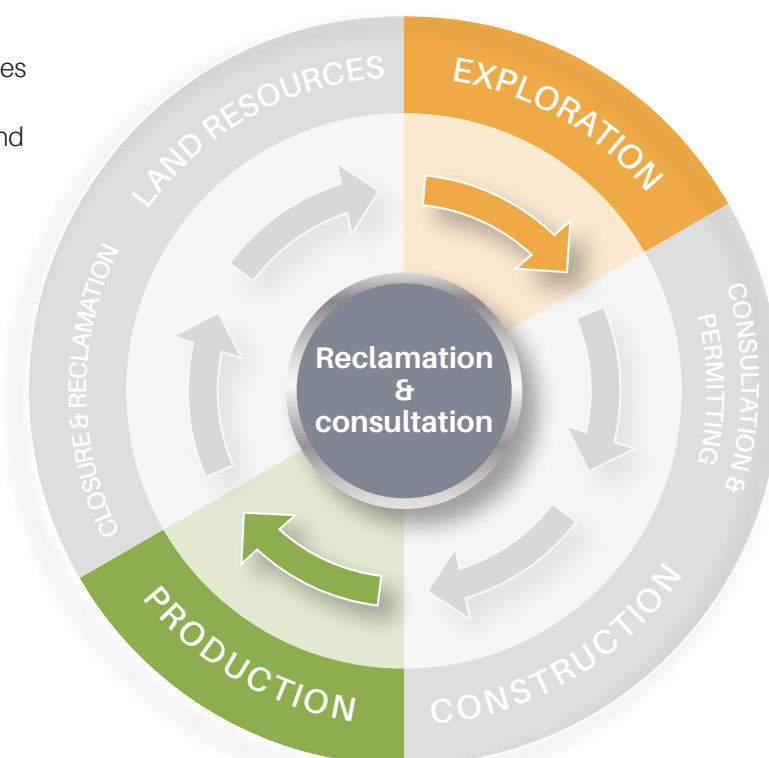
Many copper projects seek to recover value from in situ ore and surface stockpiles that were previously uneconomic. Heap-leaching and other hydrometallurgical processes, such as SX/EW, use an electrochemical process to produce high-quality copper cathodes, the metal sheets that are then ready for sale. These methods require lower upfront capital requirements and shorter construction times than traditional smelting routes. Re-processing stockpiles can also reduce the need for additional land disturbance and may shorten permitting timelines, providing near-term copper supply in countries aiming to expand production. These approaches also offer a pathway to near-term copper supply in countries seeking to expand production, creating demand for expertise in process engineering, specialist plant design, hydrometallurgical systems and advanced process-control technologies.

Moxico Resources operates three licences near Chingola (Mimbula 92.5 per cent ownership, Luano OB18 92.5 per cent and Zuka 100 per cent), combining material from in situ ore and existing stockpiles. Phase 1, based on heap-leach and SX/EW processing, has produced approximately 10 000 tpa of London Metal Exchange Grade A (99.99 per cent) cathode since December

2022. Phase 2 involves construction of a 46 000 tpa agitated-leach and SX/EW circuit to bring total capacity to 56 000 tpa. Early works are underway with 80 additional electrowinning cells increasing capacity to roughly 20 000 tpa in January 2024, Full Phase 2 commissioning is ongoing.

A March 2024 mineral resource estimate of 76.4 Mt at 1.07 per cent copper, together with 7.6 Mt at 1.19 per cent copper in surface stockpiles, supports an estimated operating life of around 13 years at a production rate of 56 000 tpa. A potential Phase 3, focused on cobalt recovery, is under consideration as a future processing option.

SOURCE: MOXICO RESOURCES PLC 2026





Copper ore. BGS © UKRI 2026.

Opportunity 3: responsible supply chains for gemstones

Example: Gemfields

Market-leading emerald and ruby production paired with London auction channels for responsible mining.

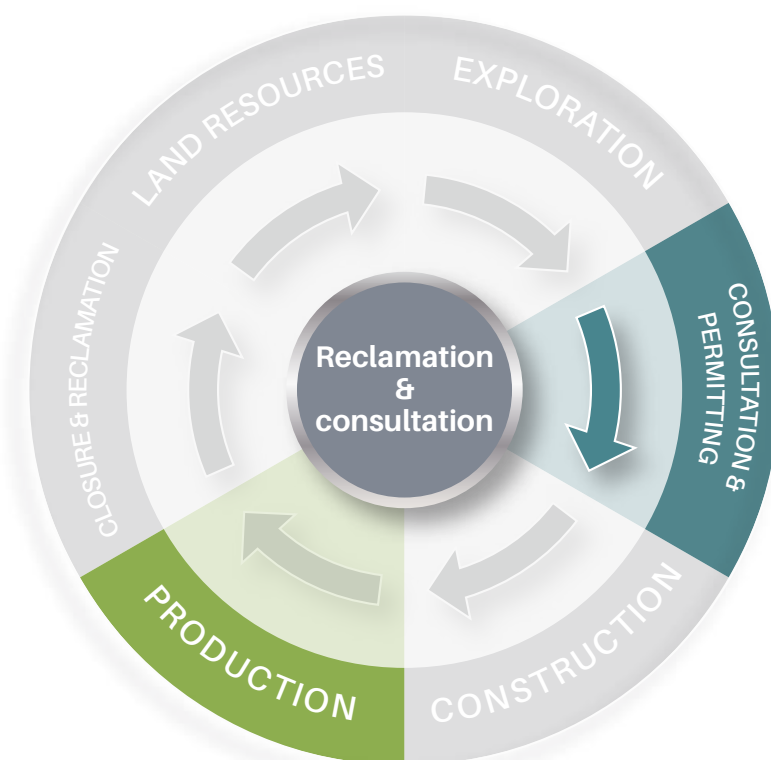
The coloured-gemstone sector places increasing emphasis on provenance, transparency and verified supply chains. Buyers and downstream companies often seek evidence of traceable origins and compliance with environmental and social standards, raising expectations for auditable production practices and visible benefits for host countries.

Gemfields operates the Kagem emerald mine in Zambia, responsible for about 25 per cent of global emerald supply and held 75 per cent by the company. Gemfields also holds a 75 per cent stake in the Montepuez ruby mine in Mozambique, one of the world's largest ruby sources. The company sells gemstones through auctions hosted in London; in 2024, Kagem's emerald auctions generated approximately US\$78.7 million. Kagem employs around 1334 people in Zambia, 93 per cent of whom are Zambian nationals. Gemfields' UK office oversees corporate governance, marketing and auction activities.

The group reports adherence to ISO-certified environmental and safety standards and supports education, health and conservation initiatives around its operations. Gemfields' 'G-Factor' indicator estimates that 19 to 24 per cent of group revenue is returned to host governments through taxes and royalties.

This creates a clear opportunity for UK firms specialising in mineral traceability, provenance systems, responsible mining audits, transparency monitoring and ESG advisory services to help strengthen transparency-driven supply chains in Zambia's emerging critical-minerals sector.

SOURCE: GEMFIELDS 2026



Opportunity 4: discovery upside in copper and battery metals

Example: Galileo Resources

Modern geophysics and focused drilling across iron-oxide-copper-gold (IOCG) and Copperbelt targets delivering new copper, silver and battery-metal prospects.

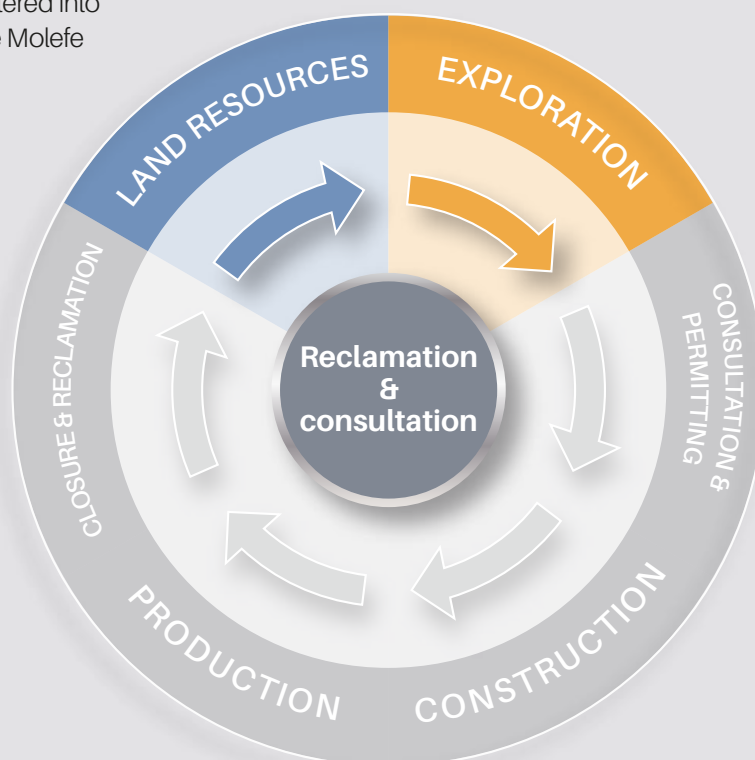
Many deposits in Zambia's Copperbelt are at a stage where targeted exploration and small-scale development can rapidly turn resources into supply. Areas with IOCG signatures or geology similar to the Democratic Republic of the Congo's Kamoa-Kakula belt, an area with one of the world's most significant high-grade copper ore resources, are especially attractive. Such areas may host multiple, large-scale mineral deposits where early drilling and local partnerships are a cost-effective way to de-risk prospects and unlock regional growth.

Galileo Resources is progressing Copperbelt and IOCG targets with near-term development potential. At Luansobe, near Mufulira, an early Joint Ore Reserves Committee-inferred resource outlines approximately 5.8 Mt at 1.0 per cent copper for an open-pit concept and a further 6.3 Mt at 1.2 per cent copper at depth, providing a basis for staged evaluation. In November 2025, Galileo entered into a collaboration with Jubilee Metals on the Molefe Copper Mine, allowing Galileo to earn up to 23.75 per cent project interest

by funding US\$700 000 of work; Jubilee retains 71.25 per cent, with 5 per cent held locally.

UK businesses have opportunities to support Zambia's emerging critical mineral prospects through the provision of advanced exploration methods, targeted drilling technologies and geological consultancy. Areas with IOCG signatures or Kamoa-Kakula-style geology offer strong prospects for early-stage partnerships, where UK expertise in resource evaluation, joint-venture structuring and project financing can help de-risk exploration. In addition, UK suppliers of drilling equipment, modular processing units and ESG or responsible mining advisory services are well positioned to assist companies as they progress critical mineral projects.

SOURCE: GALILEO RESOURCES PLC 2026



Opportunity 5: large-scale production and smelter modernisation

Example: Vedanta

World-class grades and major smelter refurbishment to lift output through the 2030s.

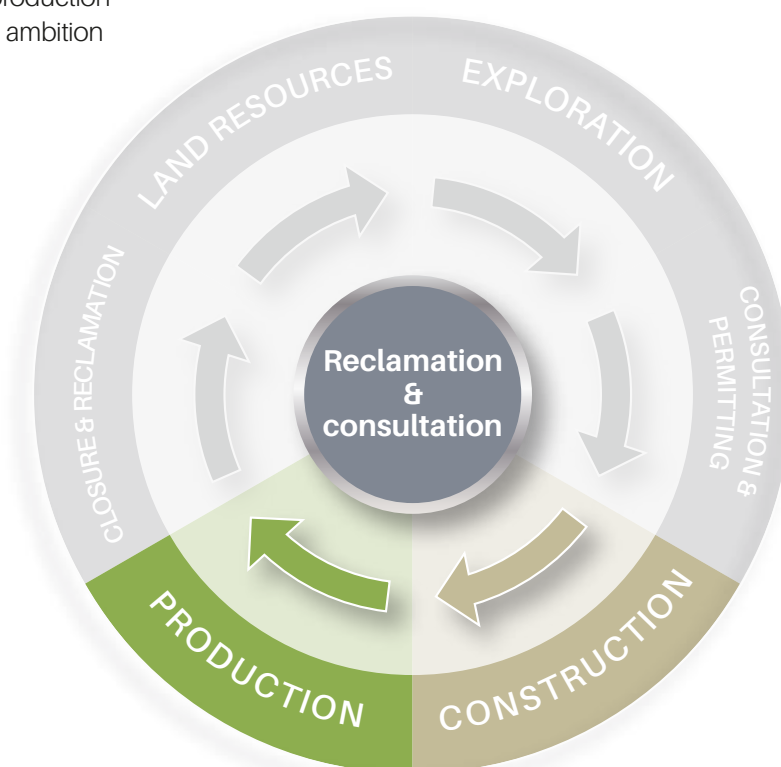
Global copper demand is expected to rise as electrification and clean-energy systems expand, increasing pressure to bring additional supply into production. In this context, higher-grade projects that are already at an advanced stage of evaluation or permitting may be developed more quickly and with lower upfront capital requirements than entirely new greenfield projects.

Vedanta holds a 79.4 per cent interest in Konkola Copper Mines (KCM) and has announced an investment programme of more than US\$400 million, including roughly US\$250 million for debt clearance and around US\$124 million for underground development. The plan focuses on accessing a high-grade resource, reported at approximately 16 Mt of copper at an average grade of about 2.3 per cent, together with an estimated 412 kt of contained cobalt in reserves and resources. KCM is also undertaking a smelter upgrade, targeting a potential ramp-up toward around 300 000 tpa of copper production in the early 2030s, supporting Zambia's ambition

to become a top global copper producer. The programme is managed through Vedanta's London headquarters.

Vedanta's investment programme at KCM is reinforced by the group's wider technology-forward ethos, which places digital transformation, automation and data-driven decision making at the centre of its mining strategy. As KCM prioritises advanced underground development and a modernised smelter complex, there is strong potential for UK businesses with capabilities in digital mining systems, automation, analytics, underground mining equipment, emissions-monitoring solutions, smelter-control technologies and ESG advisory services to support these upgrades.

SOURCE: VEDANTA LTD 2026





Zebras grazing in Zambia. BGS © UKRI 2026.

Multi-country companies

Example: Rio Tinto

Exploration and mining.

Metals such as copper, lithium, aluminium and iron ore are critical to electrification, renewable-energy systems, transport and infrastructure, and demand for these materials is projected to increase. Mining companies operating in this context face growing expectations regarding environmental management, community engagement and long-term benefits for host regions, alongside the need to reduce emissions and improve operational efficiency.

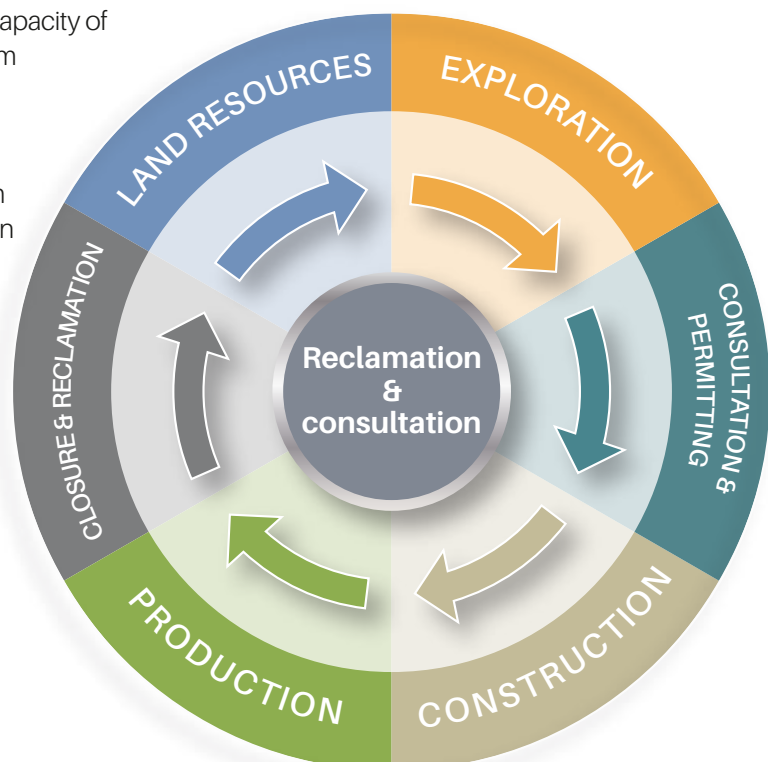
Rio Tinto is one of the world's largest diversified mining groups, headquartered in London, UK, with operations in over 35 countries. The company supplies a broad range of metals and minerals, including iron ore, aluminium, copper, lithium and industrial minerals. Rio Tinto combines large-scale mining, processing, transport and technology systems to deliver materials to global markets.

In Argentina, Rio Tinto is heavily expanding its presence in the lithium sector. At the Rincon Lithium Project in Salta Province, the company plans to invest about US\$2.5 billion to reach a targeted capacity of roughly 60 000 tpa of battery-grade lithium carbonate, using direct lithium extraction technologies intended to improve water management and reduce waste streams. The starter plant produced the first lithium concentrate in late 2024, with construction of the expanded plant expected to begin in mid-late 2025 but has not yet been confirmed as underway. Rio Tinto also operates the Fénix facility at Salar del Hombre Muerto (Argentina), producing lithium carbonate using proprietary extraction processes and the company has recently acquired other advanced-stage projects within the salar.

Rio Tinto is conducting early-stage exploration in Zambia across four areas: Mwinilunga, Greater Kalindi, the Solwezi Dome and the Mufulira Basin, focused on identifying new copper and base-metal resources through joint ventures. The company operates from Lusaka with a field base in Solwezi.

Rio Tinto does not currently have active mining operations in the Philippines and its local entity was reported as dormant in 2023. However, the company's global production and supply chains serve Asian markets and its technologies, capital and experience in lithium, copper and industrial minerals could become relevant if future opportunities emerge as the Philippines develops its critical-mineral sector.

SOURCE: RIO TINTO 2026





José Rizal Monument, Rizal Park,
Manila, Philippines. BGS © UKRI 2026.

Example: Pact

Community, ESG and responsible mining.

ASM supplies essential metals and gemstones but is often informal, low-profit and associated with increased safety, environmental and social risks, from mercury use through child labour to insecure land rights. Rather than exclude artisanal miners, there is a practical opportunity to formalise and professionalise the sector so it delivers steady livelihoods, safer working conditions and a traceable, lower-risk supply chain for global markets.

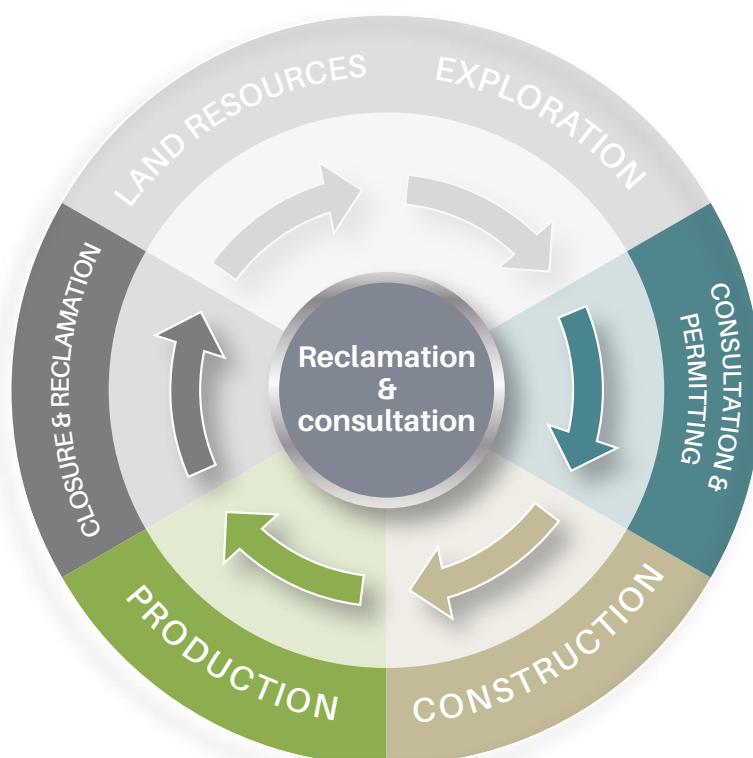
Pact is an international non-government organisations that works with communities, governments and companies on ASM governance and supply-chain development. Through its long-running 'Mines to Markets' approach, Pact supports efforts to improve safety, reduce mercury use, strengthen women's economic participation, prevent child labour and enhance local governance. Its programmes also include work on traceability systems, due diligence tools, formalisation pathways and market access. The approach is designed to operate at both site and national scales and has been applied across multiple regions.

In Zambia, Pact implemented a multi-year project addressing child labour in the Central and Copperbelt provinces, working with communities and partners to

remove children from mines and support their return to education. Pact's global traceability work (including a decade-long International Tin Supply Chain Initiative in central Africa) and its partnerships with standards and market actors strengthen auditable mineral supply chains. Pact also applies its ASM and just-transition work across Asia and South America, drawing on regional pilots and policy engagement to inform national action.

For the UK, Pact's activities create demand for exportable expertise, including traceability software, independent verification, advisory services, training and gender-sensitive health and safety curricula. These contributions support the development of ASM supply chains that are safer, legally recognised and suitable for participation in formal mineral markets.

SOURCE: PACT LTD 2026



Example: Knight Piésold

Tailings and engineering.

Mining and infrastructure projects face growing pressure to be safe, sustainable and socially responsible. Poorly designed tailings, water or civil infrastructure can cause environmental damage, operational delays and community conflict. Independent engineering and environmental expertise is therefore essential to manage risk, meet international standards and unlock economic value while protecting people and the environment.

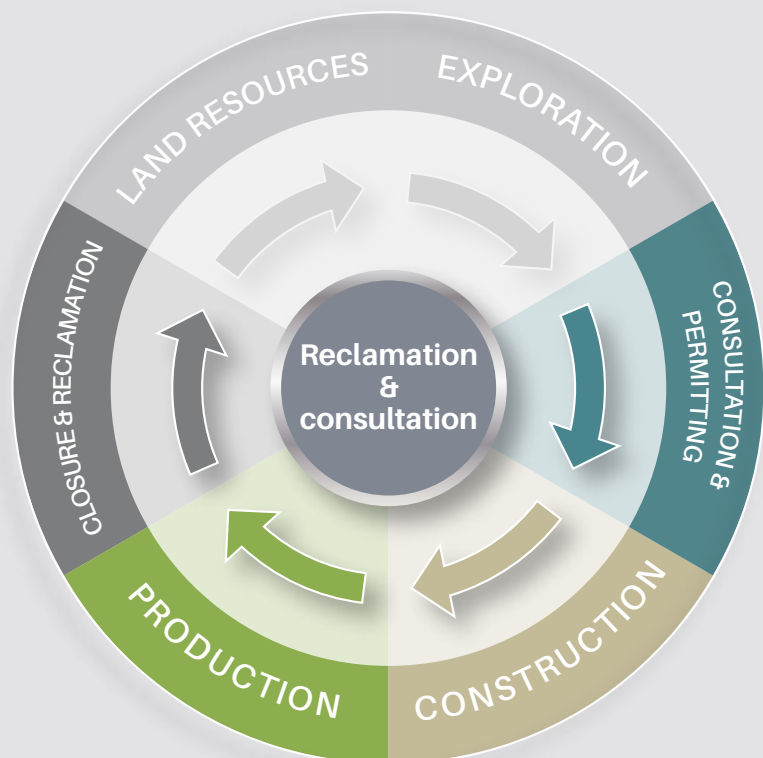
Knight Piésold is an employee-owned engineering and environmental consultancy with a UK-based office, providing services across the full project life cycle. Capabilities include engineers, environmental scientists and geoscientists working on tailings and waste management, water balance and hydrogeology, geotechnical engineering, environmental and social assessment, and related infrastructure.

Knight Piésold Zambia provides engineering and environmental support for tailings storage facilities, including design, capacity increases, rehabilitation, buttress construction and closure planning. Key projects include Muntimpa 5, TD10, and TD11 in the Copperbelt. Their work helps mines manage tailings safely, meet regulatory standards and address long-term environmental and operational risks.

At the Los Azules copper project in Argentina, Knight Piésold has led geotechnical investigations, feasibility-level engineering and environmental studies. Their work included drilling more than 12 000 m, excavating over 300 test pits, designing heap leach pads, waste dumps, and stockpiles, and developing water management and closure plans. This work helps ensure geotechnical stability, environmental compliance and safe, efficient development progress of one of Argentina's major copper resources.

For the Casecnan hydroelectric project in the Philippines, Knight Piésold developed a 150 MW run-of-river scheme to optimise power generation and water management. Their role included geotechnical mapping, hydrogeological assessment, tunnel and powerhouse design, and construction quality assurance. The work helped reduce flooding risks, improved project feasibility for private investment and supported implementation of a complex water and energy infrastructure project.

SOURCE: KNIGHT PIÉSOLD LTD 2026

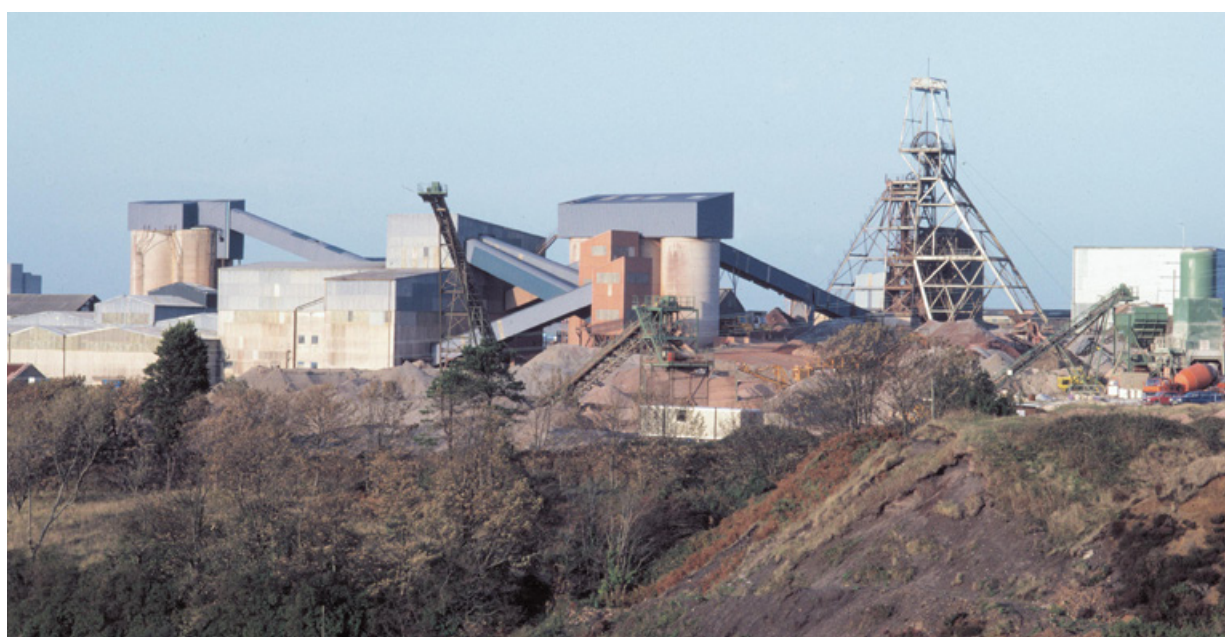


UK expertise across geoscience, critical minerals and industry

The UK has strong expertise in the critical minerals and technology metals needed for the energy transition and clean transport. BGS is a forerunner with over 15 years of research spanning mineral deposits, commodity markets and the circular economy. BGS hosts the UK Critical Minerals Intelligence Centre (CMIC), which conducts the UK's criticality assessments as one part of its main work and provides high-resolution data, market monitoring and intelligence on global mineral stocks, supply risks, ESG factors and circular-economy opportunities. BGS also collaborates with academic institutions such as the Camborne School of Mines, which leads research on critical-mineral deposits, low-impact processing and tailings remediation and re-processing in long-standing partnership with BGS. The University of Leicester and Imperial College London have also produced spin-outs, such as DesCycle, which is pioneering novel solvents for metal recovery. Additionally, BGS collaborates with

the National Oceanography Centre on marine mineral deposits.

Complementing this, the UK's wider industrial and financial ecosystem provides further internationally recognised expertise across and beyond the mining life cycle: Metso (formerly Metso Outotec) maintains a strong UK presence in mineral processing technologies; JCB provides world-class off-highway equipment; WSP brings engineering and environmental consulting capability, and The London Metal Exchange (LME) is a leading platform for global metals trading and price discovery. Together, these institutions and firms show a UK offer that spans geoscience intelligence, responsible mining innovation, advanced manufacturing, engineering consultancy and tier-one capital markets. These capabilities position the UK to partner with countries across the full value chain.



South Crofty Mine. The mill and Crooks Kitchen Shaft, Cornwall (P213305). BGS © UKRI 2026.

Summary

The study across Zambia, Argentina and the Philippines highlights a shared objective: identifying practical opportunities where UK expertise can support responsible, resilient and economically beneficial critical-mineral development. The report brings together country-specific opportunities, multi-country insights and UK capabilities into a single deliverable aimed at guiding government and industry engagement.

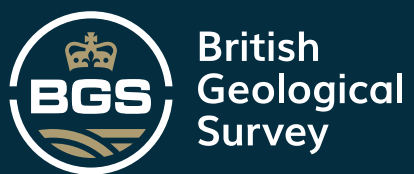
Across all three countries, several common challenge areas emerge despite their differing geological settings, institutional frameworks and stages of sector maturity. These include the need to de-risk early exploration in under-mapped or frontier regions, address power and water constraints that shape project feasibility and strengthen ESG performance in areas such as community engagement, biodiversity, tailings safety and climate-aligned operations. These common pressure points also represent shared opportunities for targeted UK engagement.

When viewed through the mining life-cycle lens, the identified opportunities and challenges span every stage, from early exploration and resource definition to project development, construction, production,

closure and long-term monitoring. This reinforces that UK expertise is not limited to a single phase: the UK can contribute geoscience, engineering, environmental, social, processing and governance capabilities along the entire life cycle, enabling more responsible outcomes and better de-risked investments.

Looking ahead, the combination of country-specific opportunities and the breadth of UK technical, scientific, industrial and financial strengths position the UK to play a meaningful role in supporting responsible mineral development internationally. By engaging across each step of the mining life cycle, the UK can help partner countries create value, strengthen governance and environmental performance, and expand global critical-mineral supply chains in ways that advance both local development and UK strategic interests.

“ Together, UK institutions and firms showcase an offer that spans geoscience intelligence, responsible mining innovation, advanced manufacturing, engineering consultancy and tier-one capital markets.”



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