Investigating the challenges posed by artisanal and small-scale mining on Zambia's attainment of Africa Agenda 2063: The case of Serenje, Zambia

Moses Mjumpi[1*]
Mwanaumo Erastus[2]

[1*]mjumpimoses@yahoo.com

[1,2]The University of Zambia

https://doi.org/10.51867/ajernet.7.2.131

ABSTRACT

This research aimed to investigate the challenges posed by Artisanal and Small-Scale Mining (ASM) to Zambia's attainment of the Africa Agenda 2063 and to examine how ASM can play a big role in enhancing sustainable development in local and surrounding communities. It focused on three main objectives: to identify Environmental, Health and Safety, Social and Economic Challenges posed by artisanal and small-scale mining on sustainable development, to examine how artisanal and small-scale mining practices affect Zambia's progress toward achieving the goals and aspirations of Africa Agenda 2063 and to assess the effectiveness of existing policies, legal frameworks, and institutional mechanisms governing artisanal and small-scale mining in Serenje. The research is guided by Sustainable Livelihood approach which helps to understand the trade-offs between short-term economic gains from ASM and the long-term sustainability of local ecosystems and community welfare. The study targeted Artisanal Small-Scale Miners of Serenje. It employed a mixed sampling technique, using simple random sampling, combining both qualitative and quantitative data from 60 respondents. It employed a descriptive research design using a mixed-methods, following a pragmatic research paradigm. The study used both primary and secondary data. It used semi-structured interview guides and questionnaires to collect data from participants. The data gotten from respondents was analyzed using inferential and descriptive statistics for those that required. The results indicate that, ASM had concerns over access to clean water around the mining sites. Results also indicate localized deforestation around ASGM sites and increased river turbidity and channel widening downstream of mining activities. A study has shown that Artisanal and small-scale mining has created job opportunities for them in rural areas. Results also indicated that fostering sustainable development principles based on environmentally and socially responsible mining, which is safe and includes communities and all other stakeholders as one of Africa Agenda 2063 Vision. The findings also show that the existing polices, legal frameworks, and institutional mechanisms governing ASM in Serenje were not effective. In conclusion, Artisanal and Small-Scale Mining (ASM) plays a vital role in providing livelihoods for many people, especially in rural areas where formal employment is limited. It contributes to poverty reduction and local economic growth by creating jobs and generating income. However, ASM often operates informally and faces challenges such as environmental degradation, poor safety standards, and limited access to finance and technology. The study recommends that there has to be the creation of a dedicated unit within government focused on ASM to help ensure improved economic and social returns from ASM, a less negative environmental impact. Not only that, there has to be an introduction of strategic social partnerships that will aid in providing finance that is directed to sustainable development enhancement rather than profit. This will enable the ASM to do their operation sustainably. To enhance the development of ASM in providing livelihood options for local communities, Government requires to establish a wing dedicated to conduct gap analyses, policy formulation, implementation and alignment in the sub-sector.

Keywords: Artisanal Mining, Small Scale Mining, Serenje, Sustainable Development, Zambia

I. INTRODUCTION

It's been noted that as traditional livelihood systems become increasingly unreliable, households are forced to seek alternative or supplementary income sources. One of such response is the expansion of artisanal and small-scale mining (ASM)-low tech, labour intensive mineral extraction and processing, (Adamson, 2026). According to De Haan, et al, (2020), Artisanal and small-scale mining (ASM) – low-tech, labour-intensive mineral processing and extraction constitutes an essential livelihood for more than 40 million people living in rural and typically impoverished areas in lower-income countries across the developing world (World Bank, 2019). ASM provides the world with a diverse array of minerals, metals, and mined materials. This encompasses base metals, including tin (cassiterite), tungsten (wolframite, scheelite), and tantalum (tantalum-columbite) (3T) ore minerals and their derivatives, which are prevalent in contemporary electronic devices (Barume, et al, 2016; World Bank, 2016), cobalt utilized in batteries powering the electric vehicle revolution, as well as copper, rare earth elements, and other essential metals required for the transition to a lower carbon economy (World Bank, 2017).

The African Union's Agenda 2063 intends to drive towards sustainable resource management and responsible mining practices across the continent. Many SADC countries have been known to suffer from poor governance, and

economic strength which has contributed to an increase of ASM with limited environmental management. Artisanal small-scale mining is often linked to conflicts over land use, health hazards, and displacement of local communities, resulting in socio-economic tensions that require urgent policy interventions, (Bhebhe & Ngoepe, 2022). The Mining sector has been critical in Zimbabwe's economy just like in any other African country. It contributes significantly to employment, national revenue, and foreign exchange earnings. However, the sharp increase in ASM, particularly in chrome-rich areas, has created significant environmental and social challenges, (Dzumbunu, 2025). Due to Zimbabwe's economic downturn, high unemployment rates, and poverty many individuals have been pushed into artisanal mining, often carried out without adherence to environmental regulations (Government of Zimbabwe, 2019).

Malawi's case has not been very different from the rest of Sub-Saharan Africa. Traditionally regarded as an agricultural country, a recent surge in mining activities has encouraged many to diversify into ASM as a potential source of income for rural livelihoods, (Adamson, 2026). Despite being an important livelihood option, ASM has not been spared from different controversies. According to Haundi et al. (2021), themes that have been extensively studied include risks to miners' health; dominating illegality such as mining in violation of existing laws or in protected areas and persisting informality which is operating outside formal regulation but not necessarily criminal, often as a result of bureaucratic barriers, unclear policies, or exclusionary frameworks; ASM's contribution to rural livelihoods; and the environmental implications and concerns.

Additionally, Zambia has the world's highest-grade zinc and lead deposits, mined at Kabwe, leaving a toxic legacy. Not only that, Zambia is has one of the largest global miners of emeralds, contributing nearly 20% to global supply. Though Zambia is endowed with a variety of mineral resources mined in both large and small-scale operations (Tychsen, et al., 2018), large-scale copper and cobalt production dominate the country's mining focus and production (United States Geological Survey [USGS], 2022). This is largely due to the fact its Copperbelt and North-western provinces host some of the world's highest-grade copper and cobalt deposits. The country has as well faced a lot of environmental challenges in reaching the Africa Agenda 2063 by the Artisanal and small-scale mining. Therefore, the aim of the study was to investigate the challenges posed by artisanal and small-scale mining on Zambia's attainment of Africa agenda 2063, the case of Serenje, Zambia.

1.1 Statement of the Problem

Artisanal mining can be viewed as an excellent means for diversifying rural economies, but its associated problems "threaten to undermine its credibility as a precursor to national and locally based socioeconomic development." (Gibb, 2019.) Artisanal mining causes environmental problems such as indiscriminate disposal of faecal waste and tailings, contamination and pollution of water bodies and soils. In addition, because of its widespread geographical locations, artisanal mining causes a great deal of landscape destruction, (Mususu & Luputa, 2026). García et al, (2019) argue that mined land becomes permanently altered that it can no longer be used for other purposes such as farming. The pits that are left open often become hazards to both humans and animals, especially when they are with water, they also serve as breeding grounds for mosquitoes (Bunker, 1984).

Artisanal and Small-Scale mining with its promise of quick wealth, also acts as a pole of attraction for criminal activities like money laundering, substance abuse, theft, and prostitution (International Labour Organization (ILO), 2021). Chipangura (2019) adds that "because of breakdown in law and order in most of these mining areas, miners spend a lot of their money on alcohol, prostitution, and gambling at the expense of productive investment", for this reason, high rates of prostitution, crime and sexually transmitted diseases like HIV/AIDS in mining communities have been reported (Fisher, 2018). The standard of occupational health and safety (OHS) in artisanal mining is inferior While the sector employs at least 1% of the world's total workforce, it is also responsible for at least 8% of the world's industrial accidents. Mine accidents range from rock falls, mine cave-ins to flooding, while health hazards include mercury poisoning and silicosis (Hentschel, 2017). Poor sanitation is another major health problem on ASM sites. Because artisanal mining is transient, miners do not construct sanitary facilities. For this reason, infectious water-borne diseases like bilharzias and diarrhoea are rampant in resident mining communities (Fisher, 2018).

Existing literature indicates a research gap regarding the challenges posed by ASM on Zambia's attainment of Africa Agenda 2063. While scholars globally have explored challenges investigates the challenges posed by ASM activities to Zambia's attainment of the Africa Agenda 2063, nor does it explore the challenges they pose to Zambia's achievement of the Africa Agenda 2063. Despite research efforts (O'Faircheallaigh & Corbett, 2016) In Zambia, related to the difficulties caused by ASM on sustainable development, a concentrated study on how these challenges affect Zambia's attainment of the Africa Agenda 2063 remains conspicuously absent.

1.2 Research Objectives

i. To identify Environmental, Health and Safety, Social and Economic Challenges posed by artisanal and small-scale mining on sustainable development.
ii. To examine how artisanal and small-scale mining practices affect Zambia's progress toward achieving the goals and aspirations of Africa Agenda 2063.

iii. To assess the effectiveness of existing policies, legal frameworks, and institutional mechanisms governing artisanal and small-scale mining in Serenje.

1.3 Research Questions

i. What are the key environmental, health and safety, social, and economic challenges posed by artisanal and small-scale mining on sustainable development in Serenje District?
ii. In what ways do artisanal and small-scale mining practices influence Zambia's progress toward achieving the goals and aspirations of Africa Agenda 2063?
iii. How effective are the current policies, legal frameworks, and institutional mechanisms in regulating and managing artisanal and small-scale mining activities in Serenje?

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 The Sustainable Livelihood (SL) Approach

The Sustainable Livelihoods (SL) Approach was developed in the 1990s by development agencies such as the UK Department for International Development (DFID) and draws on the earlier work of Chambers and Conway in 1992 (Mutale et al., 2019). The approach emphasizes that people's livelihoods depend on the resources and assets they can access such as natural, human, financial, social, and physical capital and the strategies they adopt to sustain their well-being, (Siaciti, 2022). A sustainable livelihood can cope with and recover from shocks and stresses, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for future generations. The SL approach is therefore people-centred, focusing on improving the resilience and long-term sustainability of individuals and communities, particularly in developing regions that rely heavily on natural resources, (Ncube-Phiri et al., 2015).

The Sustainable Livelihood Approach provides a valuable lens for analysing the challenges posed by artisanal and small-scale mining (ASM) on Zambia's attainment of Africa Agenda 2063, with a focus on Serenje District. ASM is a major source of livelihood for many rural households in Zambia, providing income and employment opportunities where formal jobs are scarce. However, when mining activities are conducted without regulation, they often lead to environmental degradation, unsafe working conditions, and social conflicts, all of which threaten the sustainability of local livelihoods. By applying the SL framework, this study examines how ASM influences the key livelihood assets (natural, human, financial, physical, and social capital) and how these impacts, in turn, affect Zambia's progress toward sustainable development goals under Agenda 2063, such as inclusive growth, environmental protection, and social well-being, (Musukwa, 2023).

Furthermore, the SL approach helps to understand the trade-offs between short-term economic gains from ASM and the long-term sustainability of local ecosystems and community welfare. It provides an analytical basis for identifying policies and interventions that can transform ASM into a more sustainable and regulated sector, (Siaciti, 2022). Therefore, this framework guides the study in exploring how improved governance, resource management, and community empowerment in Serenje can contribute to achieving the broader vision of a prosperous, inclusive, and environmentally sustainable Africa as envisioned in Agenda 2063.

2.2 Empirical Review

Artisanal mining is part of the informal sector and is typically identified by rudimentary mining techniques, a large labour force, and poverty. In small-scale mining, some level of mechanization may be used at both the mining and beneficiation stages of the value chain. In Zimbabwe, for instance, according to the Government of Zimbabwe (2019), the Mines and Minerals Act. 20-27 an artisanal miner is defined as a miner who carries out activities using approved tools and employs up to 40 people. These include government registered groups and cooperatives. Small-scale mining on the other hand employs the use of mechanization such as excavators, dredgers, generators, and earth moving equipment. The official distinction therefore between artisanal and small-scale miners in Zimbabwe is based on the scale of operation and the degree of mechanization. In Zambia on the other hand, according to the Mines and Minerals Development Act of 2016 (Republic of Zambia Poverty Reduction Strategy Paper, 2016), artisanal and small-scale mining licenses can only be issued to citizens, or to a citizen influenced or citizen empowered company. The distinction between small scale and artisanal mining is specified in mining legislation and defined according to the area of mining rights and requirements of mine safety regulations (Republic of Zambia Poverty Reduction Strategy Paper, 2016). As can be seen, in Zambia there is a concentration on formal small-scale mining.

2.2.1 Environmental, Health and Safety, Social and Economic Challenges Posed by Artisanal and Small-Scale Mining on Sustainable Development

A study done by Meutia (2022), on Indonesian Artisanal and Small-Scale Gold Mining, A Narrative Literature Review. This study mapped environmental and health risks from artisanal and small-scale gold mining (ASGM) across

Indonesia and reviewed the drivers that sustain mercury use and informal practices. The purpose was to synthesise field studies and monitoring data to show how ASGM affects soil, water, food chains, and community health in multiple Indonesian provinces. The author examined contamination levels, occupational exposures, and social drivers that perpetuate mercury use despite Minamata-era commitments. They also assessed local institutional capacity and community awareness programs. Findings show that Indonesia is a leading national source of mercury emissions from ASGM and that contamination is widespread near processing sites. The study reports strong links between ASGM activity and elevated mercury in riverine fish and local crops, posing chronic health risks. It also finds that economic necessity, weak enforcement and limited alternatives sustain unsafe practices. The paper concludes that coordinated formalization, mercury-free processing rollouts, and targeted public-health interventions are required to reconcile ASGM livelihoods with sustainable development.

Another study done in Indonesia by Arifin et al. (2020), on Artisanal and small-scale gold mining activities and mercury exposure in Gorontalo Utara. This research aimed to quantify mercury contamination and human exposure in communities surrounding ASGM operations in West Java and other Indonesian sites. The purpose was to combine environmental sampling (water, soil, sediment, and biota) with health risk appraisal to establish exposure pathways. Researchers collected and analysed field samples and compared concentrations against national and international safety thresholds. They evaluated socio-economic factors that encourage continued mercury use in informal gold processing. The main findings reported that mercury concentrations in soils and sediments often exceeded national standards and documented bioaccumulation in locally consumed fish. The study found that household and occupational exposures place children and women at particularly high risk. It concluded that without realistic livelihood alternatives and accessible mercury-free technologies, public-health risks will persist despite policy rhetoric. Recommendations included community education, promotion of concentrator technologies, and strengthened monitoring.

2.2.2 Ways Artisanal and Small-scale Mining Practices Influence Zambia's Progress

A study done by Mutale et al. (2019), on Corporate sustainability performance: an approach to effective sustainable community development or not? A case study of the Luanshya copper mine in Zambia. This article evaluates whether, through the implementation of CSP, companies are able to contribute to the sustainable development of host communities in developing countries. Against this backdrop, there exists a knowledge gap in Zambia as to what the actual contributions of CSP are towards sustainable community development. Through literature review and community data analysis, the results revealed that there was a mismatch in priorities between CSP and the expectations of community members. Findings show that CSP focused mostly on haphazard donations, an approach that has been proven to be unsustainable. Finally, CSP had little or negligible impact on most selected Sustainable Development Goals (SDGs). In view of these findings, the study suggests adopting sustainability frameworks that are tailored to the local context. Furthermore, formulation of CSP initiatives should take a triangular approach of communication that is inclusive of all stakeholders.

2.2.3 Effectiveness of Existing Policies, Legal Frameworks, And Institutional Mechanisms Governing Artisanal and Small-Scale Mining in Serenje

A research was done in Zambia by Hilson (2025), on Artisanal and Small-Scale Mining, Governance, and the Sustainable Development Goals. on This paper explored the relationship between ASM practices, governance structures, and the achievement of the Sustainable Development Goals (SDGs), with a focus on sub-Saharan Africa. The research highlighted that ASM is often characterized by informal practices, weak governance, and limited access to resources, which hinder its potential to contribute to sustainable development. It found that without effective governance frameworks, ASM can lead to environmental degradation, social inequalities, and economic inefficiencies. The study recommended strengthening governance structures, formalizing the sector, and integrating ASM into national development plans, such as Africa Agenda 2063, to harness its potential for sustainable development.

III. METHODOLOGY

3.1 Research Design

In this study, a descriptive research design is employed to address four distinct research questions related to the challenges posed by Artisanal and Small-Scale Mining (ASM) on Zambia's attainment of Africa Agenda 2063. Descriptive research design was used because it enables researchers to systematically describe and document the characteristics, behaviors, opinions, or conditions of a population or phenomenon without manipulating variables. The primary research objectives involve investigating, identifying, and evaluating these practices.

3.2 Study Area or Site

The study was conducted in Central Province of Zambia in Serenje Small-Scale mining exists. These comprises of the Artisanal Miners. The Central regions host major Artisanal Mines mainly involved in gold and copper mining,

(Zambia Extractive Industries Transparency Initiative [ZEITI], 2024). Communities like Kabwe and Serenje are contribute to mining sector income. The study area was appropriate as it reflects both the opportunities and challenges of ASM in attainment of Africa Agenda 2063.

3.3 Target Population

The target population for this study comprised of 88 employees within Artisanal and Small-Scale Mining in Kabundi area of Serenje District and community members who are directly affected by the challenges posed by ASM. The group consists of senior management, Supervisors, equipment operators, Headmen, community members and other employees within the ASM. The findings from this target population offered valuable insights into the challenges that ASM poses on sustainable development.

3.5 Study Sample/ Sampling Framework

The study focused on selected mining ASM area in the Central Province, namely Serenje. The study area was purposively selected because they host major Artisanal Small-Scale Mining operations with long-standing environmental, health and safety effects, and poor existing policies, Legal Frameworks, And Institutional Mechanisms Governing, (ZEITI, 2024; World Bank, 2023). A qualitative sampling framework was employed. a simple random sampling technique is utilized to select respondents for questionnaires and interviews which provided insights into the challenges that ASM poses on sustainable development.

3.6 Sampling Techniques and Sample Size

Sampling is one of the most important factors which determines the accuracy of a study. Sampling refers to selecting a smaller group of participants from a large population to participate in a particular study (Bhardwaj, 2019). Simple random sampling was used to select participants from the larger population of employees and community members who are directly affected by the challenges posed by ASM. Simple random sampling ensures that each member of the population has an equal chance of being selected for the study. This sampling method allowed for the generalization of findings to the broader population of Kabundi area of Serenje district who are affected by the challenges posed by ASM.

The sample size to determine the number of respondents was Calculated using Yamane's formula Polit and Hungler, 2010 coined by Yamane, 1967 with the sampling error of 5%

$n=N1+ (e) 2$

Where:

n= sample size

N= number of the item in the population.

e= sample error 5%

Therefore, n can be determined as 60

3.8 Data Collection Methods

The study used the qualitative approach to gather data on the challenges posed by ASM on Zambia's attainment of Africa Agenda 2063. Both primary and secondary data were utilized to provide a comprehensive understanding of the research topic.

A qualitative methodological approach is employed in developing this research. The choice for a qualitative approach is used because components such as governance, institutional frameworks and community assets are so complex to analyse by strictly using analytical means. A qualitative research approach also permits us to "formulate and seek answers to questions about the social world" (Staskevicius & So, 2015). A questionnaire was administered allowing respondents to provide standardized responses regarding challenges posed by ASM on Zambia's attainment of Africa Agenda 2063. The questionnaire only had closed-ended questions. Secondary data was gathered from various sources such as company reports, previous studies, industry publications, and relevant literature. This secondary data complemented and validated the findings obtained from primary data collection. The combination of primary and secondary data provided a comprehensive analysis of the research objectives and enhanced the overall rigor of the study.

3.9 Procedure for Data Collection

The study began with an introductory meeting with the participants to discuss the purpose and objectives of the study. After securing permission to conduct the study, potential participants were contacted through phone to secure their participation in the study. Semi-structured interviews were conducted via phone calls, video conferencing platforms. Furthermore, the researcher also used a questionnaire in the data collection procedure.

3.10 Data Analysis

The collected data was analysed using qualitative analysis techniques. Data analysis involved thematic and content analysis, such as critical thematic analysis and qualitative content analysis to examine how the challenges posed by ASM affect the Livelihood of the community in which ASM are being done and how it affects Zambia's attainment of Africa Agenda 2063.

3.11 Ethical Considerations

The study followed ethical guidelines to protect participants' rights and well-being. Informed consent was obtained, ensuring confidentiality and anonymity of data. The collected data was used solely for research purposes and not shared with third parties. Participants were informed about the interview duration and time required to complete the questionnaire. Interviews were conducted at convenient locations, and permission was obtained from organizations for data collection. Participation was voluntary, and participants had the right to withdraw without coercion. These measures ensured a transparent and responsible research process.

IV. FINDINGS & DISCUSSION

4.1 Background Characteristics

A number of background characteristics were considered in this study. Figure 1 below shows the percent distributions of how many respondents responded and the gender.

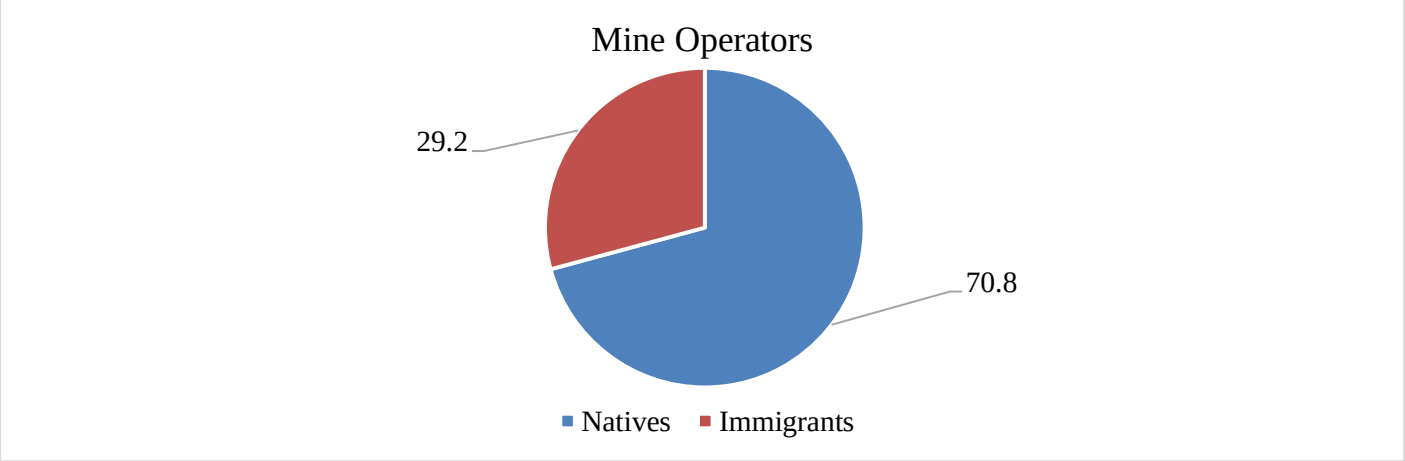

Figure 1
Mine Operators

The general scenario from the mine sites is that 71% of the mine operators are native, whilst 29% are immigrants. From Table 1, it can be concluded that ASM activities can benefit communities because they have interests by virtue of them being native. The frequency of immigrants however cannot be ignored because there is likelihood of ASM immigrants to prefer sending any proceeds from the minerals sold to their home towns.

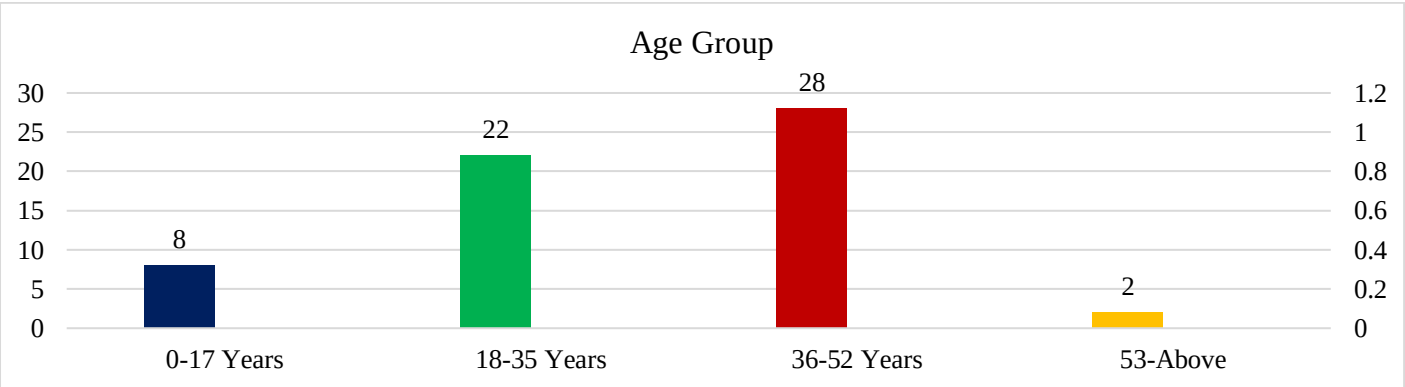

Figure 2
Age Group

The results of the study above revealed that most of the Artisan operators 47.0% (28) had the ages ranging between 36-52 years, followed by 37.0% (22) ranging between 18-35 years. The second least is 13.0% ((8) age range 0-17 years and the least was in the age range of 53 and above with 3.0% (2). The results have clearly showed the age range of the participants in the study.
The table below considered under this section is formal education. Table 1 shows the levels of education and training attained by the ASM miners in the study area.

Table 1
Highest Level of formal education reached by ASM operators.

	Frequency	Percent %	Cumulative %
None	10	19	19
Primary	27	53	72
Secondary O level	1	2	74
College	5	10	84
Undergraduate	0	0	84
Other training	8	16	84
Total	**60**	**100**	**100**

The results showed that 53.0% (27) of the respondents had primary level of education, followed by 19% (10) for those who did not have, followed by 16% (8) for those with other training and the least level of education was 0% (0) which was undergraduate.

4.2 Identify Environmental, Health and Safety, Social and Economic Challenges Posed by Artisanal And Small-Scale Mining On Sustainable Development

Environmental Challenges: The increase in ASM activities in the district raises a concern because there are no programs of rehabilitation after the mining resources are exploited and hence reducing access to arable land for farming. The study found no program of rehabilitation from the miners interviewed and usually mined out pits facilitate soil erosion during the rainy season and hence affecting the fertility of soils in the long term. Furthermore, mass soil inversion because of the open pits mining going on render large areas of forest ecosystems devastated and pose a danger to the safety and health of the surrounding communities.

Plate 1
Land Degradation due to ASM Activities

Safety Challenges: he finding was that most of the miners interviewed lacked appropriate personal protective equipment and hence susceptible to harm, as stated by some respondents. What was common was the use of novel tools such as picks, shovels, wheelbarrows, hammers, and sacks for material handling. As shown in plate 2 only 10 % of the miners interviewed had access to personal protective equipment.

Plate 2
Shows Miners with Unprotected Gear

Social Challenges: From the results, the study showed that only 10 percent of miners have had college education and 71 percent has had some form of education. The high levels of lack of know-how coupled with low skills in mining poses a challenge if efficiency of exploitation is to be achieved and the safety and health of the operatives. To work as a miner, you need to have some basic skills in safety, mining, and tool handling techniques. However, only about 16% of the interviewees had some basic skills training organized by some civil society organizations in collaboration with the government on value addition to Gold/manganese mining with a few members from cooperatives attending.

Another challenge the study indicated that, most of the interviewees raised concerns over access to clean water around the mining sites. One miner named Moses said, "We just drink water from pits and tunnels that gets exposed as mining progresses". The Serenje district situational report of 2016 indicated that only 68% of the population in the district has access to safe and clean water. The other 32 % of the population accesses water from 43 shallow wells and natural streams. From the study less than 10% of the miners interviewed had access to clean drinking water from nearby villages. Sanitation is another key component of social assets. The Serenje district situational report also showed that only 15% of the population has access to flushable toilets whilst the rest of the population used pit latrines or the bush.

Access to Schools and health facilities was also a challenge as these facilities were in far-flung areas. Only one mining area in Kabundi had a well-developed community with access to a school and clinic within a radius of 5 kilometers. One of the mine owners indicated that the ASM operators in that area had come together and collectively sold the mineral products and contributed money towards the maintenance of the clinic and school.

The access roads to the study areas were in very bad state. The study was restricted due to poor road network to access the mines. The bad state of roads also makes marketing the minerals a challenge. The Serenje Small Scale Miners Association has been a beneficiary of funds from a European Union-Mining Sector Diversification Program (EU-MSDP). The residual fund from this program is being employed in provision of 153KM Road distance covering (7) seven feeder roads in the district. So far, (3) three mining access roads have been successfully constructed. However, at the time of the study, the Serenje Small Scale Miners association was still lobbying for the completion of the program pursuant to Serenje district situational report in 2016.

Economic Challenges: The miners mentioned that there was a difference in their capacity to earn money from their mining activities alone and to secure their livelihoods. It is important to note that while financial assets tend to be versatile, they cannot alone solve all the problems of poverty. People may not be able to put their financial resources to good use due to a lack of knowledge, or inappropriate policies, institutions, or processes can constrain them. The main economic assets defined in the livelihood's framework is income generation. For the ASM operators in Serenje, different mineral products (Quartz, Gold, Manganese, and Copper) are the main sources of income. Although miners only get a salary from the proceeds and have no control on pricing and the final proceeds from the sales of the minerals, they get cash when a sale is done. However, income generation is not easily obtained, one miner said:

> *"Sometimes we stay for months without finding tangible minerals to sale and the owner of the mines in that case just gives us some small allowances to keep us going,"* (Miner, 01.03.2025)

From the study, rsults indicate that only about 10% of the miners were content with the income generated from the mining activities. Then 80% indicated that the income generated is usually not sufficient to meet the basic needs of the miners, and hence another reason why they venture into crop farming and other income generating activities. From information gathered the study found that only 20% of the miners had some form of access to finance for ASM activities. The study revealed that there is insufficient capital to buy equipment for simple mechanization as shown by the novel tools being used for exploitation in plate 2 above. Access to finance has proved to be difficult since there are insufficient bankable documents to use to access finance from banks and financial institutions.

4.3 Examine how Artisanal and Small-Scale Mining Practices Affect Zambia's Progress toward Achieving the Goals and Aspirations of Africa Agenda 2063

Efforts to Achieve Sustainable Economic Growth: Results from the study indicate that Artisanal and small-scale mining has created job opportunities for them in rural areas where formal employment is scarce. Participants indicated that ASM provides livelihoods to their families who depend on mining as their main source of income. This has helped to reduce poverty and stimulate local economies. However, most of these activities remain informal, so their full contribution to Zambia's economic growth is not properly captured in national statistics.

Apart from that, most of the respondents shared that ASM helps them as they also contribute to national development through mineral production, even though on a small scale. Many artisanal miners believe their efforts support the local and national economy by increasing mineral output and promoting entrepreneurship. The income earned often circulates within the community, stimulating local businesses and trade. However, without proper regulation and support, much of this potential remains untapped. With better organization, artisanal mining could meaningfully advance Zambia's development goals under Africa Agenda 2063. *Environmental or Social Impacts of Artisanal and Small-scale Mining:* Respondents reacted and said that most of the mining activities done in the area have been able to contribute to land degradation, and they had no control of it, as they depended on the mining activities to survive. One stated that

"when we dig for gold, the soil gets loose, and the water we use becomes dirty. Sometimes, even our animals have no good place to drink water. We see trees being cut and big holes left open after mining. This makes life hard for us later when we want to grow crops again," (Miner, 01.03.2025; Serenje). This was evident as seen from the plate 3.

Plate 3

Siltation and Pollution of Kabundi River

Other responses from the respondents stated that ASM helps them to survive because they have no other work to do, but it also brings problems to their community. They argued that smoke and dust from mining make people cough, and some get sick. Many young people stop going to school to work in the mines. Sometimes people fight over mining places because there are no clear rules. We want help so we can mine safely and still live well in our area.

Table 2
Research findings versus the Africa Agenda 2063

Thematic area	Africa Agenda expectation	Research findings
Sustainable Livelihood assets	Building human and institutional capacities towards a knowledge economy that supports innovation, research and development	The sector remains novel with low level of skill of ASM Operators. Evidence of simple mechanization exists in some areas
	Fostering sustainable development principles based on environmentally and socially responsible mining, which is safe and includes communities and all other stakeholders	Community assets such as access to clean water, Skills development, and environmental protection not fully developed. There is no existing plan on rehabilitation of former arable land where open pits and trenches have been mined
	Promoting good governance of the mineral sector in which communities and citizens participate in mineral assets and in which there is equity in the distribution	The level of stakeholder engagement between government, civil society and community is still low to advance equal participation in resource exploitation

Government's Current Policies and Regulations: Respondents stated that the government policies and regulations on mining helped them to bring order, but, they argued that, sometimes the rules are not followed. They also stated that as ASM they do not understand the laws or cannot afford the licenses, so they keep working informally. This makes it difficult for the government to control the damage caused to the land and environment. If the policies were easier to understand and apply, more miners would work legally. That would help Zambia move closer to its development goals.

Not only that, respondents also stipulated that, policies and regulations help them know that the government wants mining to support development, but there is little support for artisanal small-scale miners. Most of them stated that they do not get training or proper tools, and the officers rarely visit to teach them how to mine safely. Because of that, many continue using dangerous methods that harm the environment and their health. Some stated that, the policies look good on paper, but they are not helping them much on the ground. They argued that they need more help to make their work safe and beneficial to the nation.

Table 3
Research findings versus the Africa Agenda 2063

Thematic area	Africa Agenda expectation	Research findings
Governance	Developing a diversified and globally competitive African mineral industry that contributes to broad economic and social growth through the creation of economic linkages	Generally, but no clear direction on how it can stimulate other local economic activities.
	Harnessing the potential of small-scale mining to improve livelihoods and integration into the rural and national economy	Focus has been on formalization and licensing whilst the strategy to improve livelihoods is not clearly provided to support community assets.
	Optimizing knowledge and benefits of finite mineral resources at all levels of mining and for all minerals.	Formalization programs are in place. Beyond this, ASM is left to operate with minimal government support and monitoring

Long-term Development and the Aspirations of Africa Agenda 2063: In response to how ASM be better managed to contribute positively to Zambia's long-term development and the aspirations of Africa Agenda 2063, most of the responders indicated that, if the government gave them proper training and support on how to mine safely and protect the environment. Many of them mine without knowing the right methods, which causes damage to the land and water. *"If we are taught better ways, we can work safely and earn more income"* as stated by most of them. They also indicated that the government should also provide simple equipment and fair markets for selling our minerals. This will help them contribute to the country's development and reduce poverty. Not only that, they also indicated that it can help if small-scale miners are given licenses easily and treated fairly like big companies. Many people want to work legally, but the process is too hard and costly. If it becomes easier, more miners will follow the rules and pay taxes to support the country. The government should also put strong leaders in charge to stop illegal mining and corruption. This way, mining will bring good results and help Zambia reach its goals under Africa Agenda 2063.

Specific Challenges the Community Faces in Artisanal and Small-scale Mining: Some of the challenges faced by as revealed by the ASM are lack of proper tools and machines to do the work safely and effectively. Many of them still use hand tools, which makes the work slow and dangerous. They also do not have protective clothes, so people get hurt or sick easily. Sometimes they have no good roads or transport to take the minerals to the market. These problems make it hard for them to earn more and help the country develop. Not only that, respondents revealed that there is too much illegal mining and no clear rules in some areas. The other challenge was that most of the ASM fight over mining places, and this causes confusion and accidents. Apart from that, the government officers do not come often to guide or support them, they also face poor health because of dust and dirty water from the mines. These issues stop the community from growing and slow down the country's progress toward Agenda 2063.

4.1.3 To assess the effectiveness of existing policies, legal frameworks, and institutional mechanisms governing artisanal and small-scale mining in Serenje.

Description of Government's Policies and Regulations: Results shows that most of the ASM did not have the understanding of the policies and regulations set by the government. They argued them not to be clear for them. Many of them do not know how to get licenses or follow all the legal steps. They stated that, sometimes the rules are too difficult and expensive to follow. This makes them to continue mining illegally. If the rules were simple and explained well, more of them would follow them safely. Other respondents also stated that, officers rarely visit the mining areas to check or guide them. Many of ASM do not get support or information about the policies. Because of this, illegal mining and unsafe practices continue. They stated they needed the government to explain the laws better and make them easier to follow.

Effectiveness of Government Institutions in Managing ASA: Results show that the government institutions have not been effective. They argued that officers are few and cannot visit all the areas where people mine. Many miners continue working without following the rules. If there were more visits and guidance by the government institutions, the government institutions would have been effective could be safer and more organized. Others stated that, it seems feel the institutions are not strong enough to manage all miners properly. On the other hands, results show that Yes, institutions in the area have been effective. They stated that, they try to be effective, but there are still many problems. The government sets rules and sometimes inspects mines, but there are not enough staff or equipment to cover all areas. Many miners still work informally because it is hard to get licenses or permits. The efforts are there, but they are not enough to control all mining activities. More support and regular visits would make the institutions work better.

Challenges Artisanal Small-scale Miners Face in Following Existing Policies: Most of the respondents stated that the challenge is that the rules and licenses are too expensive. Many ASM cannot afford to pay the fees or buy the right equipment, so they keep mining illegally. This makes it hard to follow the laws and get official support. Sometimes the process to get permission is long and confusing. Because of this, many miners miss the benefits that come from working legally. Not only that, the challenge faced by ASM is lack of information and guidance about the policies. Many ASM do not know how to apply for licenses or what the rules require. Officers rarely visit the mining sites to explain the laws or give advice. Without proper knowledge, ASM continue unsafe and informal mining practices. This stops the community from benefiting fully from government programs and regulations.

Changes or Improvements Make the Laws and Institutions More Effective: According to respondents, the improvement is to make the rules and licenses easier and cheaper for small miners. If the government simplified the process and lowered costs, more people could follow the law. This would help reduce illegal mining and unsafe practices. Miners could also get better access to support and markets. Overall, it would make mining safer and more beneficial for the community and the country. Another suggested response from many participants were the trainings. They stipulated that if they are to improve the government should provide more training and regular visits from government officers. When officials come to the mines, they can teach them safe ways to work and explain the rules clearly. This would help ASM avoid accidents and follow the law. People would also know how to protect the environment while mining. These steps would make artisanal mining more organized and helpful for Zambia's development. Respondents also stated that if they are to improve, there is need to have more regular visits and supervision from government officers. Currently, officers rarely check our mining sites or give guidance. If they came often, they could help ASM follow the rules and work safely. This will reduce unsafe and illegal mining practices. ASM will then trust the government and cooperate better.

The participants also stated that, if change is to occur, institutions should provide them with better access to equipment and markets for miners. Many small miners cannot get proper tools or sell their minerals at fair prices. If the government helps with equipment and market access, mining will be safer and more profitable. This will encourage people to work legally. It will also contribute to Zambia's long-term development under Africa Agenda 2063.

Hypothesis Testing

Table 4

Hypothesis Testing Results

Hypothesis	Comment
H_1: There is No significant impact of key areas of development on sustainable development.	Not Supported
H_2: There is a significant impact of key areas of development on sustainable development.	Supported

Table 4 above reveals the following:

H_1 – There is a significant impact of key areas of development on sustainable development in attainment of the African Agenda 2063 Vision.

H_2 – There is a significant impact of key areas of development on sustainable development.

4.2 Discussion

4.2.1 Environmental, Health and Safety, Social and Economic Challenges posed by artisanal and small-scale mining on sustainable development.

The findings indicate that, there was no program of rehabilitation from the miners interviewed and usually mined out pits facilitates soil erosion during the rainy season and hence affecting the fertility of soils in the long term. This study is in line with the findings done by Bruno et al. (2020), who found out that, there was a rapid, localized deforestation around ASGM sites and increased river turbidity and channel widening downstream of mining activities. In other words, ASM practices has led to deforestation which leads to environmental degradation due to soil erosion during rainy season.

Not only that, results indicated that the AS had concerns over access to clean water around the mining sites. Some ASM in Serenje stated that they drunk water from pits and tunnels that gets exposed as mining progresses. The also indicated that was polluted as they did their mining activities. A study done by study Meutia (2022), reports strong links between ASGM activity and elevated mercury in riverine fish and local crops, posing chronic health risks. In short, the mining activities done by ASM has a capacity or has caused water pollution, which poses a challenge to the health of humans and animals.

Furthermore, the study reveals that, only 41 percent of miners have had some form of education. This coupled with low skills and know how in mining poses a challenge if efficiency of exploitation is to be achieved and the safety and health of the operatives. A similar study done by Kamtukule (2025), states that, there is a significant skills gap within the labour market, with no coherent strategy to develop the necessary workforce to support the growing mining sector. This implies that, without proper education for the ASM, mining activities cannot be fully exploited. Hence, this results into poor maximization of their efforts.

The study also reveals that there is insufficient capital to buy equipment for simple mechanization as shown by the novel tools being used for exploitation in the figure above. The result above is similar to the study done by Musukwa (2023), he found out that, the ASM lack capital, this transcended to them being no bankable document to access finance from the bank, hire proper geologist and lack of technical and business skills; unfair and inappropriate market arrangement; Lack of processing plants; and Illegal miners. In other words, the ASM lack capital that can enable them to expand their mining. This has led to also being unable to access funds from the banks as they do not have proper documentations for them to access the funds.

4.2.2 Artisanal and small-scale mining practices affect Zambia's progress toward achieving the goals and aspirations of Africa Agenda 2063.

A study has shown that Artisanal and small-scale mining has created job opportunities for them in rural areas in Serenje, where formal employment is scarce. It was revealed that ASM provides livelihoods to their families, who depend on mining as their primary source of income. This has helped to reduce poverty and stimulate local economies. A similar study done by Musukwa et al (2023) in Zambia states that the major findings were that ASM comprises more than 400 small-scale miners and an unspecified number of illegal miners and artisanal miners who are estimated to be over 500 thousand and have been able to make a living through this activity. Even though their methods are unorthodox or unconventional, the results of contributing to development which is one of the agenda of Africa 2063 cannot be denied.

Apart from that, results also show that most of the mining activities done in the area have been able to contribute to land degradation, and they had no control over it, as they depended on the mining activities to survive. This is in alignment with the study done by Matsa et al. (2024). They found out that the availability of minerals triggers slow economic growth, political instability and environmental degradation. This has contributed to numerous problems, such as poverty, corruption, crime, and inequality, which are attributed to the way minerals are mined and managed, hence, limiting the Africa Agenda 2063 Vision.

Results also indicated that fostering sustainable development principles based on environmentally and socially responsible mining, which is safe and includes communities and all other stakeholders as one of Africa Agenda 2063

Vision, community assets such as access to clean water, Skills development, and environmental protection has not fully developed. This has shown that there is no existing plan on rehabilitation of former arable land where open pits and trenches have been mined. This has impeded on the African Agenda Vision 2063. According to Kamtukule (2025), his findings indicate that while the government holds substantial decision-making power, international non-governmental organisation and private mining companies exert greater influence in the sector. Additionally, the study reveals a lack of adequate governance structures to ensure meaningful community participation, despite mining communities bearing the negative externalities of mining operations. This aligns with the findings found during the research.

Furthermore, research discovered that the government policies and regulations on mining helped them to bring order, but, they argued that, sometimes the rules are not followed. They also stated that as ASM they do not understand the laws or cannot afford the licenses, so they keep working informally. This makes it difficult for the government to control the damage caused to the land and environment. This aligns with the study done by Moomen et al. (2019), he found a disconnect between mining sector policy regimes and the desire to achieve sustainable development, lack of deliberate policy provision for the adoption and usage of geoinformation to enhance Free, Prior Informed Consent and public participation in mineral resource development projects. In other words, policies facilitate development in the community. Unfortunately, because the ASM does not follow these policies, it has been difficulty for the governments to track progress, hence, retarding development.

4.2.3 Effectiveness of existing policies, legal frameworks, and institutional mechanisms governing artisanal and small-scale mining in Serenje.

According to the study that was done, it was found that the existing polices, legal frameworks, and institutional mechanisms governing ASM in Serenje were not effective. This was seen as most of the ASM did not understand the policies and regulations set by the government. They argued against them not to be clear for them. Many of them do not know how to get licenses or follow all the legal steps. They stated that, sometimes the rules are too complex and expensive to follow. A study carried out by Moomen et al. (2019) speaks to the same challenge. In other words, the policies and frameworks set by government institutions to guide ASM mining activities have, regrettably, been a challenge, as some ASM have been unable to follow them. This proves to be unbearable for the target Africa Agenda of 2026.

According to the research, the government institutions have been ineffective. They argued that there are few officers and that they cannot visit all the areas where people mine. Many miners continue working in violation of the rules. If there were more visits and guidance from government institutions, the government institutions could be more effective, safer, and more organized. In other words, the ineffectiveness of existing policies and regulations has been as a result of few officials who cannot always be at the sites as they also have some other official meetings and work to attend to. This study aligns with a study done by Kamtukule (2025), that there is a significant skills gap within the labour market, with no coherent strategy to develop the necessary workforce to support the growing mining sector.

Furthermore, most of the results showed that the reason why the Africa Agenda 2063 Vision has been unsuccessful has been as a result of rules being too stiff and licenses being too expensive. Many ASM cannot afford to pay the fees or buy the right equipment, so they keep mining illegally. This makes it hard to comply with the laws and obtain official support. Mining licenses are costly to acquire; hence, the ASM prepares mining illegally. This impedes the developmental plans set by governments and the Africa Agenda 2063 Vision. The result above is in sync with the study done by Kamtukule (2025), as he found out that the current political framework merely channels taxes, grants, and aid, without fostering sustainable sector development. In other word, quite alright there are some frameworks in place, but they do not consider the warfare of the ASM, as their main focus is to generate income. This thus, leads to illegal mining which does not even contribute to the GDP of the country.

Another challenge faced by ASM to the effectiveness of existing policies, legal frameworks, and institutional mechanisms governing artisanal and small-scale mining in Serenje on the success of Africa Agenda 2063 Vision is, lack of information and guidance about the policies. The study found out that ASM do not know how to apply for licenses or what the rules require. Officers rarely visit the mining sites to explain the laws or give advice. A study by Moomen et al,.(2019), found the same results, that is, it found a disconnect between mining sector policy regimes and the desire to achieve sustainable development, lack of deliberate policy provision for the adoption and usage of geoinformation to enhance Free, Prior Informed Consent and public participation in mineral resource development projects. In other words, the two researches have proven that the ASM do not have access to geo-information and they are not guided, that causes them to operate their mining activities as they want without much consideration of the environmental and economic impact, which later on leads to unsustainable development.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

Artisanal and Small-Scale Mining (ASM) plays a vital role in providing livelihoods for many people, especially in rural areas where formal employment is limited. It contributes to poverty reduction and local economic growth by creating jobs and generating income. However, ASM often operates informally and faces challenges such as environmental degradation, poor safety standards, and limited access to finance and technology. The lack of proper regulation and training further hinders its potential for sustainable development. With better support, organization, and oversight, ASM can significantly contribute to national growth and the goals of Africa Agenda 2063.

The results propose that artisanal and small-scale mining (ASM) in Serenje has led to serious environmental challenges such as land degradation, deforestation, and soil erosion caused by open pits left after mining. The amount of arable land for agriculture. Water pollution was also a significant concern, as miners often relied on contaminated water from mining pits and tunnels, posing health risks to both humans and animals. These findings align with previous studies showing similar environmental impacts, including increased river turbidity and deforestation around mining sites. Such ecological degradation threatens sustainable development and the well-being of communities dependent on natural resources.

Policies, legal frameworks, and institutional mechanisms governing artisanal and small-scale mining (ASM) in Serenje are largely ineffective. Most miners lack understanding of the government's mining regulations and find the procedures for obtaining licenses too complex and expensive to follow. This lack of clarity and accessibility has led many to operate informally without legal compliance. Studies have shown that this disconnects between policy and practice undermines efforts to regulate the sector effectively and slows Zambia's progress toward achieving Africa Agenda 2063. The government's frameworks, though established, have failed to address the realities faced by small-scale miners, making compliance difficult and discouraging formalization within the sector.

Additionally, the study revealed that weak institutional capacity has contributed to the ineffectiveness of mining regulation. There are few government officers available to monitor mining sites, resulting in poor supervision and guidance for miners. This has allowed illegal mining and unsafe practices to persist, while limited outreach prevents miners from understanding or complying with the law. Moreover, high licensing fees and inadequate information-sharing mechanisms have discouraged miners from engaging with formal systems, further widening the gap between policy intent and implementation. Research supports the idea that these institutional weaknesses and lack of technical support hinder sustainable sector development and economic growth. Therefore, without reforming mining policies to be affordable, inclusive, and well communicated, Zambia's progress toward the objectives of the Africa Agenda 2063 will remain constrained.

5.2 Recommendations

The Research draws the following recommendations in ensuring that the government of Zambia achieves the intended purpose of Africa Agenda 2063. One of the recommendations is that, there has to be the creation of a dedicated unit within government focused on ASM to help ensure improved economic and social returns from ASM, a less negative environmental impact, improved safety and health standards, fewer disputes within the sector, and improved tax returns. The central government should also align mining policy to focus on sustainable development enhancement in addition to formalization and licensing.

In addition, there has to be an introduction of strategic social partnerships that will aid in providing finance that is directed to sustainable development enhancement rather than profit. This will enable the ASM to do their operation sustainably. Not only that, the efficiency of mineral extraction should be increased through Skills upgrade and training for the ASM operators. This means that, the government can take an initiative in training or providing a skill to Artisanal Small-Scale Miners, that will enable them have knowledge on how to maximize their mining activities. The government has also to setup specific policy on environmental protection for small scale mining. This will enable the protection of an environment.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding Declaration

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

REFERENCES

Adamson, K. (2026). *Mining for resilience: Exploring artisanal and small-scale mining as a pathway for climate change adaptation in rural Malawi* (Doctoral dissertation, Itä-Suomen yliopisto).

Arifin, Y. I., Sakakibara, M., Takakura, S., Jahja, M., Lihawa, F., & Sera, K. (2020). Artisanal and small-scale gold mining activities and mercury exposure in Gorontalo Utara Regency, Indonesia. *Toxicological & Environmental Chemistry, 102*(10), 521–542. https://doi.org/10.1080/02772248.2020.1839074

Barume, B., Naeher, U., Ruppen, D., & Schütte, P. (2016). Conflict minerals (3TG): Mining production, applications and recycling. *Current Opinion in Green and Sustainable Chemistry, 1*, 8–12.

Bhardwaj, P. (2019). Types of sampling in research. *Journal of the Practice of Cardiovascular Sciences, 5*(3), 157–163. https://doi.org/10.4103/jpcs.jpcs_62_19

Bhebhe, S., & Ngoepe, M. (2022). Political and socio-economic dynamics on the access to oral sources at national archives in Zimbabwe and South Africa. *Collections, 18*(2), 176–201.

Bruno, D. E., Ruban, D. A., Tiess, G., Pirrone, N., Perrotta, P., Mikhailenko, A. V., ... & Yashalova, N. N. (2020). Artisanal and small-scale gold mining, meandering tropical rivers, and geological heritage: Evidence from Brazil and Indonesia. *Science of the Total Environment, 715*, 136907. https://doi.org/10.1016/j.scitotenv.2020.136907

Bunker, S. (1984). Modes of extraction, unequal exchange, and the progressive underdevelopment of an extreme periphery: The Brazilian Amazon, 1600–1980. *American Journal of Sociology, 89*(5). https://doi.org/10.1086/227983

Chipangura, N. (2019). "We are one big happy family": The social organisation of artisanal and small scale gold mining in Eastern Zimbabwe. *The Extractive Industries and Society, 6*(4), 1265–1273. https://doi.org/10.1016/j.exis.2019.08.001

De Haan, J., Dales, K., & McQuilken, J. (2020). *Mapping artisanal and small-scale mining to the Sustainable Development Goals*. University of Delaware. http://www.pactworld.org and https://sites.udel.edu/ceoe-mms/

Dzumbunu, K. R. (2025). *Assessing the environmental and socio-economic impacts of artisanal chrome mining in Kamusha, ward 14, Mvurwi, Zimbabwe (2021–2024)* (Doctoral dissertation, BUSE).

Government of Zimbabwe. (2019). *Zimbabwe Vision 2030: Towards an upper middle-income economy by 2030*. Ministry of Finance and Economic Development.

Fisher, E. (2007). Occupying the margins: Labour integration and social exclusion in artisanal mining in Tanzania. *Development and Change, 38*(4), 735–760.

García, O. E., Veiga, M. M., Cordy, P., Suescún, O. E., Molina, J. M., & Roeser, M. (2019). Artisanal gold mining in Antioquia, Colombia: A successful case of mercury reduction. *Journal of Cleaner Production, 90*, 244–252.

Gibb, M. H. (2019). *Artisanal and small scale mining in West Africa*. Warwickshire: Intermediate Technology Publications Ltd.

Haundi, T., Tsokonombwe, G., Ghambi, S., Mkandawire, T., & Kasambara, A. (2021). An investigation of the socio-economic benefits of small-scale gold mining in Malawi. *Mining, 1*(1). https://doi.org/10.3390/mining1010003

Hentschel, E. A. (2017). *Global report on artisanal and small-scale mining*. Working Paper of Mining, Minerals and Sustainable Development (MMSD) Project, International Institute for Environment and Development (IIED).

Hilson, A. E. (2025). Women in development minerals: Artisanal and small-scale mining, governance, and the SDGs. *Environmental Science & Policy, 164*, 103980. https://doi.org/10.1016/j.envsci.2024.103980

International Labour Organization (ILO). (2021). *Social and labour issues in small-scale mines* (Report for discussion at the Tripartite Meeting on Social and Labour Issues in Small-scale Mines). United Nations.

Kamtukule, V. (2025). *Political economy of mining in Malawi: Governance, community participation and labour* (Doctoral dissertation, Mzuzu University).

Kaonda, M. K. M., & Neil, L. N. (2026). Assessing environmental and social safeguard compliance in Zambia's mining sector: A case study of Zambia Gold Company Mine. *Journal of Environmental Protection, 17*(6), 473–498. https://doi.org/10.4236/jep.2026.176023

Matsa, M. M., Dzawanda, B., Mupepi, O., Shabani, T., & Shabani, T. (2024). The Rand-Great Dyke-Copper Belt-Katanga mineral resources axis: Blessing or curse for Southern Africa. *GeoJournal, 89*(5), 192.

Meutia, A. A. (2022). Indonesian artisanal and small-scale gold mining. *Environmental and Public Health Review, 19*(7), 3955.

Moomen, A.-W., Jensen, D., Lacroix, P., & Bertolotto, M. (2019). Assessing the policy adoption and impact of geoinformation for enhancing sustainable mining in Africa. *Journal of Cleaner Production, 241*, 118361. https://doi.org/10.1016/j.jclepro.2019.118361

Musukwa, R. (2023). Wealth creation and poverty reduction among small scale and artisanal miners: A scoping review of the cooperative approach. *International Journal of Economic Behavior and Organization, 4*, 11.

Mutale, I., Franco, I. B., & Jewette, M. (2019). Corporate sustainability performance: An approach to effective sustainable community development or not? A case study of the Luanshya Copper Mine in Zambia. *Sustainability*, *11*(20), 5775.

Ncube-Phiri, S., Mucherera, B., & Ncube, A. (2015). Artisanal small-scale mining: Potential ecological disaster in Mzingwane District, Zimbabwe. *Jàmba: Journal of Disaster Risk Studies, 1*, 7.

O'Faircheallaigh, C., & Corbett, T. (2016). Understanding and improving policy and regulatory responses to artisanal and small scale mining. *The Extractive Industries and Society, 3*(4), 961–971.

Republic of Zambia. (2016). *Poverty reduction strategy paper*. Lusaka: Government Republic of Zambia.

Siaciti, N. G. (2022). Assessing the implementation of the key tenets of the African Mining Vision with Zambia's key mining policy on artisanal and small scale mining. *International Journal of Applied Sciences: Current and Future Research Trends, 16*(1), 12–23. https://ijascfrtjournal.isrra.org/Applied_Sciences_Journal/article/view/1317

Siaciti, N. G. (2022). *The role of artisanal and small-scale mining in enhancing sustainable livelihoods in Zambia* (Thesis). Lusaka: University of Zambia.

Staskevicius, A., & So, I. (2015). Measuring the "impact" in impact investing. *Harvard Business School.*

Tychsen, J., Mukofu, C., Msimuko, J., Zimba, K., Chadukwa, C., Chibonga, M., Phiri, C., Simukali, M., Nguni, M., Mwenya, C., Chinyamuka, L., Sanga, C., Chuula, T., & Milimo, I. (2018). *ASM handbook for Zambia*. Geological Survey of Denmark and Greenland (GEUS).

U.S. Geological Survey. (2022). *Mineral commodity summaries 2022* (pp. 1–194). Reston, VA. https://pubs.usgs.gov/periodicals/mcs2022/mcs2022.page=105

World Bank. (2016). *Transparency in revenues from artisanal and small-scale mining of tin, tantalum, tungsten and gold in Burundi: Final report*. Washington, DC: World Bank Group.

World Bank. (2017). *The growing role of minerals and metals for a low carbon future*. Washington, DC: World Bank.

World Bank. (2019). *State of the artisanal and small-scale mining sector*. Washington, DC: World Bank.

World Bank. (2023). *Zambia economic brief: Leveraging mineral wealth for sustainable development*. Washington, DC: World Bank.

Zambia Extractive Industries Transparency Initiative. (2024). *Zambia EITI Report.*