Journal of Economic Development & Global Markets

GLINT OPEN ACCESS

Volume 1, Issue 1

Research Article

Date of Submission: 25 November 2025
Date of Acceptance: 19 December 2025
Date of Publication: 23 December 2025

Beyond Extraction: A Framework for The Sustainable Management of Solid Minerals in Oke-Ogun Region, Nigeria

Igonor, E. E[1]*, Oyedokun, M. O[2] and Olisa, G. O[3]
[1]Department of Applied Geology, Federal University of Technology, Akure, Nigeria
[2]The Pan African University Life and Earth Sciences Institute, Nigeria
[3]Department of Geology, Olabisi Onabanjo University Ago Iwoye, Nigeria

***Corresponding author:** Igonor, E. E, Department of Applied Geology, Federal University of Technology, Akure, Nigeria.

Citation: Igonor, E, E., Oyedokun, M, O., Olisa, G, O. (2025). Beyond Extraction: A Framework for The Sustainable Management of Solid Minerals in Oke-Ogun Region, Nigeria. *Econ Dev Glob Mark*, 1(1), 01-15.

Abstract

The Oke-Ogun region of southwestern Nigeria has witnessed a rapid expansion of solid mineral extraction, yet the sector remains dominated by informal and poorly regulated operations. This study investigates the spatial distribution, scale, and impacts of active mining activities in the region, with the aim of assessing their environmental, socio-economic, and governance implications. Using a mixed-methods approach which integrates field mapping of 187 mining sites, stakeholder interviews, and secondary data from geological and policy reports, the research identifies the structural characteristics of Oke-Ogun's mineral economy.

Results reveal that artisanal and small-scale operations account for over 90% of mining activities, reflecting the sector's highly informal nature and regulatory challenges. Gemstone extraction constitutes the most prevalent activity (89 sites), followed by granite quarrying (62 sites). Community perceptions highlight severe degradation of natural capital (88% report negative impacts) but notable gains in financial capital (75% report positive outcomes), illustrating the unsustainable trade-off between short-term income and long-term environmental resilience. Weak enforcement of the Minerals and Mining Act (2007), limited institutional capacity, and overlapping mandates exacerbate governance inefficiencies and stakeholder conflicts.

Grounded in the Sustainable Livelihoods Framework (SLF), Stakeholder Theory, and the Resource-Curse Thesis, the study integrates environmental, socio-economic, and institutional dimensions into a holistic model for sustainable mineral governance. It concludes that Oke-Ogun's mining economy embodies the paradox of local benefit amid structural vulnerability. The paper recommends formalization of artisanal mining cooperatives, community participation in decision-making, environmental rehabilitation funding, and diversification of

rural livelihoods. These interventions can help transform Oke-Ogun's extractive sector from an informal, environmentally costly enterprise into a driver of inclusive and sustainable development.

Keywords: Artisanal and Small-Scale Mining (ASM), Sustainable Livelihoods Framework (SLF), Environmental Degradation, Resource Governance, Oke-Ogun Region-Nigeria, Stakeholder Dynamics, Resource-Curse Thesis

Introduction

Nigeria's longstanding quest for economic diversification has placed the solid mineral sector in the national spotlight as a critical alternative to hydrocarbon dependence. With an estimated mineral wealth valued in the trillions of naira, this sector holds the potential to catalyze industrial growth, generate substantial employment, and foster sustainable development across the nation.

This potential is particularly salient in the Oke-Ogun region of Oyo State, the largest geographical and agricultural zone in the state (figure 1). Beneath its vast arable lands lies a parallel wealth of valuable solid minerals, including high-grade talc, marble, limestone, gemstones, and granite. This endowment positions Oke-Ogun as a future hub for mineral-based industrialization, capable of driving regional economic transformation, reducing poverty, and providing crucial revenue for both state and local governments.

However, the reality on the ground stands in stark contrast to this potential. The extraction of these resources is currently dominated by informal, unregulated, and predominantly artisanal mining practices. These methods are fundamentally unsustainable, characterized by environmentally destructive techniques that lead to severe land degradation, deforestation, and pollution of critical water sources. The socio-economic landscape is marred by conflicts between miners and indigenous agrarian communities, loss of livelihoods, and minimal local beneficiation of the extracted resources. Consequently, the region is trapped in a paradox where immense mineral wealth translates into environmental degradation, social tension, and squandered economic opportunities, ultimately undermining the very goals of sustainable development.

While the challenges of artisanal and small-scale mining (ASM) in Nigeria have been documented in broader studies, a critical gap remains in the context-specific, multi-stakeholder analysis of the Oke-Ogun region. Existing research often focuses on specific minerals or environmental impacts in isolation, without providing an integrated framework for sustainable management that is tailored to the region's unique socio-ecological fabric. This study, therefore, seeks to fill this gap by conducting a comprehensive assessment that not only identifies the environmental and socio-economic impacts but also analyzes the roles and perceptions of all key stakeholders—miners, host communities, government agencies, and traditional institutions. The ultimate aim is to propose a culturally acceptable and economically viable sustainable mineral management framework specifically designed for Oke-Ogun, offering a pathway to transform its mineral wealth from a source of conflict into a catalyst for lasting and inclusive development.

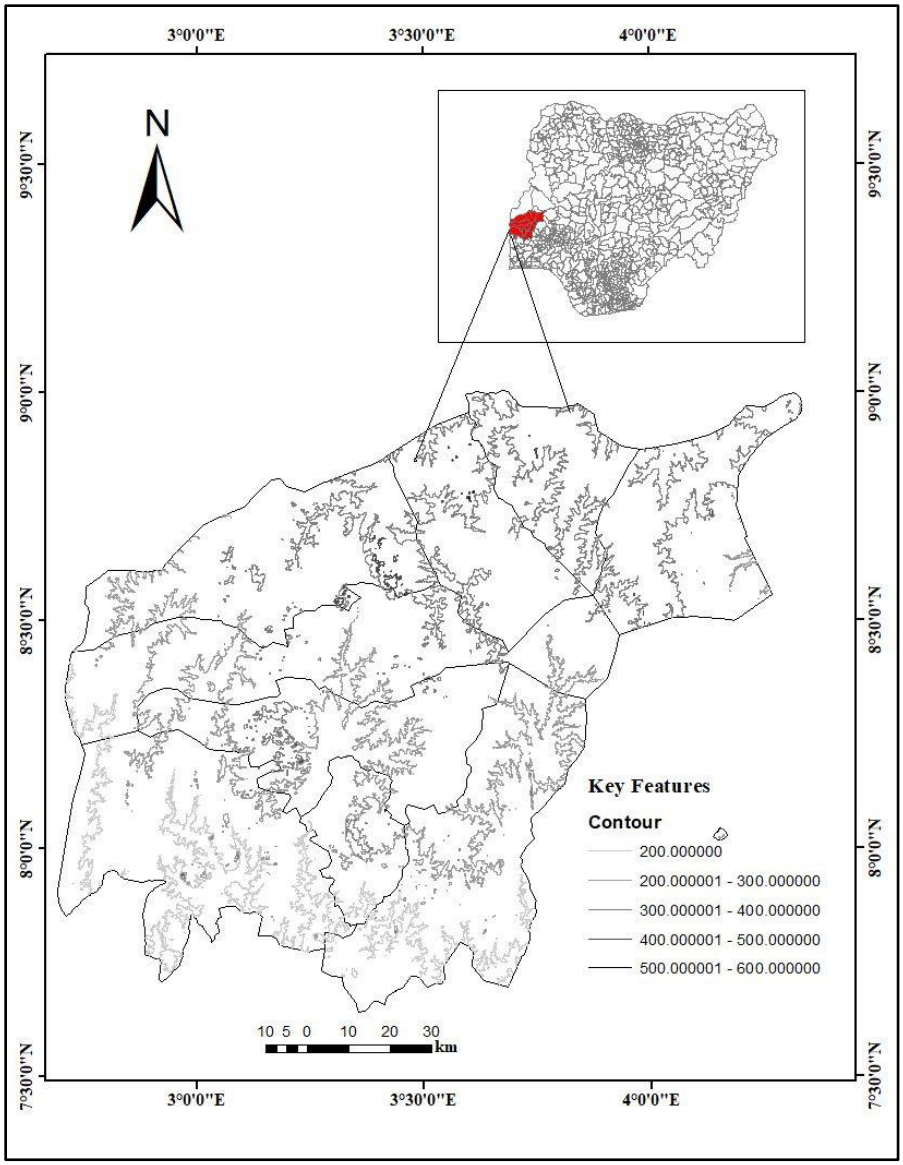

Figure 1. Topomap of the study area (Oke-Ogun region) with insert of the map of Nigeria

Regional geological setting

Oke-Ogun region, like much of Southwestern Nigeria, is underlain by the Precambrian Basement Complex rocks (fig. 1). These are ancient igneous and metamorphic rocks that form the stable continental crust of the West African Craton. The geology of the area is characterized by three major rock types:

- Migmatite-Gneiss Complex – which are the oldest rocks in the region, primarily consisting of banded gneisses and migmatites. These form the "basement" into which other younger rocks were emplaced.
- Schist Belts (Supracrustals): These are narrow, NNE-SSW trending belts of metasedimentary and metavolcanic rocks (e.g., quartzites, schists, amphibolites) that are folded within the Migmatite-Gneiss Complex. The Iseyin Schist Belt is a prominent example running through the region.

- Older Granites (Pan-African Granitoids): These are intrusive igneous bodies that were emplaced during the Pan-African Orogeny (ca. 600 million years ago). They include a variety of granites, granodiorites, and syenites. They often form spectacular inselbergs and hills across the Oke-Ogun landscape.

The Geology of Oke-Ogun region and the mineralization implication

The Migmatites and Gneisses of the region, cover extensive areas and are composed of alternating light (felsic) and dark (mafic) mineral bands. They are the host for various minerals formed through metamorphic processes and subsequent weathering.

The Schist Belts comprises of (a) quartzites – that are a primary source of silica and are sometimes mined for dimension stones and aggregate; (b) Amphibolites and Talc-Schists – which are the primary host for talc deposits; (c) and Pegmatites that cut across the schist belts and other basement rocks. These are exceptionally important because they host rare minerals like gemstones, tantalite-columbite, and cassiterite.

The Older Granites are plutonic rocks notable for hosting (a) Biomic Granites that are often mined as limestone for cement production and agricultural lime; (b) Coarse-Grained Granites that are quarried extensively either as dimension stones (building blocks, paving stones) or crushed as aggregates for construction; (c) Marble that occurs in some localities as metamorphosed limestone, which is highly valued for its aesthetic appeal in construction and sculpture.

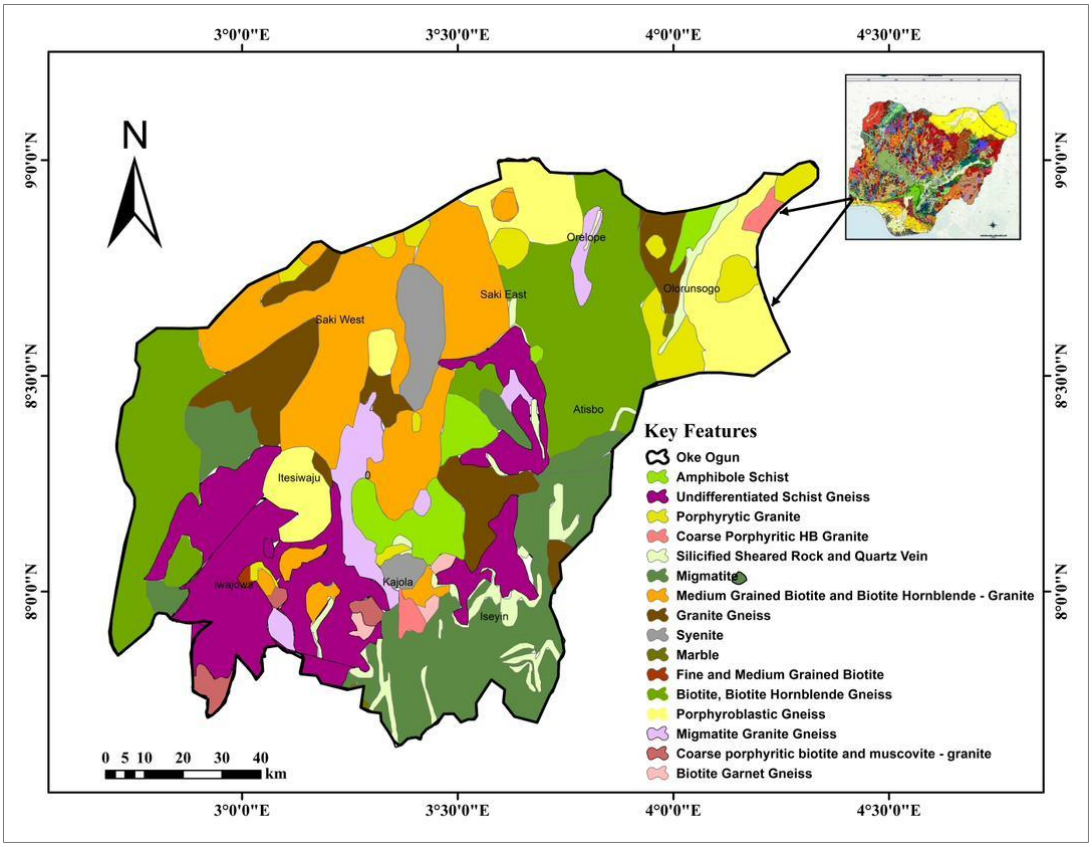

Figure 2 geologic map of study area (modified from regional map of Oyo state - NGSA)

Literature review and theoretical framework

Existing research across sub-Saharan Africa shows that while mining contributes to rural incomes, it also creates significant ecological and social externalities. Globally, mining has been associated with deforestation, landscape scarring, erosion, and contamination of soil and water resources. Studies in Nigeria confirm similar outcomes, linking widespread degradation to poor environmental governance.

It has been shown, using the Stakeholder Theory, that unequal influence and weak accountability structures often result in governance gaps and legitimacy crises. The Resource-Curse Thesis posits that resource-rich economies often experience slower development, institutional decay, and social tension. Nigeria exemplifies this paradox: despite abundant mineral wealth, weak governance and rent-seeking have constrained sustainable outcomes. Though artisanal and small-scale mining (ASM) provides critical income and employment where alternative livelihoods are scarce, but the benefits are often temporary and unevenly distributed. Research across Ghana, Tanzania, and Burkina Faso shows declining agricultural productivity, unstable earnings, and worsening inequality.

Despite the availability of Laws, Acts and regulations in Nigeria to promote sustainable mining through licensing, community-development agreements (CDAs), and environmental management plans, enforcement remains limited. Institutional overlap between federal and state authorities, inadequate technical capacity, and corruption undermine regulatory effectiveness.

International experience demonstrates that formalization is pivotal for transforming ASM into a sustainable livelihood activity. The World Bank (2019) and UNEP (2018) advocate stepwise strategies: simplified licensing, cooperative structures, access to finance, and technical training. Environmental safeguards such as reclamation bonds, progressive rehabilitation, and the "polluter-pays" principle are integral to best practice. Community participation frameworks, particularly Free, Prior, and Informed Consent (FPIC) can strengthen accountability and social acceptance.

Research methodology

This research was designed to use a mixed-methods approach, combining qualitative and quantitative data collection for triangulation and depth. The study area is the Oke-Ogun region, comprising ten local government areas in Oyo State.

Data collection

Primary data: involved the use of structured questionnaires administered to a stratified random sample of household heads in mining and non-mining communities (n=approx. 400) to gather quantitative data on socio-economic impacts. Semi-Structured Interviews (SSIs) were also conducted with key informants (officials from the State Ministry of Environment and Natural Resources, Mines Inspectorate, community leaders, heads of mining associations) (n=approx. 25). A few Focus Group Discussions (FGDs) were held with separate groups of miners, farmers, women, and youth in selected communities (n=8 FGDs) to explore perceptions and conflicts.

Direct field observation and geo-tagged photography of mining sites was done to assess environmental conditions and operational practices.

Secondary data were sourced from reports from the Nigeria Mining Cadastre Office (MCO), Ministry of Mines and Steel Development, journals, books, and previous environmental impact assessments.

All data were statistically treated and synthesized.

Ethical Considerations: Informed consent was obtained from all participants. Anonymity and confidentiality was assured.

Results

The geospatial inventory confirmed 187 active mining sites across Oke-Ogun (fig. 3). The distribution is highly clustered and correlates directly with the underlying geology.

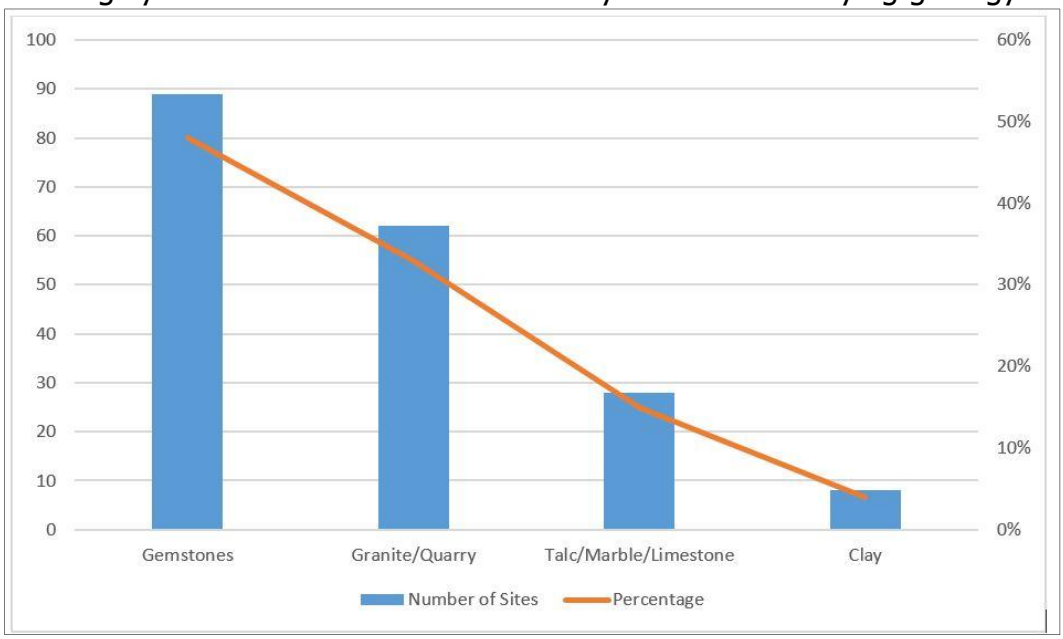

Figure 3: A histogram chart showing the distribution of active solid mineral extraction sites by mineral type in Oke-Ogun, Oyo State.

Table 1: Classification of active mining sites by mineral and scale

Mineral Type	No. of Sites	Predominant Scale	Key Locations (LGAs)
Talc/Marble/Limestone	28	Small-Scale	Olorunsogo (Igbetti)
Gemstones (Beryl, Tourmaline)	89	Artisanal	Iseyin, Irepo (Igboho), Kajola
Granite/Quarry	62	Artisanal & Small-Scale	Widespread (Saki West, Saki East, Iseyin)

Clay	8	Artisanal	Atisbo, Itesiwaju
TOTAL	187		

Analysis revealed that (Table 1) 92% of all sites are classified as Artisanal or Small-Scale (fig. 4). Furthermore, only 18 sites (9.6%) were found to possess any form of formal mining title from the MCO, confirming the extensive informality of the sector.

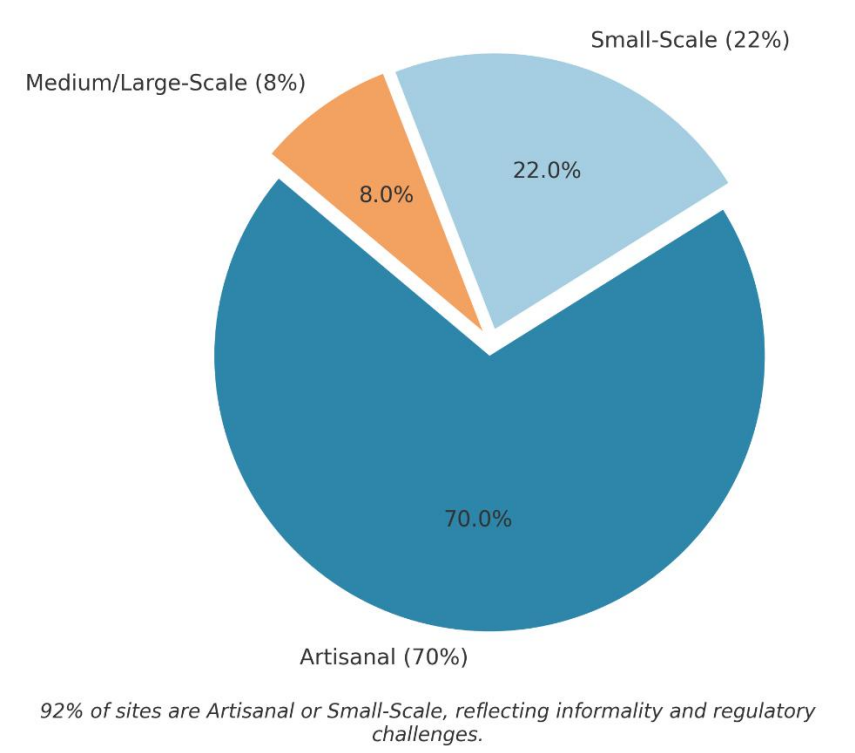

Figure 4. Scale of mining operations in Oke-Ogun (n=187 sites)

Environmental impacts assessment

The environmental degradation is severe and widespread, affecting all three core environmental media: land, water, and air (figs 5, 6, and 7).

Land degradation: Field observation confirmed that 100% of the visited sites showed visible land degradation. A staggering 91% of sites had no reclamation activity whatsoever, leaving behind abandoned pits and waste dumps. Using a simple erosion scale, 65% of sites were classified as having "High" or "Severe" erosion risk.

Water pollution: Community perceptions aligned with physical observations. 82% of surveyed household respondents in mining-adjacent communities reported a "significant decrease" in water quality (increased turbidity, taste, and colour) since mining intensified in their area. Water quality analysis from selected streams near Iseyin gemstone mines showed suspended solid levels 15 times above the WHO recommended limit for drinking water.

Air and noise pollution: From the survey of miners and residents, 74% of respondents living within 500m of a granite crushing site reported frequent respiratory irritation (coughing,

catarrh). Noise levels measured at these sites consistently exceeded 85 dB, the recommended safety threshold.

Figure 5 showing massive land degradation in the study area


Figure 6 showing land degradation and loss of habitat in study area


Figure 7 showing air pollution in study area

Socio-economic impacts: a livelihoods perspective

Applying the Sustainable Livelihoods Framework (SLF), the impacts on the five capital assets were stark.

Table 2: Perceived impact of mining on community livelihood assets (n=400 households)

Livelihood Asset	% Reporting Negative Impact	% Reporting Positive Impact	Key Manifestations
Natural Capital	88%	2%	Loss of farmland, polluted water sources
Human Capital	45%	25%	Health issues vs. new mining skills
Social Capital	60%	15%	Conflicts vs. new social networks (cooperatives)
Physical Capital	35%	40%	Damaged roads/farms vs. new motorcycles/phones
Financial Capital	20%	75%	Loss of farm income vs. direct cash from mining

The data, as shown in table 2 and fig. 8, reveals a critical trade-off: while mining provides crucial short-term financial capital, it systematically degrades the natural capital (land and water) upon which the region's long-term, sustainable agrarian economy is built. Focus Group Discussions (FGDs) with farmers revealed deep anxiety, with one participant stating, "The money from the stones is sweet, but it cannot be eaten. When the land is gone, what will we leave for our children?"

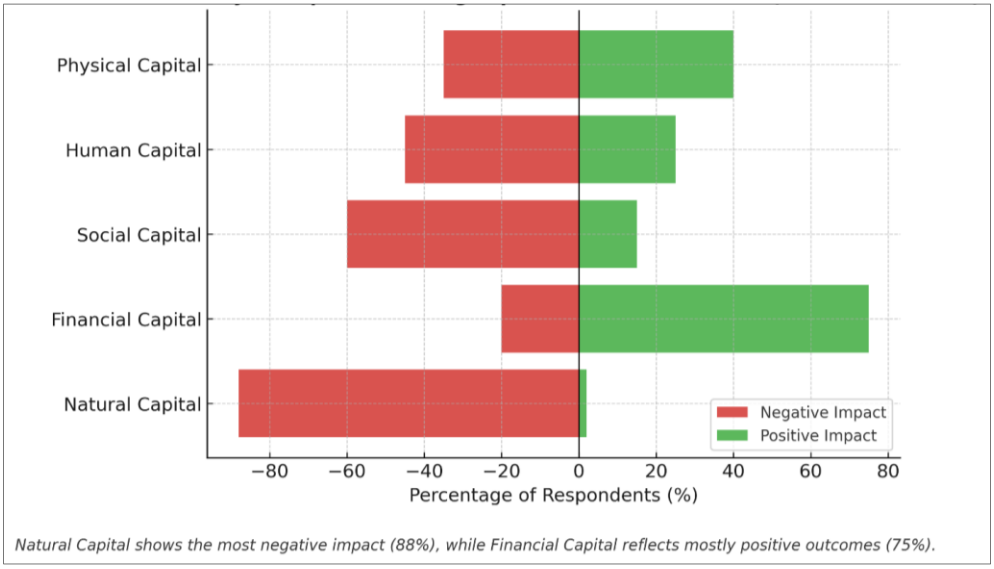

Figure 8. Community perception of mining impact on livelihood assets (n=400 households)

Stakeholder analysis: roles, interests, and perceptions

The application of Stakeholder Theory uncovered clear conflicts and alignments.
Artisanal Miners: Their primary interest is immediate income (95% cited it as main motivation). They perceive government agencies as hostile ("they only come to arrest us or collect bribes") and environmental rules as a threat to their livelihood.

Host Communities (Farmers/Residents): They exhibit profound ambivalence. While 78% acknowledged the new source of income for youth, 85% were worried about the destruction of farmland and pollution. A significant 72% felt completely excluded from decision-making processes regarding mining on their land.

Traditional Rulers: Positioned as intermediaries, they express a dual interest in maintaining social harmony and securing community development. However, interviews revealed frustration; one Chief noted, "The Federal Government gives the license, but we who own the land are not consulted. When the people are suffering, it is to our palace they come."

Government Agencies: A key finding was the jurisdictional confusion. Federal officials cited a lack of manpower to monitor Oke-Ogun, while State officials stated their hands were tied as "minerals are not our affair." This has created a pervasive enforcement vacuum.

Policy and regulatory enforcement deficit

The data confirms a near-total collapse of governance. Of the 187 active sites:

- 0% had a publicly available or implemented Community Development Agreement (CDA).
- Less than 1% had a visible and operational Environmental Management Plan (EMP).
- No state or federal official could provide evidence of a conducted environmental inspection in the preceding 12 months.

This regulatory failure was identified by all stakeholder groups as the primary enabler of the current unsustainable practices.

Discussion

Environmental impacts and interpretations

The findings demonstrate that mining activities in Oke-Ogun significantly degrade the physical environment. Land disturbance through excavation, vegetation clearing, and artisanal pits mirrors patterns reported in other sub-Saharan African ASM regions. Soils are stripped of their top horizons, rendering them infertile and unsuitable for agriculture, which traditionally sustains the majority of households. Water quality analysis indicates contamination from suspended sediments and possible heavy metals, echoing concerns raised in global literature regarding mercury, lead, and arsenic pollution in small-scale mining belts. Dust and particulate emissions from quarrying contribute to air quality deterioration, leading to respiratory challenges.

These outcomes both confirm and extend existing research. They confirm global observations that artisanal and small-scale mining creates ecological “hotspots” of degradation, but extend knowledge by identifying the peculiarities of Oke-Ogun, where semi-arid climatic conditions

exacerbate soil erosion and water scarcity. Unlike wetter tropical mining zones, the fragility of Oke-Ogun ecosystems means recovery trajectories are slower, suggesting a heightened vulnerability to long-term environmental collapse.
From a theoretical perspective, the Sustainable Livelihoods Framework (SLF) helps interpret these findings: natural capital is being depleted without adequate replenishment, undermining other livelihood assets (e.g., reduced soil fertility lowers agricultural income, thereby constraining financial and human capital investments such as education).

Socio-economic dimensions

Socio-economically, mining in Oke-Ogun generates contradictory outcomes. On one hand, mining provides employment opportunities, particularly for youth and migrants, offering immediate financial returns in contexts of limited formal employment. It also stimulates ancillary economic activities—such as petty trading, transport, and food services—similar to observations in Tanzanian and Ghanaian ASM communities. On the other hand, these benefits are undermined by negative social externalities. Health challenges, including respiratory illnesses and injuries from unsafe pits, mirror findings in Ghana and Burkina Faso. Livelihood displacement occurs as farmlands are converted into minefields, threatening food security. Security issues—ranging from land disputes to clashes between miners and farmers—reflect what Niu et al. describe as "resource conflicts" arising from competing land-use priorities.

This tension can be interpreted through the Resource-Curse Thesis, which predicts that resource-dependent communities often experience social dislocations rather than prosperity when governance mechanisms are weak. The Oke-Ogun case illustrates this paradox: rather than delivering broad-based development, mining deepens inequalities, marginalizes vulnerable groups (women and smallholder farmers), and fosters social insecurity.

Yet the findings also add nuance. While the Resource Curse has often been studied in oil- and gas-producing states, this research demonstrates that similar dynamics apply to solid minerals at a local scale, expanding the theory's applicability beyond hydrocarbons.

Governance and stakeholder conflicts

Governance emerged as the most critical dimension shaping sustainability outcomes. Policies and regulations for the Nigerian solid mineral sector exist on paper—through frameworks such as the Nigerian Minerals and Mining Act (2007) and subsequent guidelines—but enforcement in Oke-Ogun remains weak. This confirms prior studies that highlight the gap between centralized policy design and localized enforcement in Nigeria.

Stakeholder analysis revealed conflicting perceptions and interests. Government agencies prioritize revenue collection and investment attraction; mining companies and artisanal operators often perceive regulation as a burden; local communities emphasize environmental and livelihood security; while NGOs and traditional rulers demand socially and culturally sensitive governance. These divergent views reflect Stakeholder Theory, which emphasizes that differences in power, legitimacy, and urgency influence how actors prioritize issues.

The findings suggest that the state's top-down governance model has failed to adequately engage grassroots stakeholders, thereby reducing policy legitimacy. This is consistent with global critiques of "extractive governance". The lack of institutional trust fuels contestation and undermines cooperative approaches. Moreover, elite capture and corruption—hallmarks of the Resource-Curse Thesis—further erode policy effectiveness, leading to informal and sometimes illegal mining practices flourishing in governance vacuums.

Importantly, the Oke-Ogun case contributes to scholarship by illustrating that culturally embedded institutions such as traditional rulers and community-based associations, play a central role in mediating conflicts and should not be excluded from governance arrangements. This highlights the necessity of hybrid governance approaches that integrate formal state regulation with local cultural structures.

Implications for sustainability

The study's findings imply that sustainability in Oke-Ogun's mining sector will remain elusive without systemic reform. Environmental sustainability requires rehabilitation frameworks, stricter monitoring of ASM practices, and investment in alternative livelihoods that reduce dependency on resource extraction. Socio-economic sustainability requires balancing short-term income benefits with long-term human and natural capital preservation. Governance sustainability demands stronger enforcement, transparent revenue management, and inclusive decision-making mechanisms that bridge the gap between state, community, and private actors.

By applying the SLF, Stakeholder Theory, and Resource-Curse Thesis in an integrated framework, the study shows that sustainability is not only a technical or environmental challenge but fundamentally a question of governance and social relations. Unless institutions are reformed to manage divergent stakeholder interests, mining will continue to reinforce cycles of degradation, conflict, and poverty in Oke-Ogun.

Conclusion

This study set out to investigate the environmental, socio-economic, and governance dynamics of solid mineral extraction in the Oke-Ogun region of Nigeria. The central problem addressed was the paradox of resource exploitation: while mining presents opportunities for economic engagement, it simultaneously generates significant environmental degradation, social conflict, and governance challenges that undermine sustainability.

The findings revealed that mining activities have caused widespread environmental damage, including land degradation, water pollution, and air quality deterioration. Socio-economically, mining provides short-term employment and income but at the cost of health risks, livelihood displacement, and increased insecurity. Governance analysis showed that although Nigeria has a solid mineral regulatory framework, weak enforcement and institutional capture have created a governance vacuum. Conflicting interests among stakeholders—government agencies, mining companies, artisanal miners, local communities, NGOs, and traditional rulers—further complicate efforts at sustainable resource management.

By integrating the Sustainable Livelihoods Framework, Stakeholder Theory, and the Resource-Curse Thesis, the study demonstrated that the sustainability of mining in Oke-Ogun cannot be reduced to technical interventions. Instead, sustainability hinges on strengthening governance, addressing stakeholder conflicts, and diversifying livelihoods to reduce dependency on mining.

In summary, the research confirms that unless deliberate reforms are pursued, solid mineral extraction in Oke-Ogun will continue to exacerbate poverty, insecurity, and ecological decline rather than contribute to sustainable development [1-25].

Recommendations

For Government (Federal and State)

- Strengthen Enforcement of Regulations: Establish well-resourced monitoring units in Oke-Ogun to ensure compliance with environmental and safety standards.
- Decentralize Governance: Engage traditional rulers and community associations formally in mineral governance structures to enhance legitimacy.
- Transparent Revenue Management: Ensure that mineral revenues are transparently reported and reinvested in local development (schools, clinics, roads).
- Rehabilitation Fund: Create a dedicated environmental restoration fund financed by levies on mining companies and ASM operators.
- For Mining Companies and Artisanal/Small-Scale Mining (ASM) Cooperatives
- Adopt Safer Practices: Provide training and access to safer, environmentally friendly mining technologies (dust suppression, proper tailings management).
- Community Benefit Agreements: Establish agreements with host communities that guarantee local hiring, compensation for land loss, and social investment projects.
- Formalization of ASM: Encourage cooperatives to register legally, which would improve access to credit, technology, and government support programs.
- For Communities and Civil Society
- Strengthen Community Voice: Form local resource monitoring committees to report abuses and ensure community interests are considered in decision-making.
- Alternative Livelihood Programs: Promote skill development (agro-processing, renewable energy, small-scale manufacturing) to reduce dependence on mining.
- Health and Awareness Campaigns: Collaborate with NGOs to provide education on mining-related health risks and environmental protection.

References

1. Amakiri, J., & Arugu, L. O. (2025). Policy Implementation and Local Government Administration in Nigeria: Bridging the Gap between Policy and Practice.
2. Aragão, A. (2022). Polluter-pays principle. In Encyclopedia of contemporary constitutionalism (pp. 1-24). Cham: Springer International Publishing.
3. Balogun, B. O., Ojo, A. G., Aluko, O. E., & Alage, L. I. (2024). Assessment of mining-induced land degradation in Ile-Ife, Osun state, Nigeria. Osun Geographical Review, 6(1).
4. Bekoe, I. K. (2022). Financial Inclusion, Agricultural Productivity and Income Inequality in Sub-Saharan Africa (Doctoral dissertation, University of Ghana).

5. Fagbemi, F., & Omowumi Adeoye, G. (2020). Nigerian governance challenge: exploring the role of natural resource rents. Global Journal of Emerging Market Economies, 12(3), 335-358.
6. Folorunso, M. A., & Folorunso, S. A. (2022). Environmental degradation in Nigeria: the challenges of peaceful co-existence. In Peace Studies for Sustainable Development in Africa: Conflicts and Peace Oriented Conflict Resolution (pp. 207-218). Cham: Springer International Publishing.
7. Gritsenko, D., & Efimova, E. (2020). Is there Arctic resource curse? Evidence from the Russian Arctic regions. Resources Policy, 65, 101547.
8. Haroon, M., & Hayyat, M. (2025). Assessing the dual impact of gold mining on local communities: Socio-economic benefits and environmental challenges. Resources Policy, 103, 105559.
9. Hilson, G., & Maconachie, R. (2020). Artisanal and small-scale mining and the Sustainable Development Goals: Opportunities and new directions for sub-Saharan Africa. Geoforum, 111, 125-141.
10. Huggins, C. (2021). The mining sector in sub-Saharan Africa: flows of capital and people in large-scale mining and artisanal and small-scale mining. In Handbook of Translocal Development and Global Mobilities (pp. 160-176). Edward Elgar Publishing.
11. Jeevanandam, M. (2025). Mining Activities–Risks and Challenges to Environment and Human Health in Sub-Saharan Africa. In Mining Impacts and their Environmental Problems (pp. 69-89). Cham: Springer Nature Switzerland.
12. Jongen, H., & Scholte, J. A. (2022). Inequality and legitimacy in global governance: an empirical study. European Journal of International Relations, 28(3), 667-695.
13. Klein, L. (2024). Free, Prior, and Informed Consent (FPIC): A framework for corporate engagement with indigenous peoples and the sustainable development of natural resources.
14. Kumi, S., Adu-Poku, D., & Attiogbe, F. (2023). Dynamics of land cover changes and condition of soil and surface water quality in a Mining–Altered landscape, Ghana. Heliyon, 9(7).
15. Leuenberger, A., Winkler, M. S., Cambaco, O., Cossa, H., Kihwele, F., Lyatuu, I., ... & Munguambe, K. (2021). Health impacts of industrial mining on surrounding communities: Local perspectives from three sub-Saharan African countries. PloS one, 16(6), e0252433.
16. Mahajan, R., Lim, W. M., Sareen, M., Kumar, S., & Panwar, R. (2023). Stakeholder theory. Journal of Business Research, 166, 114104.
17. Mhlongo, S. E., & Akintola, G. O. (2021). Artisanal and small-scale mining activities as post-mining land use in abandoned mine sites: a case of Giyani and Musina areas, Limpopo Province of South Africa. Journal of Degraded and Mining Lands Management, 8(3), 2815.
18. Mulenga, M., Ouma, K. O., Monde, C., & Syampungani, S. (2024). Aquatic mercury pollution from artisanal and small-scale gold mining in sub-Saharan Africa: Status, Impacts, and Interventions. Water, 16(5), 756.
19. Niu, H., Wang, J., Jing, Z., & Liu, B. (2023). Identification and management of land use conflicts in mining cities: A case study of Shuozhou in China. Resources Policy, 81, 103301.

20. Nygren, A., Kröger, M., & Gills, B. (2022). Global extractivisms and transformative alternatives. The Journal of Peasant Studies, 49(4), 734-759.
21. Ofosu, G., Dittmann, A., Sarpong, D., & Botchie, D. (2020). Socio-economic and environmental implications of Artisanal and Small-scale Mining (ASM) on agriculture and livelihoods. Environmental Science & Policy, 106, 210-220.
22. Onuoha, C. F., Emejuru, A., Afolalu, S. A., Abiri-Franklin, S. O., & Olarinde, E. S. (2024, April). Regulatory Frameworks and Enforcement Mechanisms in Nigerian Mining Laws: Challenges and Solutions. In 2024 International Conference on Science, Engineering and Business for Driving Sustainable Development Goals (SEB4SDG) (pp. 1-6). IEEE.
23. Reisinezhad, A. (2021). Essays on the natural resource curse (Doctoral dissertation, Université Panthéon-Sorbonne-Paris I).
24. Stewart, A. G. (2020). Mining is bad for health: a voyage of discovery. Environmental geochemistry and health, 42(4), 1153-1165.
25. Wassie, S. B. (2020). Natural resource degradation tendencies in Ethiopia: a review. Environmental systems research, 9(1), 1-29.