BRIEF

Health Impact Assessment of a Lithium Mining and Processing Operation in Bikita District, Zimbabwe[1]

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AFRICAN EXTRACTIVISM & THE GREEN TRANSITION

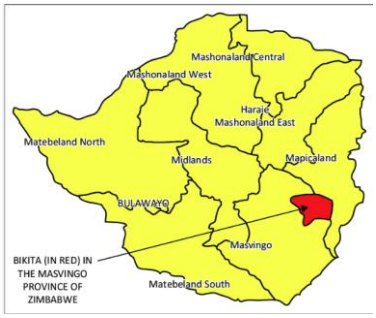
Key Messages

Health impact assessment (HIA) is an internationally recognised method to assess health impacts and recommend improvements to economic activities and policies. This concurrent HIA examined three elements of Bikita Minerals' lithium operation in Bikita District, Masvingo Province:

a. Open-pit lithium ore extraction.
b. Lithium ore processing.
c. Waste disposal, tailings slime dam management and water access.

The mine employs about 1 000 people, with 20 000 residents in the area affected by its processes. Three impacts were rated as highly significant:

a. Silicosis and other chronic lung disease in workers;
b. Tuberculosis (TB) in workers, where HIV infection and living conditions also contribute;
c. The loss of nearby safe water due to groundwater seepage for those living near tailing dams, and water abstraction, raising risks of violence of women and girls walking for water.



Mine location in Bikita district (in red), Zimbabwe Source: Authors, 2026

Further prioritised impacts include: community respiratory illness from dust emissions exceeding safe limits; loss of downstream water availability from water abstraction; chronic diseases from metal (cadmium, lead, arsenic) or acid water contamination; gastrointestinal disease from tailings and waste seepage into shallow wells. The operation brings benefits for employment and income, that may not reach the women, children and villages affected by harms to health.

The health impacts are preventable if measures are built into the mine operation, including:

i. Dust management (in transport, crushing, conveying) backed by dust monitoring
ii. Published monitoring and enforceable caps on water abstraction tied to dam levels;
iii. Mine water recycling, lining and audit of slime dam; seepage monitoring wells around waste sites; protected water for affected households and testing dam, river and well water
iv. Annual lung health and TB screening for all workers and within 3km

The Policy Context

Bikita Minerals, owned by Sinomine Resource Group, is a hard-rock lithium operation working one of the largest pegmatite lithium deposits (1), with a processing plant commissioned in 2023 after Zimbabwe's 2022 restriction on raw lithium exports. The primary impact zone covers five wards of Bikita District, while the Matezva dam downstream impact extends into Zaka, Gutu and Masvingo Districts. While the Constitution protects rights to health, safe water and environments, local communities have raised concern about dust, water and fencing of water points (2,3). The mine is regulated by the Ministry of Mines and Mining Development (MMMD), the Environmental Management Agency (EMA), the Zimbabwe National Water Authority (ZINWA) and Bikita Rural District Council (BRDC) while the Public Health Act [CH15:17] mandates HIAs.

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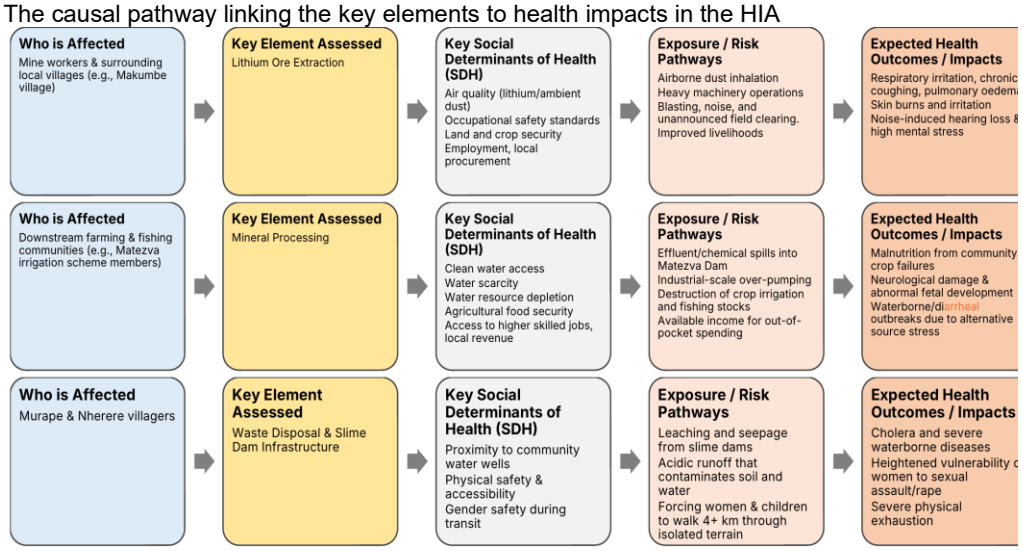
The Health Impact Assessment

With the mine already in process, this concurrent HIA, implemented between July and October 2026 during the 2026 EQUINET regional training programme on HIA, used an internationally recognised method: screening to identify causal pathways and focus of the HIA; scoping to identify the sources and forms of evidence; a profiling and assessment stage to identify the direction, magnitude, severity, likelihood and on this basis the significance of the health impacts assessed; and the setting of recommendations for significant impacts; and steps to report and communicate the HIA and propose areas for monitoring impacts and of implementation of the recommendations. From the screening and scoping stages, the HIA focused on three key elements:

a. Open-pit lithium ore extraction.
b. Lithium ore processing.
c. Waste disposal, tailings slime dam management and water access.

A causal pathway shown in the figure adjacent was developed from background information and used as a framework for data collection The assessment drew evidence from a desk review of routine 2025 district health data, 2022 census data, peer-reviewed and technical literature, mine HIAs in the region (4,5); civil society reporting (3) and interviews with two local leaders (KI1 and KI2) in September 2026. Informants gave verbal informed consent and are anonymised. Community assertions are reported as community accounts. Triangulating from multiple sources of evidence gives reasonable confidence in the findings.

The causal pathway linking the key elements to health impacts in the HIA



Findings of the HIA on health impacts

The HIA pointed to health impacts for the pathways in each of the three areas assessed. It found significant negative health impacts across all three elements, alongside positive impacts from employment and revenue. The most significant impacts are summarised below.

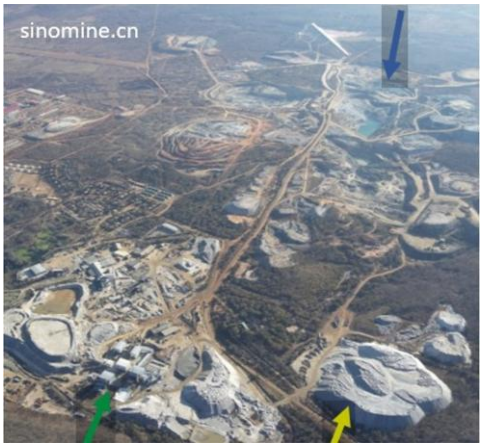
Firstly, in relation to **lithium ore extraction,** blasting, drilling and haulage generate dust as a highly significant impact, that, based on comparable quarry monitoring, is likely to exceed legal limits within about 3 km downwind, affecting about 6,000 residents of Makumbe and surrounding villages in Wards 11, 23, 30 and 32 and over 1,000 miners over a 20-year life of mine (6). Baseline moderate acute respiratory infection is already 1 811/ 10 000 children under five and 1 787/10 000 in people aged five and over (5. Silicosis and chronic obstructive lung disease cause permanent lung damage, disability and premature death (8). Respirable crystalline silica from drilling and crushing also reactivates TB, with a TB burden three times higher in mineworkers (9). Men made up 79% of Bikita's 170 TB notifications in 2025 (7), and 1 000 miners and 1 400 men in surrounding communities are thus at risk. *If it settles that thick on solar panels, imagine what our children and elderly are breathing into their lungs*. (KI,2026)



Open-pit ore extraction at Bikita Minerals. Source: CNRG, 2024.

Secondly, in relation to **mineral processing:** spodumene processing uses about 40 m³ of fresh water per tonne of lithium carbonate equivalent (a global life-cycle estimate) (10), drawn from Matezva Dam. Dry-season over-pumping could reduce domestic supply for about 24 000 downstream farming and fishing residents, including about 3 700 children under five, raising the risk of diarrhoea and acute malnutrition (11). Diarrhoea incidence in Bikita is 263 per 10,000 overall and 593 per 10,000 in children under five (7). Chemical effluent from flotation and refining could, if it contaminates water, cause neurological and renal damage and abnormal foetal development (8,12). Both impacts, while of medium significance, are potentially severe.

Thirdly there are is highly significant impacts in relation **waste disposal and slime dams.** Seepage and acidic leaching from unlined slime dams and tailings dumps within 1,000 m of water sources threaten about 6,000 villagers of Murape and Nherere. This includes 930 children, where diarrhoeal and gastrointestinal disease and skin conditions are already at 1 160/ 10 000 children under five (7). The fencing of clean water sources near the tailings dams forces women and girls to walk long distances through isolated terrain, exposing women of childbearing age, adolescent girls and female-headed households to exhaustion, stress and the risk of harassment and sexual assault (2,3) *When the mine fenced off clean water boreholes near the tailings dumps, women were forced to walk over 4 kilometres into isolated brush to find water.* (KI, 2026).



Processing plant (green arrow), ore stockpile (yellow) and tailings (blue). Source: sinomine.cn 2026

The challenges identified did not affect all the residents evenly. The HIA indicates that the most affected groups are mineworkers, largely male; communities in surrounding villages, especially women and children; and farming and fishing communities downstream of the mine.

Recommendations from the HIA

Based on the findings, actions are recommended to mitigate the most significant health impacts and to close the evidence gaps. The cost of inaction is continued unmeasured exposure, preventable chronic disease and unresolved community complaints, with reputational and licensing risk for the mine.

As high priority, immediate actions, the HIA recommends that:

a. Bikita Minerals implements a dust management plan (water suppression on haul roads and blast areas, covered ore transport, enclosed crushing and conveying). This can be done after a 3-to-6-month baseline dust test at villages and a comparison site, with continuous PM2.5 and PM10 monitors at the fence line, Makumbe and adjacent villages that is reported quarterly and publicly, and enforced by EMA.

b. NSSA and the MoHCC enforce respirator use and provide annual spirometry, chest X-ray and TB screening for all workers, including contractors, and extend community TB screening within 3 km of the mine.

c. Bikita Minerals, with BRDC and GBV response services restore access to fenced-off boreholes or builds protected water sources within 500 m of homes in Murape and Nherere, and puts safety and referral measures in place for women and girls.

d. MoHCC, EMA and ZINWA carry out joint quarterly testing of the dam, river and well water for lithium, lead, arsenic, cadmium and pathogens against WHO limits (13), with results published by ward, and the MoHCC district team provides for testing 96 water samples per quarter, prioritising sources within 1 km of waste sites.

As medium-to-long term actions, the HIA recommends that:

e. ZINWA issues an abstraction permit with enforceable caps tied to Matezva Dam levels and downstream irrigation needs and publishes dam levels and mine abstraction monthly.

f. Bikita Minerals lines the slime dams and has them independently audited to engineering and EMA standards within 12 months, installs seepage-monitoring wells, commissions geochemical characterisation of ore, waste rock and tailings, and moves towards water recycling and zero liquid discharge, with EMA issuing compliance orders.

g. BRDC, EMA and MMMD establish a multi-stakeholder health and environment review committee, including women's, worker and community representatives, and convert these measures into licensing conditions reviewed annually for license renewals.

Implementation of these recommendations will have positive effects beyond Bikita, as new lithium mines open in Zimbabwe. Measuring and publishing dust and water data, and integrating health into licensing, can set a precedent for the critical minerals sector, in line with the UN Sustainable Development Goals (SDGs) 3, 5 and 6.

As an overarching recommendation, the HIA proposes monitoring by a joint committee, with progress reviewed at 12 months. Triggers for action include: PM10 above 45 µg/m³ or PM2.5 above 15 µg/m³ in a quarter (WHO 24-hour guidelines (14)); Matezva Dam levels below a threshold set by hydrological review; mine-related exceedance of WHO drinking-water values compared with upstream sources; and distance to protected water above 500 m or evidence of seepage.

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