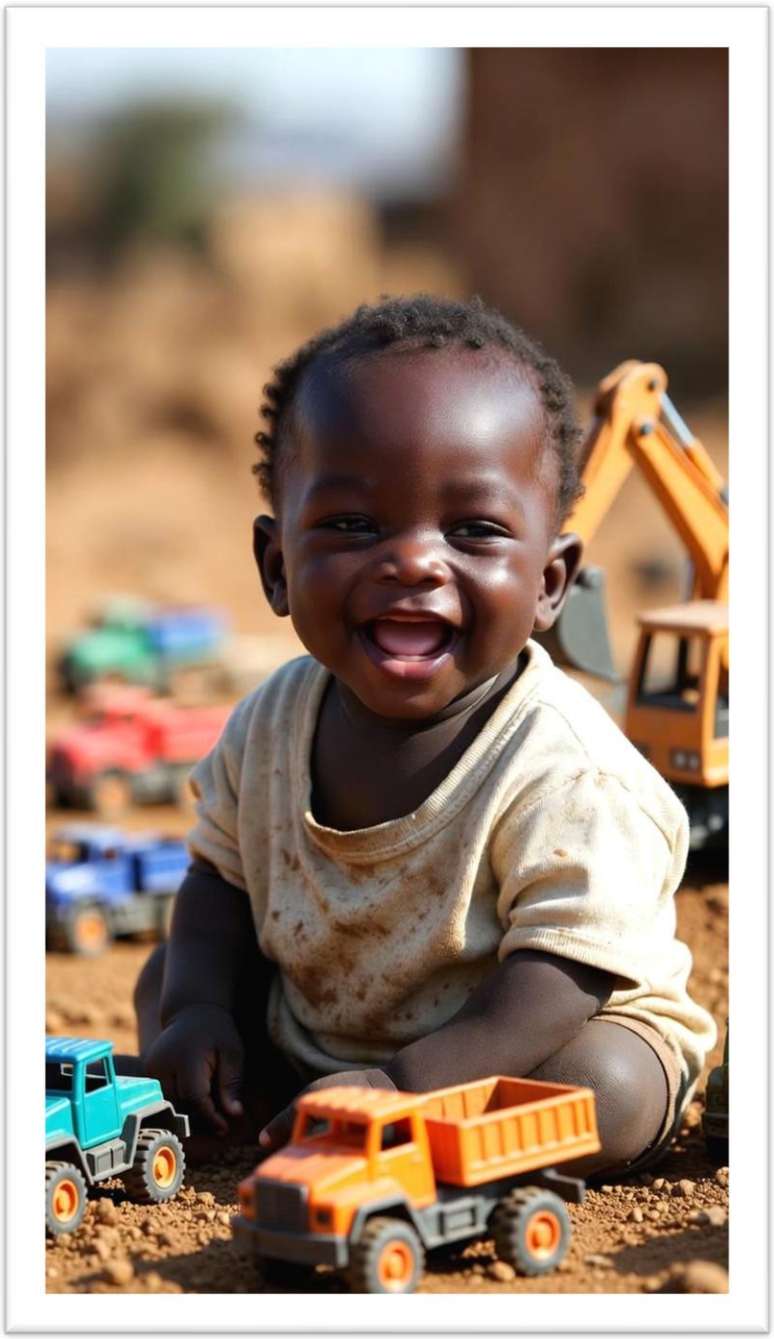

The Impact of Mining on the Creation of Vulnerable Children in Mining Communities

EXECUTIVE SUMMARY

Mining activities have contributed to the creation of vulnerable children through parental deaths from workplace accidents and occupational diseases, prolonged family separation due to migrant labour systems, and poverty-driven household breakdown, particularly in artisanal and small-scale mining (ASM).

No single authoritative global tally exists for these impacts, as data sources do not attribute vulnerability specifically by parental industry. Credible synthesis of International Labour Organization (ILO), UNICEF, Global Burden of Disease (GBD), and sector-specific reports indicates a cumulative low-to-mid tens of millions of vulnerable children affected over the past 100 years, with low-to-mid tens of thousands newly impacted annually as of 2025. Compared with other industries, mining produces far fewer cases in absolute terms than agriculture but shows higher intensity per worker. Psychologically, the effects manifest primarily through intergenerational trauma, with clear examples in Appalachian coal regions, South African platinum mining communities, and Indigenous territories. Progress in safety and child-labour interventions has slowed new cases, yet rising demand for minerals sustains risks in informal sectors. This report synthesizes historical, quantitative, comparative, and psychological evidence drawn from peer-reviewed and institutional sources.

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INTRODUCTION

Mining has long stood at the intersection of economic progress and profound social transformation. From the coal fields of the Industrial Revolution to today's artisanal gold and cobalt operations across Africa, Latin America and Asia, the extraction of minerals has generated wealth, powered technological advancement and shaped national destinies. Yet these gains have come at a human cost that extends far beyond the mine gate. In communities surrounding both large-scale and informal operations, the industry has repeatedly destabilised family structures through workplace fatalities, chronic occupational illness, extended parental absence and sudden economic shocks. The result is a persistent pattern of household fragility that leaves millions of children without stable parental care, consistent nurturing or reliable pathways to education and opportunity.

This report examines that pattern with precision and care. It synthesises the best available evidence on how mining activities across centuries and continents have contributed to the creation and perpetuation of vulnerable children in mining communities. Drawing on data from the International Labour Organization, UNICEF, the Global Burden of Disease studies and peer-reviewed academic research, the report presents the most credible estimates of historical and current scale, compares mining's impact with other major industries, and explores the psychological mechanisms through which these effects endure across generations. Particular attention is paid to the lived realities in South Africa, where a decade of industry contraction now offers a critical lens on what happens when traditional mining livelihoods erode without adequate transition support.

By focusing exclusively on the experiences of vulnerable children, those facing loss of stable parental care, family separation or household destabilisation linked to mining, the analysis avoids sensationalism while confronting an uncomfortable truth: the very sector that supplies the materials for modern life has, for generations, left some of the youngest and most dependent members of society bearing disproportionate and often invisible burdens. Understanding these dynamics is not merely an academic exercise. As the world accelerates its demand for critical minerals to support the green transition, the choices made today in safety standards, labour practices, community planning and post-closure rehabilitation will determine whether mining's legacy of vulnerability continues or is finally interrupted.

This report seeks to inform policy makers, industry leaders, civil society organisations and affected communities alike. It provides a clear-eyed foundation for more humane and sustainable approaches to mineral extraction, one in which the developmental needs of vulnerable children are placed at the centre of every decision, from exploration to eventual mine closure.

HISTORICAL OVERVIEW

The global mining sector, encompassing large-scale operations and informal ASM, has long shaped family structures in surrounding communities. Mechanisms include direct parental loss from fatal incidents or chronic illnesses (such as silicosis and coal workers' pneumoconiosis), extended absences under migrant labour models, and economic pressures that destabilize households and push children into hazardous work. These factors create cycles of vulnerability that extend across generations. This report examines the phenomenon from the Industrial Revolution onward, provides the most accurate available estimates for the past century and 2025 specifically, compares mining with other industries, outlines relevant psychological frameworks, and presents documented case studies. All analysis relies on established data from the ILO, UNICEF, GBD studies, and targeted academic research. Terminology focuses exclusively on vulnerable children to reflect those experiencing loss of stable parental care, family separation, or household destabilization linked to mining.

HISTORICAL CONTEXT

Documented patterns date to the Industrial Revolution in the United Kingdom, United States, and Europe, where coal mining employed families under dangerous conditions. Accidents and lung diseases frequently removed parents from households, leaving children in unstable caregiving arrangements or entering the workforce early. Colonial-era forced-labour systems, such as the Spanish mita in Potosí silver mines (Bolivia) from the 1540s, generated similar outcomes through high mortality and family disruption that persist intergenerationally.

In the 20th century, Southern Africa's gold and diamond mines institutionalized migrant labour, separating men from rural families for extended periods and contributing to community instability. From the 1980s, these systems accelerated the spread of HIV/AIDS, amplifying household breakdown in sending communities across sub-Saharan Africa. Since the late 20th century, the global boom in ASM (currently employing approximately 40–45 million people) has become the primary driver, with family separation, accidents, and toxin exposure creating ongoing vulnerability in regions such as the Democratic Republic of Congo (cobalt), Ghana (gold), and Mali.

SCALE OF IMPACT: ESTIMATES OVER THE LAST 100 YEARS (C. 1925–2025)

No precise global figure exists, as vulnerability is not tracked by parental occupation. The most credible synthesis aggregates data on fatalities, occupational diseases, HIV linkages, and ASM child-labour cycles:

- Direct parental loss from accidents and diseases: Conservative estimates place cumulative mining-related deaths in the high hundreds of thousands to low millions. With average family sizes, this corresponds to several million vulnerable children.
- HIV/AIDS effects tied to historical migrant labour: Southern Africa bore a disproportionate burden, with mining-linked transmission contributing to millions of cases of family destabilization and parental illness.
- ASM-driven separation and poverty: Sustained recruitment of children into hazardous work after household collapse has added several million more vulnerable children.

Overall credible range: low-to-mid tens of millions cumulatively affected, with the majority arising since the 1980s due to HIV peaks and ASM expansion. Africa accounts for the largest share.

CURRENT ANNUAL IMPACT IN 2025

Data for 2025 remain preliminary, drawing on 2024 benchmarks and stable trends. Formal large-scale mining reports low fatalities (e.g., 33 in the United States; 42 among ICMM members), while ASM incidents are underreported. GBD estimates continue to show approximately 18,000 annual pneumoconiosis deaths globally, many mining-related. The ILO-UNICEF 2024 estimates indicate a persistent stock of roughly 1 million children engaged in mining and quarrying worldwide, many entering after parental absence or illness.

Newly created vulnerability in 2025: several thousand from direct parental loss plus tens of thousands from family separation and poverty cycles in ASM. Total annual impact remains in the low-to-mid tens of thousands, concentrated in Africa and parts of Asia and Latin America. Antiretroviral therapy and safety improvements have reduced HIV-related contributions, though funding disruptions pose future risks.

COMPARISON WITH OTHER INDUSTRIES OVER THE LAST 10 YEARS (2015–2025)

Using ILO proxies, stock of children in hazardous work and occupational fatalities, mining ranks lower in absolute scale than agriculture and construction but higher in risk intensity.

- **Child labour/vulnerability proxy**: Agriculture accounts for 61% of the global 137.6 million children in child labour (approximately 84 million), far exceeding mining/quarrying's consistent ~1 million (less than 1% of total). Industry overall (including construction and manufacturing) comprises 13–14%, with mining a small subset.

- **Fatality proxy**: Agriculture and construction dominate the ILO's ~330,000 annual fatal injuries; mining contributes low thousands at most. Over the decade, agriculture-related sectors generated the overwhelming majority of work-related parental losses and resulting vulnerability.

Mining therefore creates and sustains far fewer vulnerable children than agriculture (by a factor of 50–80 times) but exhibits elevated per-worker hazards (ASM fatality rates 6–7 times higher than formal mining) and unique separation effects. Trends show modest declines across sectors due to regulations, yet informal mining remains entrenched.

PSYCHOLOGICAL FRAMEWORKS

No industry-specific psychological diagnosis exists. The dominant mechanisms are family separation leading to socially vulnerable children (prolonged parental absence or inability to provide care) and intergenerational trauma, the transmission of psychological, emotional, and physiological effects across generations via disrupted attachment, unresolved grief, adverse childhood experiences, and community stress. These frameworks explain how initial household destabilization from mining perpetuates mental health burdens, including elevated depression, anxiety, and behavioural challenges in subsequent generations.

DOCUMENTED EXAMPLES OF INTERGENERATIONAL TRAUMA

- **Anthracite Coal Regions, Northeastern Pennsylvania and Appalachia (USA)**: Centuries of deadly disasters, black lung disease, and deindustrialization created structural violence. Anthropological research documents transmission through family dynamics and possible epigenetic changes, manifesting today in higher rates of depression, substance use, and "diseases of despair" among descendants.

- **Marikana Platinum Mining Community (South Africa, post-2012)**: The police massacre of striking workers, layered on decades of migrant labour separation, produced ongoing effects including PTSD, school disruption, and economic collapse passed to children and grandchildren. Community studies ten years later highlight persistent grief and mental health burdens.

- **Indigenous Territories Affected by Mining (Canada, Australia, and the Americas)**: Land dispossession, environmental degradation, and family separation from extractive projects trigger depression, anxiety, and cultural disruption that transmit intergenerationally. Systematic reviews link these to elevated adverse childhood experiences and community-level mental health challenges.

SUB CONCLUSION

Mining has consistently contributed to the creation of vulnerable children through preventable mechanisms of parental loss, separation, and poverty, with effects concentrated in ASM and historically in migrant-labour regions. While absolute numbers remain smaller than in agriculture, the intensity and intergenerational nature of impacts warrant targeted interventions. Strengthening formal safety, regulating ASM, supporting family preservation programs, and addressing trauma through culturally appropriate care can mitigate future vulnerability. Continued mineral demand for green technologies underscores the urgency of these measures to break cycles of intergenerational harm.

SOUTH AFRICA'S DECLINING MINING INDUSTRY AND ITS EFFECTS ON VULNERABLE CHILDREN IN MINING COMMUNITIES (2015–2025)

INTRODUCTION

The sustained contraction of South Africa's mining sector over the past decade has moved beyond immediate operational adjustments to reshape the everyday lived realities of families in long-established mining towns. As selective downscaling and care-and-maintenance arrangements become more common, communities once anchored by mining infrastructure now navigate incomplete transitions that heighten emotional, developmental, and structural pressures on vulnerable children. These pressures arise from evolving family arrangements, interrupted learning environments, weakened emotional security, and policy gaps in post-mining planning. The following sections explore these dynamics, highlighting how the industry's gradual retreat continues to influence caregiving, education, identity, and future prospects in regions such as Rustenburg and northern KwaZulu-Natal coal fields.

SHIFTS IN HOUSEHOLD CAREGIVING AND INTERGENERATIONAL RESPONSIBILITIES

Mining settlements have seen a marked rise in elderly-headed households where grandparents assume primary caregiving and breadwinner roles for multiple children. In Ikemeleng near Rustenburg, for instance, a large majority of households include up to three children under the care of older relatives, with social grants providing the main monthly income stream. Reduced on-site employment at nearby operations placed under care and maintenance since 2019 has intensified this pattern, forcing older caregivers to stretch limited resources across extended family needs. This shift places additional emotional and practical burdens on vulnerable children, who often experience reduced adult supervision, delayed developmental support, and heightened expectations to contribute domestically at early ages. Such arrangements, while demonstrating family resilience, limit opportunities for consistent nurturing and increase the risk of intergenerational cycles of limited mobility.

INTERRUPTIONS IN EDUCATIONAL ACCESS AND QUALITY

Vulnerable children in mining-adjacent areas face recurring disruptions to schooling linked directly to ongoing operations and the winding down of corporate involvement. Blasting activities in coal-mining zones, sometimes occurring within 500 metres of homes and schools, create noise, vibration, and safety concerns that interrupt classroom time and heighten absenteeism. In northern KwaZulu-Natal communities near active sites, families report children missing lessons due to fear or physical disturbances, while closures elsewhere have led to the withdrawal of company-supported educational facilities and teacher positions. In Rustenburg's Freedom Park, some households have responded by prioritising higher education pathways for their children as a deliberate diversification strategy, yet broader trends show rising dropout risks when corporate social investment declines. These interruptions compromise long-term learning outcomes and narrow future opportunities for vulnerable children already navigating economic uncertainty.

PSYCHOSOCIAL AND EMOTIONAL BURDENS

The slow retreat of mining has fostered collective experiences of loss and uncertainty that transmit emotional strain to vulnerable children. Narratives from retrenched families in Rustenburg reveal persistent trauma stemming from disrupted household stability and the erosion of community routines once tied to mine schedules. In coal-dependent areas, the absence of clear post-closure pathways amplifies anxiety within homes, with children absorbing parental stress through reduced play, heightened vigilance, and disrupted family relationships. While some communities demonstrate coping through participatory local initiatives, the prevailing sense of unresolved grief and diminished security creates lasting psychosocial effects, including difficulties in forming stable attachments and pursuing personal aspirations.

CHALLENGES IN PLACE ATTACHMENT AND POST-CLOSURE HOUSING STABILITY

Strong emotional bonds to mining landscapes, forged through decades of company-provided or subsidised housing, complicate adaptation when operations scale back. Policies that encouraged family accommodation and homeownership during boom periods have transferred long-term responsibilities to municipalities and households, resulting in persistent informal settlements and commodified reconstruction-and-development housing in areas like Rustenburg. Vulnerable children growing up in these environments experience housing instability that affects their sense of belonging and safety, with families reluctant to relocate yet facing deteriorating infrastructure. This attachment, while culturally significant, heightens vulnerability when corporate exit leaves gaps in maintenance and service provision, exposing children to environments ill-suited for healthy development.

SHORTCOMINGS IN THE JUST ENERGY TRANSITION AND LONG-TERM COMMUNITY PLANNING

Efforts to shift from coal reliance have delivered limited visible benefits on the ground in mining towns, leaving families and vulnerable children in prolonged limbo. Around former power stations such as Komati, training programmes have focused on basic skills like CV preparation without corresponding job creation, contributing to ghost-town conditions and service erosion. In KwaZulu-Natal coal areas, protests over infrastructure damage have occasionally blocked access to clinics and schools, while the lack of diversified economic pathways sustains dependency on dwindling mining-related support. Without strengthened social labour plans and proactive rehabilitation frameworks, vulnerable children face heightened future risks, including reduced access to quality services and entrenched barriers to breaking intergenerational patterns of limited opportunity.

These dynamics underscore the need for more integrated, community-led approaches to closure and transition that centre the developmental needs of vulnerable children in South Africa's mining regions.

CONCLUSION

Across history and continuing into the present, mining activities worldwide have contributed significantly to the creation and perpetuation of vulnerability among children in affected communities. The combination of occupational hazards, prolonged family separations, and economic dependencies has generated enduring patterns of household instability that affect developmental outcomes long after individual incidents occur. While the absolute scale varies by region and industry form, the psychological and social legacies demonstrate how deeply extractive economies can imprint on successive generations.

South Africa's ongoing mining contraction brings these dynamics into sharp contemporary focus. As traditional employment structures erode and communities enter prolonged periods of transition, the cumulative effects on family stability and child development become particularly visible in former mining heartlands.

These dynamics underscore the need for more integrated, community-led approaches to closure and transition that centre the developmental needs of vulnerable children in South Africa's mining regions. Effective responses will require multi-stakeholder frameworks that integrate child rights into every stage of mine closure planning, from early notification through to long-term economic diversification. This entails establishing dedicated funding mechanisms for youth and family support services, redesigning social labour plans to prioritise educational infrastructure and psychosocial care, and fostering genuine participation of local residents in decisions about land rehabilitation and alternative livelihoods.

By placing vulnerable children at the core of pre- mining and post-mining strategies, South Africa has the opportunity to transform a legacy of disruption into one of renewal. Failure to do so risks entrenching cycles of disadvantage, while success could serve as a model for responsible industry transitions globally. The well-being of vulnerable children in these communities ultimately reflects society's commitment to equitable and sustainable development in the face of economic change.

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