

## **EVOLVING DYNAMICS AND SOCIO-ECONOMIC BENEFITS OF ARTISANAL AND SMALL-SCALE MINING (ASM) ACTIVITIES IN SELECTED LOCAL GOVERNMENT AREAS IN ZAMFARA STATE, NIGERIA.**

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### **Abstract**

Artisanal and Small-Scale Mining has become a key feature of rural economic adjustment in Zamfara State, Nigeria, driven by livelihood insecurity and limited formal employment opportunities. This study examines the evolving dynamics of ASM and its socioeconomic contributions in selected Local Government Areas of the state. The study adopted Social Exchange Theory to provide theoretical insight for the study. Using a mixed-methods approach, data were collected from 400 respondents 384 respondents through structured questionnaire, supported by Key Informant Interviews. Quantitative data were analysed descriptively, while qualitative data were thematically interpreted. The findings indicate that ASM significantly supports miners, their relations and residents of mining communities, through income generation, income diversification, employment absorption, and local market development. Informal governance arrangements, including cooperatives and community networks, increasingly shape access to mining resources and labour relations, amidst other challenges accompany mining operations. The study concluded that ASM activities will continue to evolve as demand for mining products continue to expand and the evolving partnership among the actors continue to metamorphose. The study emphasizes the need to integrate ASM into formal development and governance frameworks to enhance inclusiveness and sustainable rural livelihoods, through the guidance of Ministry of Mines and Steel Development in Nigeria.

**Keywords: artisanal and small-scale, mining, dynamics, socio-economic, benefits, Zamfara State, Nigeria**

### **Introduction**

Artisanal and small-scale mining (ASM) has emerged as a pivotal sector in economic and social landscapes of many developing regions. Historically perceived as a marginal livelihood strategy, ASM now occupies centre stage in discussions about rural development, poverty alleviation, and informal integration across many countries of the world. Empirical studies have documented that ASM not only serves as a critical source of income for millions of households but also catalyses community resilience and local entrepreneurships (Hilson, & Ackah-Baidoo, 2021; Anchirigah, 2003, Dennis,2024). As it is beneficial to miners, their relations and residents of mining communities through creating direct and indirect jobs opportunities to those leveraging on the sector, there by attracting numerous participants across the globe. The sector's complexity has grown over time, involving a diverse array of stakeholders-including politicians, traditional rulers, foreign entities, security officials and financiers (Dennis, 2024) who are often seen as indirect miners due to their contributions in perpetuating ASM activities in different domains. The interplay among these key actors has led to evolving social, economic and political dynamics that influence governance, environmental sustainability and community livelihoods in mining sector.

Recent research by scholars indicates that evolving regulatory frameworks, demands by foreign companies, direct and indirect involvement of foreigners, technological advancements, and shifting market dynamics, interdependence between artisanal and small-scale mining with large scale mining entities are reshaping ASM practices. These developments have generated both opportunities and challenges for miners, their relations and mining communities (Dennis,

2024). On one hand, innovative approaches in resource management, local participation, foreign influences and safety protocols are enhancing productivity and sustainability are shaping the evolution of ASM dynamics. The sector continues to grapple with issues of environmental degradation and social inequity (Brugger & Zongo, 2023) which often cast bad light on the sector by burying the potentials the sector is endowed with but illuminating its numerous challenges to limelight which depict the activities as retarding national development. Moreover, the interplay between local cultural practices and global economic pressures has contributed to complex social transformations within ASM communities, offering a unique lens through which to examine the evolving dynamics and the socioeconomic benefits of the sector, which transcends broader implications of informal economic activities. Many mining communities in Nigeria have turned to destination of numerous commercial activities. For instance, in Zamfara State the on-going mining activities have created numerous markets, rented houses, hotels, and many different business outlets in the State (Dennis, *et al.*, 2024). This article aims to critically analyse the evolving dynamics of ASM and the socioeconomic benefits associated with ASM activities, drawing on realistic, empirical evidence to explore the activities in ASM by analysing the parties involved and the accompanied tripartite benefits derived from ASM activities in Zamfara State. The paper was anchored on the following objective: to examine the nexus and dynamics created among the participating parties for sustaining ASM activities; to identify the benefits derived by miners, their relations and residents of host communities.

#### **Literature Review:**

##### **Evolving Parties and Dynamics in ASM Activities**

Globally ASM sector housed different key participants that are playing critical roles in sustaining and perpetuating the practices either at formal or informal levels. These players continually partnering with one another to sustain ASM activities due to the significance benefits they are individually and collectively deriving from the activities. The key players work as individuals, groups and cooperative associations, with each unit of analyses having their defined roles in the value chain of mining landscape. Below are the evolving dynamic roles each party played in the sector:

**Individuals:** individuals play diverse roles in propelling and perpetuating ASM activities, ranging from exploration, processing, beneficiation, marketing and the exporting of minerals to foreign countries where they are needed as raw materials for different industries. The individuals participating in ASM activities include labourers of different categories, pit owners/claim-holders, processors/chemical users, traders and brokers (Busia & Arthur-Holmes, 2024). Each of these categories of individuals has unique roles they are playing to facilitate ASM in different mining locations as they are considered as direct miners. Other individuals that are facilitating ASM are the financiers, security personnel, ministry officials, foreigners, traditional rulers and politicians (Dennis, 2024), these later categories are indirectly playing pivotal roles that are sustaining diverse ASM activities in mining hubs. Sometimes, these activities are designed along gendered based roles carried out by individuals. Some are designated for males while others designated for females but each category are serving as promoters of ASM activities.

Paschal & Kauangal (2023) ; Busia & Arthur-Holmes (2024) emphasized that, there are certain roles that are predominantly carried out by women in mining spot, these include washing of mine products, transportation of mines product, sieving, processing among others activities engaged by them as women miners. Though, the above scholars are of the viewed that these categories of individuals are often marginalized in leadership roles, economic opportunities, and are subjected to underpayment and are exploited by the male dominant class in ASM

activities. While the males on the other hand predominantly engage in exploration, digging, owning and managing of pit , buying, selling and serving as agents of connecting buyers and sellers (both local and international) (Dennis, 2024). The male category often dominates the women category in sector, thereby been seen as the major players in the sector.

**Group:** sometimes mining activities exists in groups rather than mere individual activities. Certain number of persons under informal or formal arrangements form group for the sake of carrying on mining activities. This group comes inform of family, friends, communities, workmates, among other categories. Ntiri *et al* (2023), revealed that the nature of the activities in ASM locations is labour-intensive and thus requires the miners to collaborate and work in group due to certain factors that will promote their interests. Ntiri *et al* (2023), opined that the idea of forming groups in mining enclaves is not happenstance but rather for numerous benefits that accrue to its members. Working in group have some notable advantages like pooling resources together to purchase tools, accessing mining sites, securing better prices for minerals, creating credit schemes and enjoying formal recognition (Ofosu *et a.,l* 2024). Furthermore, Dennis (2024), showed how women, youth and children in Zamfara and Taraba mining locations utilize organized groups to navigate structural barriers, bargaining power, confront gender-based violence, and secure formal recognition of their activities in ASM, and position themselves in advantageous point.

Aside from the opportunities, several positive criteria have been identified, including cooperation to attain goals, resources-sharing, support provision, and social interaction and companionship are the key drivers for the formation groups in mining locations (Ofosu *et al.*, 2024). This group exist as family, friends, co-worker, Community Mining Scheme among other arrangements utilize by ASMiners.

**Cooperative societies:** due to quest for diversification, formalization, internationalization and improvement of Gross Domestic Product (GDP) of nations, ASMiners are encourage and supported through cooperative societies model across different countries with the view to enhancing the growth of the sector . Through cooperative societies, government are promoting the mining sector by issuance of license, access to loan facilities, and opportunities for specialized training. Arthus-Holmes & Mengba (2024), noted that these societies can exist both at formal or informal levels but all are contributing positively to the growth of ASM activities. De-haan & Geenen (2016), showed that in DRC artisanal miners are force to formalize their stay through forming cooperatives to help facilitate the formalization process of their operations. But miners who joined the cooperatives see it as means of continually exercising power and exploitation. They perceived it as a weapon of institution “legalizing exploitation” by those assigned with the responsibilities of managing the system as formalized institution. Arthus-Holmes & Mengba (2024), revealed that Ghana women usually formed informal cooperatives based on their lines of roles and operations in ASM operations, they categorized them into two namely the shanking cooperatives (for women involved in sieving crushed extracted ore) and sambalga cooperatives (for digging at the bank of rivers and streams, or uplands in search of gold. The main reasons for the formation of these cooperatives are for their welfare, to advocate for the recognition and inclusion into key mining work, social recognition and for economic security. These cooperatives are now playing pivotal roles of sustaining the mining ecosystem in diverse ways. Some of the notable roles they played are highlighted below.

By pooling capital, cooperatives purchase shared tools and machinery, reducing individual costs and increasing productivity. For instance Tanzanian mining cooperatives cooperatively

owned and operate processing equipment which is boosting their efficiency (ILO, 2025). Also, cooperative society helped in achieving fairer prices and reduced exploitation of artisanal miners. For instance women miners in Uganda increased earnings by selling gold collectively as cooperative societies (Planetgold, 2023). Cooperatives promote safer work environments through structured operations and shared safety protocols. For instance in Mali's Sikasso cooperative reported reduced pit accidents and clearer work roles due to the regulations of cooperatives (International Labour Organization, (ILO), 2023).

Furthermore, members of cooperative receive education on financial literacy, equipment handling, and responsible mining practices. ILO (2023), supported co-ops train miners in sustainable practices and governance. These trainings are tailored into the directions that will promote safe mining practices that will be beneficial to both artisanal miners and mining communities. Cooperatives encourage democratic participation, gender inclusion, and enforcement of labour standards which might not necessarily be observed at individual and group levels. Co-ops in DRC promoted child labour reduction and women's leadership (PACT,2021). All these benefits encourage participation of miners in their various cooperative societies.

Overall, individuals, work groups, and cooperatives become relevant stakeholders in ASM because they represent different layers of organization that respond to economic needs, social pressures, and regulatory expectations. As they become more organized, they expand from operational participation to strategic involvement in mining governance as they determine when and how the operations of ASM should be.

### **Benefits of ASM**

Artisanal and Small-Scale Mining (ASM) serves as a crucial livelihood strategy for millions in rural and economically marginalized regions. Its accessibility, requiring minimal capital and technical expertise, makes it a viable alternative to traditional rural activities such as farming. ASM not only provides income opportunities but also creates a multiplier effect that benefits local economies, generating indirect and induced employment, stimulating trade, and facilitating access to global supply chains. Despite its informal nature, ASM contributes significantly to local and global economic growth, supplying critical raw materials for industries such as construction, electronics, and jewellery (World Bank, 2020).

ASM provides a vital source of income, often exceeding earnings from traditional occupations such as agriculture. According to Mensah et al. (2023), miners can earn three to five times more than alternative employment options, making ASM a lucrative choice for rural populations. For example, artisanal gold miners in Mozambique earn between \$75 and \$1,500 per month, far surpassing average rural incomes (CASM, 2009). Similarly, Ibrahim and Bello (2023) found that ASM in Nigeria has lifted many households above subsistence levels, enabling investments in education, healthcare, and farming inputs. ASM is a significant driver of employment, creating direct, indirect, and induced jobs. In sub-Saharan Africa, ASM employs an estimated 15 million people directly, with indirect benefits reaching over 100 million individuals (World Bank, 2020). In Nigeria, ASM activities in states like Zamfara, Niger, and Kaduna support local economies by engaging labor across mining, trade, and support services (Aminu *et al.*, 2022). Studies in Ghana show that for every direct mining job, up to 10 additional jobs are created in related sectors (Hilson *et al.*, 2021). Indirect employment includes roles in equipment supply, transport, and downstream processing, while

induced employment arises from increased consumer spending in mining communities. For instance, a study by McPhail (2009), in Ghana reported that ASM operations supported 50,000 induced jobs in one mining region, compared to 5,000 indirect jobs. Eguny & Boakye-Danquah (2024), ASM provides opportunities for economically disadvantaged groups, including women and youth. Women often engage in ore processing and trade, earning income to support their households. Despite challenges such as limited access to resources and decision-making, women in ASM contribute significantly to local economies (Dennis *et al.*, 2024). Youth participation in ASM also addresses unemployment challenges, particularly in rural areas where formal jobs are scarce. ASM income is frequently reinvested into farming and other rural activities. Miners use their earnings to purchase fertilizers, hire labor, and expand farmland, indirectly supporting local agricultural productivity (Mohan *et al.*, 2023). This synergy between mining and farming highlights ASM's role in sustaining rural livelihoods, particularly in regions with declining agricultural outputs due to climate change. Mensah *et al* (2023) revealed that ASM support broad rural economy and provide huge capital for agricultural activities. These findings corroborate with rural reality, as agricultural activities are the mainstay of rural economy.

Mining creates significant job opportunities and wage earnings within local communities, categorized into direct, indirect, and induced employment. Direct employment refers to jobs within mining companies and onsite contractors. Indirect employment includes positions created by offsite contractors, suppliers, subcontractors, and social investment activities related to mining (Cordes, Ostensson, & Toledano, 2016). In Canada, mining generated approximately 409,000 direct jobs and 217,000 indirect jobs as of 2018, suggesting that about 0.5 indirect jobs are created for every direct job in the sector (Natural Resources Canada, 2018). The induced employment effect often surpasses both direct and indirect job creation. Furthermore, ASM provides livelihood opportunities for more than 150 million people around the world from direct and indirect ASM-related activities (ILO, 2020). These benefits are opened for both urban and rural communities but with much focus on rural communities by scholars. Osei & Yeboah (2023) and Osei *et al* (2021) they submitted that ASM provides rural youth employment opportunities. The youth use the funds obtained to pay for school fees, supplies family needs and support family in diverse ways.

### **Theoretical framework**

This study adopted Social Exchange Theory as a theoretical framework. The theory is a sociological and psychological theory which studies and explains social behaviour as the result of an exchange process between two parties in form of individuals or groups who engaged in social exchange. The theory demonstrated how people interact by weighing the potential costs and benefits of the relationships they engaged. This occurs when each party has goods that the other parties value. The theory assumed that individuals are thought to evaluate the rewards and costs that are associated with particular relationship. The theory was contributed by different scholars at different historical epochs, the proponents include John W. Thilbaut (1917-1986), Harold H. Kelly (1921-2003), George C. Homans (1958), Peter M Blau (1964), Richard Marc Emerson (1925-1982), Claude Levi-Strauss. Thus, their common postulations is that human behaviour is rational and goal oriented, this serves as stimulus for social exchange to take place among the participating parties.

The basic assumptions of social exchange theory emphasize that human behaviours are rational and calculative thereby people make choices that maximize benefits and minimize costs. Social relationships operate like economic exchanges, whereby interactions are seen as

transactions. Also, costs and rewards influence decisions, in this context costs include time, effort, money, or emotional strain; rewards include social approval, love, money, or support. More so, relationships persist when both parties perceive the exchange as fair which is regarded as reciprocity and fairness.

In terms of the application of this theory, ASM activities create a network of mutual exchanges that affect not only the miners but those around them-their relations and residents of host communities. Miners who are the primary social actors' benefits form the activities in diverse ways, which serves as catalyst for social exchange to take place with buyers, dealers and regulating bodies. Miners generate daily income through proceeds from ASM to carter for themselves and their immediate family, it serves as means of raising money from mining proceeds to build personal houses, buy farm lands, purchase plots of lands and other assets like commercial cars, shops, establishing another business line. They also used it to finance their marriages, buy motorcycles and cars as revealed by the findings of the study.

Apart from the primary actors, their relations also share in the benefits derived from the operations; some miners sponsor the educational pursuit of their siblings and extended family members to better schools which hitherto they could not afford. They also helped in sponsoring some of their relations to pilgrimage in Mecca which in turn creates feeling of fulfilment for them that they support religious activities and receive reward from God Almighty among others.

Furthermore, apart from community members that engaged directly in mining, others that may not dig or crush stones but interact directly with miners also benefits individually and collectively. Presence of miners and numerous mining locations in the state which has led to creation of more local markets for women sell foods, drinks, mining tools, second-hand clothes among other benefits.

## **Methodology**

The study adopted probability and non-probability sampling methods. A purposive non-probability sampling technique strategy was used to select three LGAs, one from each senatorial district; this was informed as a result of the active participation of residents in ASM activities. The total population of the three selected LGAs according to the projected National Population Census of 2022, which shows that Maradun has 369,300 persons, Zurmi 241,900 and Maru 521,500, which total to 1,132,700 persons. This demographic size reflects a diverse mix of people who are directly or indirectly linked to ASM activities, making them an appropriate and representative sample for the study. Using Krejcie and Morgan (1970) table of sample size determination, a population of 1,132,700 can be adequately represented by 384 sample sizes. Additionally, Bowley's population allocation formula was applied to determine the sample sizes from each local government.

Data for this study were elicited using survey method for the quantitative data and IDI and KII for the qualitative data from community members, miners, traditional leader and cooperative society's leaders, mining association officials, and local authorities across selected mining communities. Observations were also made regarding market activity, informal economic engagements and display of wealth by miners.

In terms of data analysis, the quantitative data was analysed using SPSS version 23 for the descriptive statistics and Principal Component Analysis (PCA) for the inferential statistics.

The PCA was used to reduce the dimensionality of the data and identify key components that explain the most variance. While qualitative data was thematically analysed.

## **Results:**

### **Findings on Operational Nexus and Dynamics Among individuals, Groups and Cooperative Societies in ASM:**

The qualitative findings showed the manners and ways different mining actors work as relevant stakeholders to complement each other. One of the respondents submitted that

The actors usually work as stakeholders of deciding where and when to operate. They also fuelled the creation of markets for mining and non-mining products to perpetuate mining activities in different locations. Also, all parties played key roles through collaborations with agents, security officials, politicians and foreign buyers. (Chairman of one mining cooperative societies in Maru).

Another respondent added:

Truly mining originally started as individual activities but we are almost trying to eliminate individuality and promote group work at all points. So, group both formal and informal are serving as a bridge between miners and local authorities, because they are easier to negotiate with than scattered individuals. Though, individuals too are sometimes key players at level of financing, connections to foreign buyers, politicians and security agents. (Chairman of miners association in Zurmi).

Another key informant added that

Each of these categories of actors are relevant and they played relevant key roles. For instance individuals provide labour services and knowledge that keeps ASM active in the state, but lack voice in the sector. So to have voice, they join group, work groups organize this labour, strengthen negotiation capacity, and make miners visible to local power structures. This group sometime metamorphose to cooperatives which enhance formalization and visibility, enabling sustainable engagement with markets, governments, and development partners.

### **Findings on Tripartite Benefits of ASM Activities (Benefits of ASM to Miners, Miners-relations)**

Artisanal and small-scale mining (ASM) activities bring various benefits to participants that are partaking in mining, their dependents, and residents of host communities. These benefits can be categorized into three main areas: benefits to miners, miners relations, and residents host communities.

**Table 1. Benefits derived by Miners from ASM Activities**

<b>Benefits</b>	<b>Frequency</b>	<b>Percent</b>
Raising money for marriage	42	11.0
Buying of cars	70	18.2
Building of houses	101	26.3
Raising of capital to start up new line of businesses	21	5.5
Buying of tricycle	33	8.6
Sponsoring of personal education	27	7.0
Others (land, farmland, animals, going for pilgrimage)	90	23.4
<b>Total</b>	<b>384</b>	<b>100.0</b>

Source: Field Work, 2023

The data in Table 1 highlights the diverse benefits miners derive from their involvement in artisanal and small-scale mining (ASM) activities in Zamfara State. Among the benefits listed, 23.4% of respondents noted improvements in wealth accumulation through the acquisition of land, farmland, and livestock or fulfilling personal aspirations such as embarking on pilgrimages to Mecca. This finding underscores the significant socioeconomic impact mining has on both personal wealth and community development.

Additionally, 26.3% of respondents reported using proceeds from mining to build personal and commercial properties. This demonstrates how ASM activities contribute to local infrastructural development, as miners reinvest earnings into long-term assets like housing, thereby elevating their social and economic status.

The ability to buy cars (18.2%) and tricycles (8.6%) was also frequently cited, reflecting the economic empowerment ASM provides. These vehicles are often used for personal use or as a source of additional income through transportation services. Meanwhile, 7.0% of respondents noted using mining proceeds to sponsor personal education, an investment in human capital that could lead to future upward mobility and diversification of income streams.

Finally, 11.0 % of respondents mentioned raising money for marriage, showcasing how ASM supports cultural and societal obligations, further integrating mining into the social fabric of the region.

The qualitative data aligns closely with the quantitative findings, adding depth and context to the benefits of ASM

A labour leader in a mining site shared:

Gold discovery in Zamfara has been a blessing for those of us who embraced it as an occupation. With the proceeds, many have built houses, bought vehicles, and supported their families. For instance, I've used my mining earnings to empower young people by giving them tricycles and motorcycles, which they use to earn a living.

A female miner explained:

Mining has become a household economic activity in our state. Many miners have improved their standard of living by buying flashy cars, building houses,

and sending their children to better schools. The younger miners see this as a motivation to work hard and achieve similar success later in life.

Another official from the mining association commented:

Many of us have diversified our income streams. For instance, I've invested in cattle rearing and land acquisition business. Mining has given us opportunities we never imagined in our lifetime, even though challenges like cattle rustling and government restrictions persist, it is still extremely lucrative.

The data highlights the transformative impact of ASM activities, which go beyond immediate financial gains to enable long-term socioeconomic mobility. Mining provides the capital needed for miners to diversify their investments into sectors such as agriculture, transportation, and education, creating a multiplier effect in local economies. ASM helps to uplift individuals and their communities.

Furthermore, the qualitative data underscores the cultural significance of ASM as a means of achieving personal milestones, such as marriage and family support, as well as contributing to community well-being. These insights reveal the pivotal role mining plays in sustaining livelihoods and fostering economic empowerment, particularly in regions with limited formal employment opportunities. In general, both quantitative and qualitative data depicted that ASM activities is beneficial to miners in diverse ways

**Table 2. Benefits of ASM to Miner's Dependents/Relations**

Benefits	Frequency	Percent
Sponsoring education	125	32.6
Building houses	64	16.7
Establishing businesses for others	55	14.3
Sponsoring of marriages	79	20.6
Others	61	15.8
Total	384	100.0

Source: Field Work, 2023

The data in Table 2 illustrates the benefits that miners' dependents and relations derive from the proceeds of artisanal and small-scale mining (ASM) activities from their relations that engaged in it. The most significant benefit, as indicated by 32.6% of respondents, is sponsoring education for family members. Mining proceeds are often allocated to cover school fees, uniforms, books, and other educational expenses, enabling miners' children and relatives to access quality education and pursue brighter futures.

Another notable benefit, as reported by 20.6% of respondents, is the sponsorship of marriages for miners' relations. Marriage, being a key cultural milestone in Zamfara State, often requires substantial financial commitments. Proceeds from mining help families meet these obligations, which strengthens social bonds and fulfils cultural expectations.

Further, 16.7% of respondents highlighted the construction of houses for family members as a significant benefit. This not only improves living conditions but also provides long-term stability for miners' dependents. Additionally, 14.3% of respondents mentioned that miners invest in establishing businesses for their relatives, empowering them to achieve economic independence. Lastly, 15.8% noted other benefits, such as the acquisition of land, farmlands, livestock, and sponsoring relatives' pilgrimage to Mecca.

The qualitative findings align with the quantitative data, adding personal narratives that enrich the analysis.

An official from the Union of Gold Dealers remarked:

We cannot separate our benefits from our families and relations. Most of us come from large, polygamous households, and we use mining proceeds to support our relations. This includes paying for education, sponsoring marriages, even starting businesses for them and supporting our aged parents.

A pit manager in Maru Local Government further elaborated:

Mining has allowed us to provide for our immediate and extended families. I have bought farmlands, sponsored my parent and grandparents to Mecca, and paid for my younger siblings' education. This income has transformed our lives and enabled us to escape the cycle of poverty.

Data derived here shown that miners utilized their proceeds from mining on their relations by investing on their educations and other economic empowerments strategies which in turn make them better off.

**Table 3. Principal Component Analysis of Benefits of ASM to Host Communities**

Item	Description of Variables (Benefits)	Factor Loading Benefits to Communities	KMO
Item 1	Creating of local markets in mining communities	.961	0.774
Item 2	Building of commercial houses in mining communities	.919	0.774
Item 3	Enhancing of job opportunities in mining communities	.782	0.774
Item 4	Getting of spouse from the community	.880	0.774
Item 5	Increasing youth engagements in many socioeconomic activities	.834	0.774
Item 6	Presence of NGO's to assist residents	.834	0.774
Number of observations		384	

Source: Field Work, 2023

The results of the Principal Component Analysis (PCA) reveal a robust statistical association between the benefits of ASM activities and the host communities. All six independent variables analysed exhibited factor loadings exceeding 0.5, with the Kaiser-Meyer-Olkin (KMO) measure for sample adequacy at 0.774, signifying the data's suitability for PCA.

Among the benefits, the creation of local markets emerged as the most impactful, with a factor loading of 0.961, highlighting its role in driving economic activity within mining communities. The construction of commercial houses ranked second with a factor loading of 0.919, reflecting the demand for rental accommodations fuelled by the influx of miners and traders. The variables related to obtaining spouses and youth socioeconomic engagement also demonstrated strong factor loadings of 0.880 and 0.834, respectively, showcasing the broader cultural and

social transformations tied to ASM activities. The presence of NGOs and enhanced job opportunities further underscore the social and economic advancements within these communities, with factor loadings of 0.834 and 0.782.

The quantitative findings were corroborated by qualitative insights from interviews with traditional rulers, community leaders, and ministry officials.

A traditional ruler from a mining community stated:

Despite the challenges, we are grateful for the numerous benefits that mining has brought to our communities. Many people have used their proceeds to build houses, marry, and even sponsor pilgrimages to Mecca. Our local economy has been revitalized, with markets bustling with activity and money circulating more than ever before.

Another traditional ruler from Tsafe Local Government added:

Our markets are expanding, and the influx of visitors has created a steady flow of cash within the community. Even local transportation services, like motorcycle operators, have experienced a boom. Although conflict has somewhat slowed this momentum, the benefits are undeniable.

An elderly resident from Anka Local Government observed:

Landowners whose farmlands are used for mining have received significant monetary compensation. While some have wisely invested their money, others squandered it, but the opportunity to benefit financially is there for everyone involved.

A ministry official highlighted the revival of traditional industries:

Mining has spurred innovation and creativity among local blacksmiths, who now fabricate and repair mining tools. These developments have not only boosted commercial activities but also created a new stream of income for artisans, strengthening our local economy.

The data accentuates that ASM activities bring diverse and far-reaching benefits to host communities. The creation of local markets and the construction of commercial houses are the most impactful benefits, catalysing economic activities and infrastructure development. The presence of NGOs has enhanced access to social services, while job creation and youth engagement have contributed to reducing unemployment and fostering entrepreneurship. Moreover, the cultural benefits, such as fostering inter-community marriages and supporting religious pilgrimages, reflect the social integration and improved living standards in these communities. The quantitative and qualitative findings collectively illustrate how ASM activities extend beyond individual miners to transform entire communities, driving economic growth and social development. ASM serves as a critical driver of socioeconomic advancement in Zamfara State. By creating employment opportunities, stimulating local markets, and fostering cultural and social progress, ASM has become deeply ingrained in the fabric of host communities.

## Discussion of Findings

In terms of benefits, the study identified a three-fold set of benefits. For miners, ASM activities provide employment opportunities, income generation, and a source of livelihood. The study found that miners use their earnings to build houses, fund marriages, purchase cars and tricycles, raise start-up capital for new businesses, fund personal education, and acquire other assets such as land, farmland, and livestock. Some miners also invest in commercial buses and trailers. These benefits make ASM activities attractive, encouraging more people to join the mining business. These findings align with McPhail (2009), and the World Bank (2019), who noted that ASM activities provide numerous benefits, including job creation, livelihood means, and income generation through direct, indirect, and induced employment. Hilson (2018), emphasized that ASM activities boost the entrepreneurial spirit among miners and community residents. Additionally, Ledwaba & Nhlengetwa (2016), and Huntington (2022), pointed out that artisanal mining, after agriculture, is a significant driver of rural economies in developing nations, employing a large share of labour across various categories. Proceeds from mining activities enable miners to build houses, purchase cars, and establish other business ventures, contributing to national development. Regarding the benefits to miners' relations, the study found that family members also benefit in various ways. These benefits include building houses for parents and other relatives, sponsoring family members' education, establishing businesses for family members, and funding weddings. Other benefits include purchasing land, cars, farmland, and livestock for resale, as well as sponsoring pilgrimages. These benefits contribute to the self-enrichment of miners' families, highlighting the broader impact of ASM activities on their social and economic well-being.

The study highlights several benefits that mining communities in Zamfara State derive from the presence of miners operations. Findings indicate that these activities have spurred socioeconomic development in mining communities. For instance, the establishment of new markets, construction of commercial housing, and increased employment opportunities have been observed. Furthermore, some residents have married miners, and youths engagement in various socioeconomic activities has increased, providing income and livelihood opportunities. The presence of miners has also led to the involvement of NGOs that work to address the adverse effects of mining and related security challenges, thereby creating additional job opportunities. These benefits suggest that ASM activities have significantly opened up economic opportunities in these communities, enabling residents to engage in diverse activities beyond traditional farming and mining. Supporting these observations, Nyam et al. (2014), and the World Bank (2016, 2019, 2020), argue that ASM operations create numerous direct and indirect job opportunities and stimulate new economic prospects for mining communities and surrounding areas. Kitula (2006), also notes that mining activities generate market opportunities for residents. The World Bank (2020), further describes ASM as a source of economic and market opportunities for rural areas. However, other studies present a more critical view. For instance, Pactor (2016) and Cavanagh & Jost (2018), argue that the economic benefits of ASM can be overstated. They suggest that while some markets and job opportunities emerge, the overall impact on local economies can be limited and uneven, with benefits often concentrated among a few rather than widely distributed. Moreover, the increase in economic activities can sometimes exacerbate existing inequalities within communities.

## Conclusion

The study reveals that ASM in the study area is characterized by emerging organizational dynamics, with increasing participation by groups and cooperatives societies alongside individual miners. These shifts have strengthened collaborations and improved the efficiency of mining activities. The socioeconomic benefits of ASM are evident, particularly in enhanced household income, construction of residential buildings, acquisition of properties, and broader livelihood improvements for miners, their relations and residents of mining communities. While these contributions underscore the importance of ASM as a key economic activity in resource endowed nations, the findings also point to the need for supportive policies that promote sustainable practices and safeguard long-term community welfare. Overall, ASM remains a vital component of local development especially in rural communities, offering significant opportunities for economic empowerment when properly coordinated, regulated and managed by government rather than left in the hands of individuals and non-state actors.

## Recommendations

The paper recommends that, as a growing sector, there is need for increase stakeholders collaboration to foster strong partnerships among government, traditional institutions, mining associations, NGOs, and private sector actors to ensure sustainable and safer practices by promoting growth and development of the sector as a formal means of livelihood for national prosperity through the lens of Federal Ministry of Mines and Steel Development .

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