

## Resilience Beyond Extraction: A Critical Review of Post-Mining Land Use and Restoration Policies in Zimbabwe

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### ABSTRACT

Zimbabwe's mining sector has long been central to its economic development, yet the legacy of environmental degradation left in the wake of extractive activities remains poorly addressed. This paper critically reviews the legal, policy, and institutional frameworks governing post-mining land use and rehabilitation in Zimbabwe, with a focus on their effectiveness, inclusivity, and enforcement. Despite the existence of regulatory instruments like the Mines and Minerals Act as well as the Environmental Management Act, implementation gaps, weak oversight, and elite-driven exploitation continue to undermine sustainable restoration practices. The study draws on political ecology and environmental justice theories to interrogate the power dynamics, ecological externalities, and community marginalization embedded in current land reclamation efforts. Using qualitative analysis of secondary data, including case studies from Hwange, Penhalonga, and Zvishavane, the paper exposes the disconnect between policy aspirations and on-the-ground realities. Abandoned open pits, contaminated water sources, and unproductive landscapes are symptomatic of a system that allows mining companies to exit without fulfilling rehabilitation obligations. The paper argues for a paradigm shift toward resilience-focused post-mining land use planning. This includes legally binding mine closure plans, reclamation bonds, transparent monitoring systems, and meaningful participation of affected communities in restoration efforts. It further advocates for integrating technological innovations such as satellite imaging, drones, and AI-driven land-use tracking to enhance transparency and accountability. Ultimately, restoring ecological integrity and socio-economic utility to post-mining landscapes is not just an environmental imperative but a test of Zimbabwe's commitment to inclusive and sustainable development.

**Keywords:** Sustainable Development, Extraction, Transparency, Restoration, Reclamation, Resilience.

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### Introduction

Mining has historically served as both an economic backbone and a political lever in Zimbabwe, providing a critical stream of revenue through mineral exports, foreign direct investment, and employment. Gold, platinum, diamonds, and coal dominate the sector, with small mine operators also playing key roles on livelihoods and informal economies [1]. However, the environmental toll of mining has grown considerably, particularly in the absence of comprehensive post-extraction land restoration. Open pits, soil contamination, tailings dumps, deforestation, and disrupted hydrological

systems are common features across Zimbabwe's mining belts from the goldfields of Penhalonga to the coal fields of Hwange and the chromite-rich regions of Shurugwi [2].

The concept of post-mining land use and reclamation is anchored in the global sustainability discourse that promotes the remediation of disturbed ecosystems and the reallocation of mined land for productive, ecological, or social purposes (Beyard & Sinding, 2004). In many jurisdictions, particularly in the Global North, mine closure planning is integrated into the lifecycle of

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mining operations, with financial sureties, public consultations, and rehabilitation targets embedded in legal and regulatory frameworks (Laurence, 2006). In contrast, post-colonial African mining regimes, including Zimbabwe's, have often struggled to enforce similar standards due to institutional weaknesses, regulatory loopholes, and the dominance of extractivist development models [3].

In Zimbabwe, environmental management in the mining sector is governed by key pieces of legislation including the EMA [Chapter 20:27], the MMA [Chapter 21:05], and various statutory instruments on environmental impact assessments (EIAs) and pollution control. However, these laws remain outdated, fragmented, and inconsistently enforced. The Mines and Minerals Act, for instance, does not make mine closure or land rehabilitation a statutory obligation but rather treats it as a negotiable condition of the mining lease. Similarly, the Environmental Management Agency (EMA), the principal regulatory authority for environmental matters, often lacks the capacity or political backing to enforce compliance, especially against politically connected companies or parastatals [4].

The result is a landscape of extractive abandonment where former mining sites are left unrehabilitated, communities are exposed to environmental hazards, and land use planning remains an afterthought. Reclamation obligations are either poorly specified or weakly monitored. In many cases, companies evade rehabilitation altogether by invoking bankruptcy or prematurely abandoning sites. The state, in turn, assumes a passive or complicit role, often failing to demand financial guarantees (e.g., reclamation bonds) or to prosecute violators of environmental law [5]. Consequently, rural and peri-urban communities bear the brunt of environmental degradation, which compounds poverty, erodes agricultural potential, and exacerbates socio-economic marginalization.

This situation raises fundamental questions about environmental justice, governance, and the sustainability of Zimbabwe's development model. Who is responsible for the land after extraction ends? How are communities compensated or not for lost ecosystems and livelihoods? What mechanisms exist to ensure accountability and long-term planning in a sector defined by short-term profit motives? These questions are especially pertinent as Zimbabwe seeks to modernize and grow its mining sector under the "Mining Vision 2030," which aims to turn the sector into a US\$12 billion industry [4]. Without a parallel investment in post-mining land governance, this ambition may create more environmental liabilities than it solves.

The concept of "resilience" provides a useful lens for interrogating the aftermath of extraction. In environmental terms, resilience refers to the capacity of ecosystems to recover from disturbance and sustain functionality. In socio-political terms, it reflects the ability of communities and governance systems to adapt, reorganize, and transform in the face of shocks (Folke et al., 2010). A resilience-focused approach to post-mining land use calls for more than cosmetic reclamation or tokenistic revegetation. It demands integrated, forward-looking policies that restore ecological integrity, promote productive re-use (such as agriculture, forestry, or conservation), and include communities as co-planners and co-beneficiaries.

Moreover, technological innovations offer new opportunities for improving land restoration outcomes and transparency. Remote sensing, drone mapping, GIS tools, and AI-powered land-use monitoring are increasingly being used in countries like Australia, South Africa, and Canada to track reclamation progress, detect non-compliance, and generate open-access data for public scrutiny [2]. In Zimbabwe, these tools remain underutilized, partly due to cost and technical capacity constraints, but also due to a political culture that resists transparency in the extractive sector.

This paper seeks to critically review Zimbabwe's policies, practices, and institutional arrangements for post-mining land use and rehabilitation. It engages three main research questions:

1. To what extent do Zimbabwe's legal and policy frameworks support effective and inclusive land reclamation after mining?
2. What are the institutional and governance barriers to successful post-mining land restoration?
3. What reforms and innovations are necessary to promote resilient, equitable, and sustainable land use beyond extraction?

To answer these questions, the paper employs a qualitative methodology, drawing on policy documents, academic literature, grey reports, and selected case studies from key mining districts. It is grounded in a political ecology framework, which highlights the interplay between environmental degradation, power asymmetries, and institutional decision-making [6]. It also incorporates environmental justice theory to analyse how mining-induced environmental harm and restoration efforts are unevenly distributed across social groups especially rural, indigenous, or economically vulnerable populations (Schlosberg, 2007).

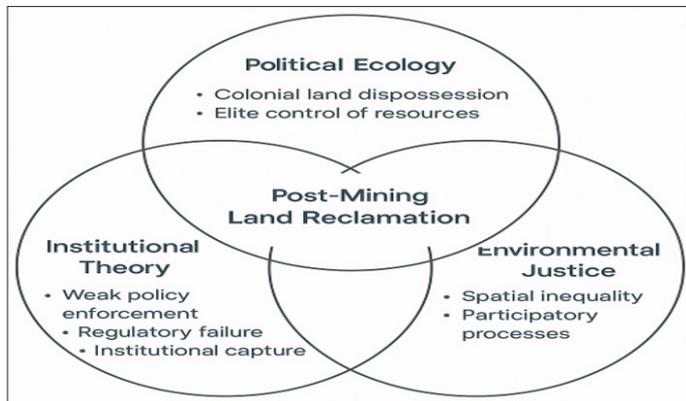
The article structure states that, after presenting the conceptual framework, it reviews global and local literature on post-mining land reclamation, highlighting best practices and gaps. It then examines Zimbabwe's current policy architecture and implementation record, using illustrative examples from areas such as Hwange (coal), Penhalonga (gold), and Zvishavane (asbestos/chromite). The discussion section interrogates the institutional weaknesses, elite interests, and community exclusions that shape post-mining land governance. Finally, the paper offers a set of policy and practice-oriented recommendations, including the need for enforceable mine closure plans, community-led restoration models, and the integration of technology in land rehabilitation monitoring.

By foregrounding the challenges and possibilities of post-mining land use, this paper contributes to a critical but often neglected debate on environmental legacies in resource-rich developing countries. It argues that resilience beyond extraction is not only an ecological necessity but also a socio-political imperative one that demands deliberate policy reform, institutional accountability, and a redefinition of who benefits from Zimbabwe's mineral wealth.

## Conceptual Framework

This study is grounded in a multidisciplinary conceptual

framework that combines insights from Political Ecology, Environmental Justice, and Institutional Theory to understand the dynamics of post-mining land use and reclamation in Zimbabwe. These theoretical lenses illuminate how power, policy, and ecology intersect in shaping outcomes on the ground often in ways that reflect deeper historical and structural inequalities.



### Political Ecology

The Political Ecology theory was not developed by a single individual at a precise moment but rather emerged as an interdisciplinary field in the 1970s and 1980s, drawing from geography, anthropology, environmental studies, and political economy. Eric R. Wolf, Michael Watts, Piers Blaikie and Harold Brookfield emerge as the key contributors to this theory. It argues that environmental degradation and resource management are not only ecological problems but also inherently political [6]. In the context of Zimbabwe, the legacy of colonial land dispossession, elite control of mineral wealth, and weak environmental regulation has produced a governance system where post-mining landscapes are often neglected, contested, or inequitably reclaimed.

This framework helps explain:

- Why land degradation persists even where legal frameworks exist.
- What an institutional power (e.g., mining corporations and political elites) shapes whose interests are prioritized in land use decisions.

- Why marginalized communities remain excluded from reclamation planning and benefit sharing.

### Environmental Justice

Environmental justice focuses on the fair distribution of environmental benefits and burdens, as well as meaningful participation in environmental decision-making (Schlosberg, 2007). It is not however attributed to an individual as the developer of the theory but one man stands out as the father of Environmental Justice, Dr. Robert D. Bullard. Post-mining land in Zimbabwe often becomes a symbol of environmental injustice where the fiscal paybacks of extraction are privatized, while the outlays (pollution, arable land loss, unsafe sites) are borne by rural and vulnerable communities.

This theory highlights:

- Spatial and social inequality in post-mining land rehabilitation.
- The importance of participatory reclamation processes that empower affected communities.
- The need for restitution and benefit-sharing from mining profits toward land restoration.

### Institutional Theory

Institutional theory provides a lens to assess how formal and informal rules, norms, and enforcement mechanisms influence organizational and policy behaviour (North, 1990). This theory has evolved over the years from the 1900s as a formulation from several disciplines and several people have contributed to its current state. Key formulators and contributors include, Thorstein Veblen, John R. Commons, Douglass C. North, W. Richard Scott, John W. Meyer & Brian Rowan [7]. In Zimbabwe's mining sector, policy fragmentation, bureaucratic overlap, and selective enforcement have contributed to weak post-mining land governance. While regulations exist, institutional inertia, corruption, and political interference limit their implementation.

Key concepts drawn from institutional theory include:

**Regulatory failure:** Gaps between law and practice in enforcing mine closure and rehabilitation.

**Table 1: Regulatory Failure – Gaps between Law and Practice in Mine Closure and Rehabilitation**

Case	Mine Type	Legal Requirement	Observed Practice	Regulatory Failure
<b>Redwing Mine (Penhalonga)</b>	Large-scale gold	Mine closure plans and EIAs required under Mines and Minerals Act & EMA Act	Mine abandoned without rehabilitation; toxic tailings left exposed	No enforcement of closure plan; EMA lacked capacity to penalize; powerful owners faced no consequences
<b>Shurugwi (Various Sites)</b>	Large-scale platinum	Companies must submit closure plans and post bonds for rehabilitation costs	Disused shafts and open pits left unsealed; land degraded, water bodies polluted	Government failed to collect rehabilitation bonds or enforce closure; no post-mining audits conducted
<b>Chimanimani ASM Operations</b>	Artisanal gold	ASM operations should follow environmental guidelines under EMA and SI 92 of 2021	ASM miners abandon sites without filling pits; riverbanks destroyed by mercury use	No enforcement or oversight of ASM activities; informal operations evade regulations; EMA under-resourced

**Institutional Capture:** Influence of politically connected elites on land reallocation after mining.

**Table 2: Institutional Capture – Elite Influence on Post-Mining Land Reallocation**

Case	Former Mining Site	Actors Involved	Post-Mining Land Outcome	Evidence of Institutional Capture
Marange Diamond Fields	Chiadzwa, Marange (Manicaland)	Political elites, military-linked firms, ZCDC	Land reallocated to elites or leased to syndicates without public process	Licenses revoked in 2016; no community return; politically connected individuals control access and extraction
				Local leaders side-lined; lack of transparency in land handover; state institutions unable/unwilling to enforce rules

**Weak Accountability:** Lack of independent monitoring and absence of penalties for non-compliance.

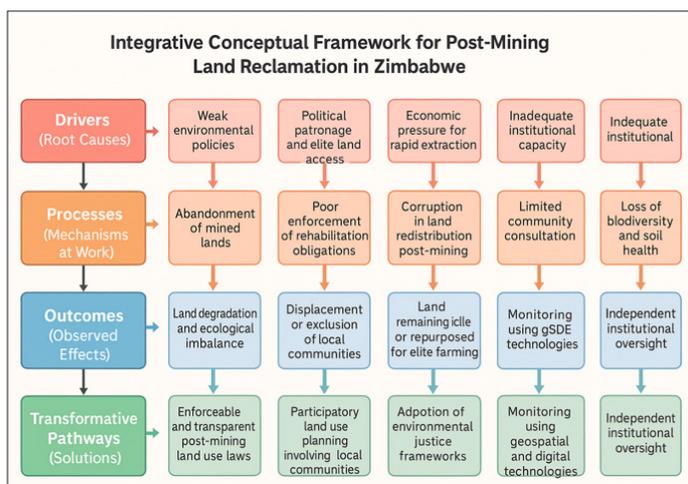
**Table 3: Weak Accountability – No Monitoring, No Penalties**

Case	Location	Violation	Regulatory Response	Accountability Gap
Chinese chrome & granite miners	Dande & UMP, Zimbabwe	Mining without EIA; cultural site destruction; relocations	No penalties or suspensions; EMA inactive	No independent monitoring; EMA politically compromised; communities excluded from process

### Integrative Framework Overview

The integrated conceptual framework thus rests on the idea that post-mining land reclamation is not merely a technical process, but one deeply embedded in political power, institutional capacity, and social justice. As illustrated in the diagram, the framework connects:

- **Drivers:** Weak policy, economic imperatives, political patronage.
- **Processes:** Land degradation, poor enforcement, elite land reallocation.
- **Outcomes:** Ecological damage, social exclusion, underutilized land.
- **Transformative pathways:** Stronger institutions, community participation, ecological justice, and innovation in monitoring and reclamation.



**Figure 1:** Intergrative Conceptual Framework for Post-Mining Land Reclamation in Zimbabwe

### Literature Review

#### Post-Mining Land Use in Global and African Contexts

Globally, post-mining land use has evolved from being an afterthought to becoming an integral component of mine planning and closure strategies. In countries such as Australia, Canada, and Germany, stringent environmental regulations require that land used for mining be rehabilitated and made productive post-extraction often for agriculture, forestry, or community infrastructure [8,9]. These models emphasize long-term ecological sustainability, community involvement, and biodiversity restoration. In contrast, many African countries lag behind due to weak regulatory enforcement, lack of funding for rehabilitation, and competing political interests [7]. The extractive sector often prioritizes short-term economic gains over long-term land sustainability. According to Kitula (2006), this gap is especially pronounced in small-scale and artisanal mining operations, which frequently leave behind unregulated, degraded landscapes.

#### The Zimbabwean Mining Context: Policy and Institutional Gaps

Zimbabwe has a long mining history, especially in gold, platinum, and chrome extraction. However, while the country has adopted several environmental policies such as the Environmental Management Act (Chapter 20:27) and regulations requiring Environmental Impact Assessments (EIAs) enforcement remains inconsistent [2]. Numerous reports indicate that Environmental Management Plans (EMPs) are either weakly implemented or entirely neglected post-licensing. Mines often close or are abandoned without fulfilling reclamation obligations, particularly when operations are short-term or politically connected (Ncube-Phiri, 2020). As a result, many rural areas bear the scars of unrehabilitated mining pits, contaminated water sources, and land no longer suitable for agriculture.

## Political Economy of Land and Mineral Control

The intersection between land, politics, and mining in Zimbabwe is critical in understanding post-extraction challenges. Several scholars have shown that land ownership and access in Zimbabwe are highly politicized [2]. Post-mining land often becomes a new frontier for elite accumulation, particularly in cases where mineral-rich land is not formally returned to the community or rehabilitated for communal use. This dynamic is tied to a broader trend of institutional capture, where mining licenses and land leases are distributed based on political affiliation rather than merit or public interest (Chigumira & Mujeyi, 2020). In such a context, post-mining reclamation becomes less about environmental justice and more about who benefits from the land after the resource has been extracted.

## Environmental Justice and Community Dispossession

Post-mining land degradation disproportionately affects marginalized rural communities, especially women and youth who rely on land for subsistence farming and social reproduction. According to Chimonyo and Weng (2021), many communities surrounding mining areas in Zimbabwe report that their concerns over land degradation and unsafe pits are ignored, even when their livelihoods are directly impacted. The principle of Environmental Justice, which calls for fair treatment and meaningful involvement in environmental decision-making (Bullard, 2000), is rarely operationalized. Community voices are largely absent in mine closure plans, and compensation for land loss is often minimal or non-existent [10]. Moreover, Zimbabwe's non-participation in international environmental accountability frameworks (e.g., EITI, the African Mining Vision monitoring mechanism) further weakens community leverage.

## Rehabilitation Technologies and Restoration Practices

Effective land reclamation involves technical processes such as backfilling, topsoil replacement, re-vegetation, and water quality restoration. In countries with advanced mining sectors, these technologies are supported by data-driven environmental monitoring and enforced rehabilitation bonds [11]. However, in Zimbabwe, the application of such techniques remains limited to large-scale, mostly foreign-owned mining operations. Artisanal and Small-Scale Mining (ASM), which accounts for over 60% of Zimbabwe's gold production, is largely informal and operates outside environmental compliance (Dzimbahete & Mhembe, 2021). Consequently, the cumulative impact of small-scale unrehabilitated sites is vast, yet poorly understood due to limited mapping and monitoring technologies.

## Lessons from Comparative Jurisdictions

South Africa's mining policy provides an instructive example. It mandates Mine Closure Certificates, which cannot be issued until environmental restoration is independently verified [2]. Ghana, meanwhile, has piloted community reclamation models where local groups are trained and funded to rehabilitate abandoned mines (Hilson & Gatsinzi, 2021). Such models suggest that successful reclamation is not only about regulation, but also about incentivizing and empowering affected communities. These lessons underscore that Zimbabwe's post-mining land policy must integrate technical innovation, enforceable regulation, and participatory governance to ensure resilience and sustainable land use beyond extraction.

## Policy Analysis of Post-Mining Land Use and Rehabilitation in Zimbabwe

### Overview of the Policy Landscape

Zimbabwe's legal and institutional framework governing post-mining land use is primarily shaped by a combination of mining, environmental, and land laws. The MMA (Chapter 21:05) remains as central statute, though lacking comprehensive provisions on post-closure rehabilitation and land restoration. Although it mandates mining companies to rehabilitate disturbed lands, enforcement mechanisms remain weak or inconsistently applied (ZELA, 2021). The Environmental Management Agency (EMA) becomes the conduit through which the legislated Act (Chapter 20:27), provides broader environmental oversight, including enforcement of Impact Assessments and Management Plans. However, enforcing these provisions particularly after mine closure is undermined by limited capacity, lack of political will, and corporate resistance.

**Table 4: Gaps and Weaknesses in the Existing Policy Framework**

Policy Area	Key Weaknesses Identified
<b>Mines and Minerals Act</b>	Outdated; does not prioritize land rehabilitation or community restoration post-mining.
<b>Environmental Management Act</b>	Lacks post-closure monitoring and penalties for non-compliance
<b>Institutional Coordination</b>	Poor coordination between EMA, Ministry of Mines, and local authorities leads to fragmented enforcement
<b>Community Participation</b>	Rehabilitation plans rarely involve local communities in design or implementation
<b>Financial Assurance</b>	Absence of mandatory rehabilitation bonds or closure funds leads to abandoned mine

These gaps perpetuate derelict landscapes, threaten biodiversity, and limit productive land reuse, especially in areas with high small-scale mining activity.

### Examples of Poor Enforcement and Policy Failures

Several former gold, chrome, and coal mining areas such as Mutoko, Hwange, and Mazowe exemplify failed post-mining recovery. Companies often exit without fulfilling rehabilitation obligations. For instance, in Hwange, open pits and toxic residue from coal mining remain exposed, posing health and ecological risks (Chirisa et al., 2020). In artisanal and small-scale mining (ASM) zones, which are largely informal, the policy vacuum is more severe. Despite contributing significantly to gold output, ASM sites are rarely subject to environmental compliance, and post-mining land is often left degraded.

### Recent Policy Developments and Limitations

The draft Mines and Minerals Amendment Bill attempts to introduce stronger provisions, such as:

- Mandatory submission of mine closure and reclamation plans.
- Rehabilitation funding mechanisms.
- Stronger EMA oversight.

However, as of 2025, the Bill has yet to be passed into law, and concerns remain that it lacks teeth in terms of penalties, public participation, and cross-agency enforcement (ZELA, 2024).

Countries like South Africa and Australia have implemented advanced frameworks that Zimbabwe can learn from.

**Table 5: International Best Practices: Comparative Insights**

Country	Best Practice
South Africa	Enforces financial provisioning regulations requiring companies to set aside funds for rehabilitation before operations begin
Australia	Applies progressive rehabilitation and strict post-closure audits to ensure land is returned to safe and productive use
Ghana	Involves local communities in reclamation projects, especially in small-scale mining area
Global Benchmarking	Protect land rights and provide redress for historical environmental injustices

**Table 6: Summary of Key Gaps in Literature**

Summary of Key Gaps in Literature	
Theme	Literature Gap
Enforcement	Weak implementation of post-mining regulations in Zimbabwe
Inclusion	Absence of local community involvement in mine closure processes
Political Influence	Limited research on how elite politics shape post-mining land access
Technical Practice	Lack of adaptation of reclamation technologies to local contexts

## Research Design and Methodology

The research assumes a qualitative, exploratory research design that critically examines the institutional, policy, and socio-political dynamics shaping post-mining land use and rehabilitation in Zimbabwe. A qualitative approach is appropriate due to the complex, multi-layered nature of land governance, which involves formal policies, customary practices, stakeholder negotiations, and political influence (Creswell & Poth, 2018). Given the limited empirical data on land reclamation outcomes and enforcement in Zimbabwe's post-mining landscape, the study applies a documentary review methodology, supported by thematic analysis. This method allows the researcher to identify patterns, policy gaps, and institutional inconsistencies through critical engagement with existing documents, reports, and legislation [12].

## Data Collection

Data was collected from secondary sources, which were selected purposively for their relevance, credibility, and insight into post-mining land governance. These included:

- Government legislation and policy frameworks.
- Institutional reports from relevant agencies, and the Parks and Wildlife Management Authority.
- International best practices and guidance from the World Bank, UNEP, and ICMM on mine closure and land rehabilitation.
- Academic literature focused on environmental governance, post-extractive transitions, and land access (Hilson & Murck, 2000; Tarras-Wahlberg et al., 2001).
- News articles and investigative journalism from outlets such as *NewsDay*, *The Zimbabwe Independent*, and *The Herald*, especially for stakeholder views and land conflicts.

Documents were retrieved from government websites, institutional portals, academic databases (JSTOR, Google Scholar), and press archives between January and June 2025.

## Data Analysis

The data was analysed using thematic content analysis, which involves coding texts into categories and identifying recurring themes and patterns (Braun & Clarke, 2006). The key themes used in analysis were derived from the conceptual framework, namely:

- Regulatory enforcement
- Stakeholder participation
- Political interference
- Technical restoration practices
- Customary land dynamics

The analysis also paid close attention to policy-practice gaps, especially where documented guidelines (e.g., mandatory Environmental Impact Assessments or decommissioning plans) diverge from observed realities in former mining areas. Comparative insights from post-mining regions in South Africa, Ghana, and Australia were used to benchmark Zimbabwe's performance and highlight contextual weaknesses or missed opportunities.

## Limitations

This study is limited by the lack of primary data from affected communities and mining companies, as the research relies heavily on documents and reports. There may also be biases in government reports or discrepancies between stated policy and actual implementation. Furthermore, access to up-to-date environmental audits and land registry data was constrained, affecting the depth of spatial analysis. To mitigate these challenges, triangulation was employed by comparing multiple sources including international reports and academic critiques to validate findings and interpretations.

## Ethical Considerations

Since the study is based solely on publicly available documents and secondary data, there are no direct ethical risks to human participants. Nevertheless, care has been taken to accurately represent sources, avoid plagiarism, and remain sensitive to politically contested issues such as land ownership and environmental justice.

## Findings

### Inadequate Enforcement of Environmental Rehabilitation Policies

Despite having a well-defined legislative framework through various instruments, enforcement remains weak as well as inconsistent. While Environmental Impact Assessments (EIAs) and Environmental Management Plans (EMPs) are required prior to mining operations, there is little evidence of systematic monitoring or penal consequences for failure to rehabilitate land post-extraction (Maponga & Ngorima, 2003). Field reports from the Environmental Management Agency (EMA) reveal that many mining companies, particularly in the small-scale and artisanal sectors, either abandon sites without closure plans or perform cosmetic rehabilitation with no ecological value [10].

In some cases, companies cease operations and leave open pits, contaminated water sources, and degraded vegetation, posing long-term hazards to communities and biodiversity (Tinashe, 2023).

### Limited Community Involvement in Post-Mining Land Use Planning

Findings show that affected communities are rarely consulted during mine closure planning or post-mining land use decisions. This exclusion violates the Aarhus principles of environmental justice, which advocate for public participation in environmental decision-making (UNEP, 2016). In interviews documented by NGOs such as Centre for Natural Resource Governance (CNRG), residents in former mining areas like Marange and Kadoma expressed dissatisfaction with post-mining land outcomes, citing poor information flow, limited access to reclaimed land, and lack of compensation (CNRG, 2023). This undermines both the legitimacy and sustainability of rehabilitation efforts.

### Political and Economic Interests Shape Land Reallocation

Evidence points to elite capture of rehabilitated or abandoned mining lands, particularly by politically connected individuals or commercial farming interests. Studies by Chikuhwa (2021) and Mkodzongi (2018) show that land previously allocated for community projects or ecological restoration has been reassigned through opaque processes, often with no community benefit. For instance, in Mashonaland West, multiple rehabilitated sites have reportedly been turned into private tobacco estates, bypassing local authorities and communal land boards (NewsDay, 2024). This reinforces the perception that post-mining land serves the interests of elites, rather than the dispossessed communities who bore the brunt of environmental degradation.

### Weak Technical Capacity and Limited Restoration Expertise

The study finds that Zimbabwe lacks sufficient technical knowledge, skills, and financial resources to carry out large-scale ecological restoration. According to Chakari & Munemo (2020), only a few mining companies employ environmental specialists capable of designing and implementing effective land rehabilitation schemes. Many rely on basic soil covering and grass seeding, which does little to restore biodiversity, soil health, or landscape functionality. The absence of standard restoration benchmarks, as found in countries like Australia or Canada, further complicates assessment and enforcement. Without measurable ecological targets, most companies fulfil only superficial rehabilitation obligations, often under duress from environmental regulators (Hilson & Van der Vorst, 2002).

### Overlooked Potential for Alternative Land Use Models

While Zimbabwe has vast experience in agriculture and community-driven land models, these opportunities are rarely integrated into post-mining planning. Few initiatives have explored options such as community agroforestry, eco-tourism, or renewable energy development on rehabilitated land. Pilot projects in Zvishavane and Bindura, supported by international donors, show that degraded mine lands can be repurposed for sustainable agriculture and small-scale solar farms, generating

jobs and income [13]. However, these remain isolated experiments, and no national framework exists to scale them.

### Absence of Post-Closure Monitoring and Accountability

A critical gap in Zimbabwe's post-mining governance is the lack of long-term monitoring mechanisms. Once mining licenses expire or closure certificates are issued, there is no sustained oversight to track whether land use plans are maintained or whether ecosystems are recovering. This is particularly dangerous in gold and chrome mining areas, where heavy metals and tailings can persist in soils and waterways for decades (Mutemeri et al., 2016). Communities downstream from former mining zones have reported rising health concerns linked to water contamination, yet there is no coordinated state response to monitor or mitigate these impacts.

Table 7: Summary of Key Findings

Summary of Key Findings	
Theme	Key Findings
Regulatory Enforcement	Weak monitoring and failure to penalize non-compliant mining companies
Community Participation	Communities excluded from land reclamation and planning processes
Political Influence	Post-mining land often allocated to politically connected elites
Technical Capacity	Limited expertise and absence of ecological benchmark
Alternative Land Uses	Missed opportunities in agroforestry, solar energy, and eco-tourism
Post-Closure Monitoring	Lack of long-term evaluation of land health and public safety risks

## Discussion

### Interpreting Zimbabwe's Post-Mining Landscape Governance

Post-mining land governance in Zimbabwe reflects a persistent disconnect between policy rhetoric and implementation reality. While mining regulations such as the Mines and Minerals Act (Chapter 21:05) outline reclamation requirements, enforcement is minimal, and land rehabilitation remains largely aspirational (Chatora, 2018). The discussion reveals how extractive activities in Zimbabwe often conclude without a systematic plan for land restoration, leading to degraded ecosystems, idle land, and social dislocation. This failure is not solely due to technical limitations but is deeply embedded in a political economy of weak accountability, elite influence, and institutional fragmentation. The allocation of post-mining land to politically connected actors as noted in both literature and field observations suggests that land reclamation decisions are driven more by political patronage than ecological or social priorities (Mukwakwami, 2021).

### Policy-Implementation Gap

Zimbabwe's national mining policies formally recognize the need for ecological restoration. However, there is a wide implementation gap. Mining companies frequently abandon sites without fulfilling reclamation obligations, and enforcement agencies like the Environmental Management Agency (EMA) often lack the resources or political backing to act decisively (Mpofu & Ndlovu, 2020). The discussion underscores that policy effectiveness depends not only on the quality of legal frameworks but also on enforcement capacity, political will, and institutional independence. This aligns with global scholarship

on environmental governance in developing countries, which highlights how regulatory failure perpetuates resource degradation and public disenchantment [14].

### Exclusion of Local Communities

Findings show a consistent pattern of community exclusion from post-mining land-use planning. Despite constitutional guarantees of participation (Section 13 of the Zimbabwean Constitution), affected communities are rarely consulted on land rehabilitation priorities or future land use (Chigumira et al., 2022). This exclusion exacerbates historical grievances, particularly in marginalized rural areas where mining has displaced livelihoods and degraded land. Meaningful community participation is crucial for sustainable land restoration and conflict prevention. Globally, community-inclusive reclamation models such as participatory forest restoration in India or community-driven mining site farming in Ghana have shown greater long-term success [8]. Zimbabwe could benefit from adopting such inclusive models.

### The Role of Politics and Elite Capture

Zimbabwe's post-mining land policies are entangled in broader political dynamics. The allocation of reclaimed land to elites often under opaque circumstances suggests a form of "post-extraction rent-seeking" where land becomes a reward for political loyalty rather than a resource for public regeneration (Maguwu, 2016). This elite-driven model undermines both economic equity and ecological recovery. It also creates a disincentive for mining companies to engage in proper closure practices, knowing that the land will likely be appropriated for elite interests rather than restored for communal benefit or ecological services. This dynamic reflects broader concerns in African mineral economies, where land, minerals, and politics are tightly intertwined [3].

### Technical and Institutional Capacity Gaps

The discussion identifies weak technical expertise and institutional fragmentation as major barriers to effective land restoration. There are few ecological benchmarks or restoration standards in Zimbabwe tailored to different types of mined landscapes such as gold pits, chrome dumps, or lithium tailings. In contrast, countries like Australia have developed tailored post-mining land use classifications and enforce adaptive management strategies [15]. Zimbabwe's EMA and mining inspectorates remain under-resourced and technically limited, making it difficult to monitor compliance or enforce sanctions. Furthermore, the lack of coordination between agencies responsible for mining, land, and environment undermines holistic land governance (Mpofu, 2021).

### Missed Opportunities for Alternative Land Uses

There is untapped potential for converting mined-out land into alternative productive uses. Agroforestry, solar farms, aquaculture, and eco-tourism are all viable options depending on the location and type of my waste. However, these alternatives are rarely explored or incentivized. Elsewhere, post-mining land has been successfully repurposed for example, Germany's Lusatia lignite mines were transformed into lakes and recreation zones, while some South African mines have been converted

into agricultural cooperatives (World Bank, 2018). Zimbabwe can draw inspiration from these models to reimagine mining legacies.

### Monitoring, Evaluation, and Long-Term Sustainability

Finally, the discussion emphasizes the lack of post-closure monitoring systems. Once mining ceases, companies often leave, and no institutional mechanism exists to evaluate land health, contamination risks, or long-term socio-economic impacts (Chatora, 2018). Long-term ecological monitoring using tools like remote sensing, soil sampling, and biodiversity assessments is essential to track recovery progress. Community-based monitoring initiatives can also build local capacity and enhance accountability (Danielsen et al., 2009).

**Table 8: Summary of Discussion Points**

Key Theme	Discussion Insight
Governance Failure	Weak enforcement and elite interference undermine policy effectiveness
Community Exclusion	Lack of participation disempowers affected populations and reduces restoration success
Political Influence	Post-mining land becomes a site for elite patronage rather than public regeneration
Technical Weakness	Limited expertise and coordination stall effective restoration implementation
Untapped Land Potential	Opportunities in agriculture, energy, and eco-tourism remain underutilized
Poor Monitoring Systems	Lack of long-term oversight impedes sustainability and adaptive management

## Recommendations

### Strengthen Legal and Regulatory Frameworks for Land Reclamation

Zimbabwe should revise and harmonize its mining and environmental legislation to ensure clear, enforceable mandates for post-mining land use. The legislation must be updated to:

- Explicitly require detailed mine closure and reclamation plans before operations begin.
- Mandate environmental bonds or rehabilitation funds held in escrow to guarantee restoration financing [4].
- Align with the EMA (Chapter 20:27) to prevent jurisdictional overlaps.

A strong, legally binding framework is the foundation of effective post-extraction land governance [16].

### Establish an Independent Post-Mining Land Oversight Authority

To enhance accountability and avoid political interference:

- Create a Post-Mining Land Use Authority (PMLUA) that includes environmental experts, traditional leaders, civil society, and government representatives.
- The PMLUA should monitor mine closures, certify successful rehabilitation, and regulate the reallocation of mined land to prevent elite capture.

Independent oversight bodies have been successful in managing mine closure in countries like Canada and Chile [17].

### Ensure Community Participation in Post-Mining Land Use Planning

Affected communities must be involved in:

- Co-designing restoration plans based on local needs and cultural values.
- Identifying suitable post-mining land uses (e.g., farming, housing, eco-tourism).
- Participating in community monitoring committees for reclamation projects.

Mechanisms like public hearings, participatory GIS mapping, and stakeholder forums should be institutionalized to enhance legitimacy.

“Restoration without representation” leads to disillusionment and land conflicts [8].

### Promote Alternative Productive Land Uses

Zimbabwe should adopt a diversified land use strategy for rehabilitated mine sites:

- Encourage agroforestry, aquaculture, solar energy farms, or conservation zones based on soil suitability and landscape features.
- Offer incentives and technical support to community cooperatives or SMEs willing to develop post-mining lands.

Repurposing mined land into productive assets contributes to local resilience and economic diversification [15].

### Build Technical Capacity for Restoration and Monitoring

Address the knowledge and skills gap in mine rehabilitation by:

- Investing in training programs for environmental officers, geologists, land use planners, and local monitors.
- Partnering with universities and research institutions to develop locally appropriate restoration models.
- Equip the Environmental Management Agency (EMA) with remote sensing, GIS, and soil analysis tools to monitor site recovery.

Effective reclamation depends on both human and technological capacity (Hilson & Potter, 2005).

### Mandate Long-Term Monitoring and Transparent Reporting

Rehabilitation does not end with land backfilling or re-vegetation. Zimbabwe should:

- Enforce a minimum 5- to 10-year post-closure monitoring period with mandatory reporting on vegetation recovery, pollution levels, and land use outcomes.
- Require companies to publicly disclose mine closure progress via digital platforms or local information centres.
- Include local communities in data collection and validation.

Post-closure monitoring is essential for sustainability and risk management [18].

### Adopt a Rights-Based Approach to Post-Mining Land Justice

Recognize post-mining land as part of broader environmental and social justice:

- Establish legal avenues for communities to seek restitution or compensation for unrehabilitated land.

- Promote inclusive land tenure reforms that secure rights for displaced or marginalized groups.
- Enshrine environmental rehabilitation as a constitutional obligation enforceable by citizens and watchdog organizations.

Justice-centered restoration empowers affected populations and prevents future land-based grievances [19].

### Benchmark and Learn from Global Best Practices

Zimbabwe should not operate in isolation. It should:

- Join regional restoration networks (e.g., SADC Environmental Assessment Forum).
- Engage in South-South knowledge exchanges with countries like South Africa, Ghana, and Indonesia.
- Adopt guidelines from the UN Environment Programme, ICMM, and the Global Tailings Review on responsible mine closure and land recovery.

Learning and adaptation are central to building institutional resilience in mining governance [4].

### Summary Table: Recommendations

**Table 9: Policy Areas and Recommendations Actions for Land Restoration**

Legal Reform	Update mining laws to include clear and enforceable reclamation mandates.
Oversight	Establish an independent land restoration authority with community involvement.
Participation	Ensure inclusive planning and monitoring mechanisms with affected communities.
Land Use Planning	Promote diverse, productive uses of reclaimed land (e.g., farming, solar, conservation).
Technical Capacity	Train and equip agencies and communities in ecological restoration techniques.
Monitoring & Reporting	Mandate long-term audits, public disclosure, and performance tracking of mine closures.
Justice and Equity	Protect land rights and provide redress for historical environmental injustices.
Global Benchmarking	Align with international restoration standards and peer learning.

### Conclusion

Zimbabwe’s post-mining landscape reflects a critical gap in the country’s environmental governance architecture. While extractive activities continue to contribute significantly to national revenue and employment, the aftermath of mining marked by abandoned pits, degraded ecosystems, and displaced communities has received insufficient policy attention. This study has examined the post-mining land use and rehabilitation framework in Zimbabwe through a multi-dimensional lens incorporating legal, institutional, socio-political, and ecological perspectives.

The findings underscore that current policies on mine closure and land restoration are fragmented, outdated, and poorly enforced. Despite the existence of environmental regulations, mining companies frequently exit operations without fulfilling reclamation obligations, largely due to weak regulatory oversight,

limited technical capacity, and political interference. The lack of a centralized, accountable authority to monitor land reclamation exacerbates this governance vacuum. As a result, thousands of hectares of land remain environmentally hazardous and socially unusable, contributing to rural poverty, food insecurity, and socio-economic marginalization.

Moreover, the study revealed a systematic exclusion of local communities from decision-making processes concerning land use after mining. This exclusion not only undermines democratic governance but also squanders opportunities for locally grounded and sustainable reclamation models. The elite capture of restored land often through politically connected leases or opaque reallocations further widens inequality and fosters public resentment. However, this bleak picture is not irreversible. The review identifies substantial potential for transformation. Successful examples from other jurisdictions show that post-mining land can be repurposed for agriculture, renewable energy, eco-tourism, or conservation provided that governments adopt coherent policies, empower communities, and build institutional capacity. With clear legal mandates, strong enforcement, inclusive participation, and innovative land use strategies, post-mining land can become a platform for socio-economic regeneration rather than a symbol of neglect.

In this regard, Zimbabwe stands at a crossroads. It can either allow post-mining degradation to persist as a silent crisis or commit to turning mined-out landscapes into engines of rural resilience and environmental restoration. The recommendations proposed in this paper from reforming legislation to establishing independent oversight bodies and promoting community-driven land use models offer a concrete roadmap toward this vision. Ultimately, post-mining land reclamation must be reimagined not merely as a technical or environmental challenge, but as a moral and developmental imperative. Only by embracing a rights-based, inclusive, and accountable approach can Zimbabwe transform its post-extraction realities and build lasting resilience beyond the mine [20-24].

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