



MANDELA MINING PRECINCT
MINDS FOR MINES

Article 2:

SMALL SCALE MINING AND MINING COMMUNITIES

SATCAP 2023

About the Mandela Mining Precinct

The Mandela Mining Precinct is a Public-Private Partnership between the Department of Science and Innovation and the Minerals Council South Africa. The Precinct is jointly hosted by the Council for Scientific and Industrial Research and the Minerals Council. The Mandela Mining Precinct is an initiative aimed at revitalising mining research, development and Innovation in South Africa to ensure the sustainability of the industry. This is achieved through the South African Mining Extraction, Research, Development and Innovation (SAMERDI) strategy.

The strategy comprises six research programmes:

1. Longevity of Current Mining;
2. Mechanised Mining Systems;
3. Advanced Orebody Knowledge;
4. Real-Time Information Management Systems;
5. **Successful Application of Technologies Centred Around People;** and
6. Test Mine.

This article was developed under the Successful Application of Technologies Centred Around People (SATCAP) research programme. The programme is aimed at understanding the effects, impacts and challenges of mining modernisation on people in the minerals sector, and lends support to the ESG agenda.

ISBN number: SATCAP 2023 Small Scale Mining and Mining Communities

Contact details enquiries@mandelaminingprecinct.org.za
www.mandelaminingprecinct.org.za

Author: M Ramalebana (SATCAP Intern 2021/22), Dr Sherin Ramparsad (SATCAP PM), T Chabalala (SATCAP Project Administrator), S Kganakga (SATCAP Intern 2022/23)

Approved: A. Saffy (SATCAP TSC Chairperson)

Table of Contents

1	INTRODUCTION	4
2	BACKGROUND AND CONTEXT	6
3.	METHODOLOGY	9
4.	FINDINGS	11
5.	COMMUNITY BENEFITS OF SMALL-SCALE MINING	15
6.	CONCLUSION	17
7.	REFERENCES	19



Introduction



1. INTRODUCTION

Artisanal and Small scale mining (ASM) is a largely informal economic sector that includes workers around the world who use basic tools to extract from the earth everything from gold and gemstones to vital metals such as cobalt, tin, tungsten, and tantalum. ASM is important for several reasons. Mining of these metals are critical to the world's economies – necessary for computers, mobile phones, airplanes, medical devices, rechargeable batteries and much more. A significant portion of these metals are produced through ASM. If the world demands these products, artisanal miners will continue to dig for the minerals they require, often under dangerous, exploitative conditions. Despite this, literature suggests that the ASM sector contributes to job creation and subsequent poverty alleviation, particularly in rural areas (DMRE, 2021).

Mining is an important part of the South African economy and has been the driver of much of the economic development of the country. The Artisanal and Small scale mining (ASM) operations have continued to grow significantly post the sector's official recognition in 1994 (reference). Small-scale miners may be involved in mining of different commodities, with a leaning towards gold, diamonds and quarrying for construction materials, including brick-clays. Literature indicates that ASM accounts for approximately 20% of the global gold production, with 40.5 million artisanal miners directly and 100 million indirectly involved (DMRE, 2021).

Small-scale mining is regulated by the same legislation (i.e., for the environment, labour, mineral rights, exploration, and mining permitting, and skills development) as large-scale mining, though compliance is particularly lower where artisanal mining is concerned. Despite the government interventions and support structures put in place, the sector still faces countless challenges compared to large scale mining (DMRE, 2021). The effective participation of small-scale miners in the mining sector is often hampered by their lack of skills, i.e., technical, business and management, and their limited access to mineral deposits, capital and markets.

ASM in South Africa is grouped into various categories, Small – scale miners (Junior and emerging miners) and artisanal miners. Small-scale mining activities are conducted within the legal framework with approved permits and mining rights and operating in accordance with the Department of Mineral Energy regulations (DMRE, 2021). Often artisanal mining activities are mostly illegal and undertaken at abandoned or owned licensed operating mine shafts with no health and safety compliance (DMRE, 2021).

For many artisanal miners, their activities often result in negative impacts evident in the inefficient, unsafe, and environmentally unfriendly operations. Recently there has been government policies which has led to special programmes being put in place to promote the small scale mining subsector. Intervention strategies for the support of small-scale mining (some of which are already in operation) include programmes for kickstarting mineral beneficiation and value-addition projects, development of appropriate technologies and skills and technology transfer. Small-scale mining, if well-regulated in industry could be a cornerstone for future rural economic development, particularly for mining communities (DMRE, 2021).



Background and Context

2. BACKGROUND AND CONTEXT

Artisanal and Small scale Mining (ASM) continues to grow in many resource-rich rural communities (Ofosu, Dittmann, Sarpong, and Botchie, 2020). ASM is generally characterised as a low-tech, low capital, and labour-intensive resource extraction activity of relative high value alluvial minerals such as gold and diamonds; it is also described as a poverty driven activity with low-entry barriers and minimum mechanization (Ofosu, Dittmann, Sarpong, and Botchie, 2020). The miners are mostly local groups or individual entrepreneurs using primary technology such as wheelbarrows, pick-axes and shovels. Although ASM is associated with minimum mechanisation, in some countries such as Ghana, Philippines, Guyana and Brazil, the phenomenon has been the use of sophisticated technology such as excavators and dredgers - of the small scale mineral industry due to the influx of foreign capital, increasingly from China (Ofosu, Dittmann, Sarpong, and Botchie, 2020). These country cases are the few exceptions though; in the general case ASM qualifies as a low-technology enterprise with a high level of informality (Ofosu, Dittmann, Sarpong, and Botchie, 2020).

Artisanal, and Small scale mining activities are becoming widespread simply because there are few alternative employment opportunities in many parts of the developing world (Umirzoqov, Azamat & Abdurashidovich, 2020). An increasing number of rural and mining community inhabitants are turning to artisanal and small scale mining to feed their families or to make a living.

Many governments, amid claims of having finally recognized the potential economic value of the mineral outputs derived from artisanal and small scale mines, began implementing a series of policies that both legalized resident activities and regulated their production (Umirzoqov, Azamat & Abdurashidovich, 2020). The main problem in legislating small scale mining operations appears to be in situations where mining areas are already covered by other mining rights, such as prospecting permits and exploration permits related to large mining projects. The same problem also occurs when prospecting or exploration permits for large mining operations are granted over areas where there are existing small scale mining operations (Umirzoqov, Azamat & Abdurashidovich, 2020).

In South Africa, due to growing illegal activities, there are calls for the government to fully formalize and develop the ASM industry in line with the regional and international mining jurisdiction regulatory framework (ASM Policy, 2021). There are negative ramifications of unregulated ASM activities, including loss of revenue and taxes, formal employment opportunities, foreign and imports exchange earnings (Minerals Council SA, 2019).

According to the DMRE, the Mineral and Petroleum Resources Development Act, in relation to the Small scale mining framework, this may be redesigned to envelop all the challenges the ASM industry faces, including resource and compliance requirements, access to information and funding, and lack of support from government (Infrastructure, capacity building) (DMRE, 2021). There is also an overlap in defining Small-scale mining from Artisanal mining - the MPRDA Act does not cater for artisanal mining. This has created a regulatory gap in the ASM industry; thus, the redesigned framework should clearly distinguish Artisanal and Small-scale mining, with their respective permits and unique requirements. Graduation provision should be implemented allowing artisanal miners to graduate to small – scale miners and subsequently into large-scale miners (DMRE, 2021).

In some parts of the world, gold mining is being undertaken almost exclusively by corporate entities, whose operations vary in size and scope: from junior mining firms engaged in high-risk exploration activities (Dougherty, 2013) to multinational companies that develop massive open-pit mines. In other places, we have seen the emergence of complex mining constellations, wherein mining companies share the same space with an equally diverse and predominantly informal range of artisanal and small scale gold mining (ASGM) operations. There are those regions and countries where informal ASGM dominates the scene (Verbrugge & Geenen, 2019).

ASM as a resource extraction activity may be a springboard to poverty alleviation. This is because its considerable socio-economic benefits are not only restricted to employment generation, but also encompass the importance of revenues from resource extraction, at least at the macroeconomic level (Ofosu, Dittmann, Sarpong, and Botchie, 2020).

Literature suggests that small scale gold mining operations can be harmful to the environment and may result in adverse pollution of the atmosphere, soil degradation, landscape damage, ground and surface water contamination, flooding, deforestation, and an aggregate of health-related issues (Umirzoqov, Azamat & Abdurashidovich, 2020). Small scale miners may be of poor social standing and lack basic knowledge about the potentially harmful outcomes (Umirzoqov, Azamat & Abdurashidovich, 2020). Environmental problems are overlooked by the small scale miners and most governments where they operate mainly for a reason that the industry keeps the poor population employed and the small term economic gains prevail over long term environmental resolutions (Umirzoqov, Azamat & Abdurashidovich, 2020).

Artisanal mining activities are scattered across low-income countries and used as an economic supplement in conjunction with farming (Hilson and Gatsinzi, 2014). However, it is noted that ASM as an extractive activity can have negative effects on agriculture through various mechanisms. One key mechanism is land degradation. The negative legacy of ASM – mine pits and excavated soils – can render previously fertile lands unsuitable for crop production thereby reducing the availability of land for agriculture production. In addition, the environmentally destructive effects of ASM such as bush burning and deforestation reduces the availability of grazing areas for livestock (Ncube-Phiri et al., 2015). This can entrench a cycle of poverty in the agrarian economy through loss of farming-generated income and a reduction in food and cash crop and livestock production. Another troubling facet is the asymmetry of the effects of ASM agriculture interactions. Agricultural production pollution problems do not affect the integrity of non-renewable mineral deposits, but the siting of ASM activities close to agricultural productive lands has been observed to reduce crop yields through farm invasions and the destruction of cultivated crops (Ofosu, Dittmann, Sarpong, and Botchie, 2020).



Methodology

3. METHODOLOGY

A literature search was undertaken using the multidisciplinary database Google Scholar to identify influential papers in this research domain. These databases have broad coverage of the natural resource management and the extractive industry. The research was limited to the following key words— ‘artisanal and small-scale mining and livelihoods’, agriculture and small-scale mining and livelihoods’, and ‘artisanal and small-scale mining and environmental degradation. A desk-top review was conducted.

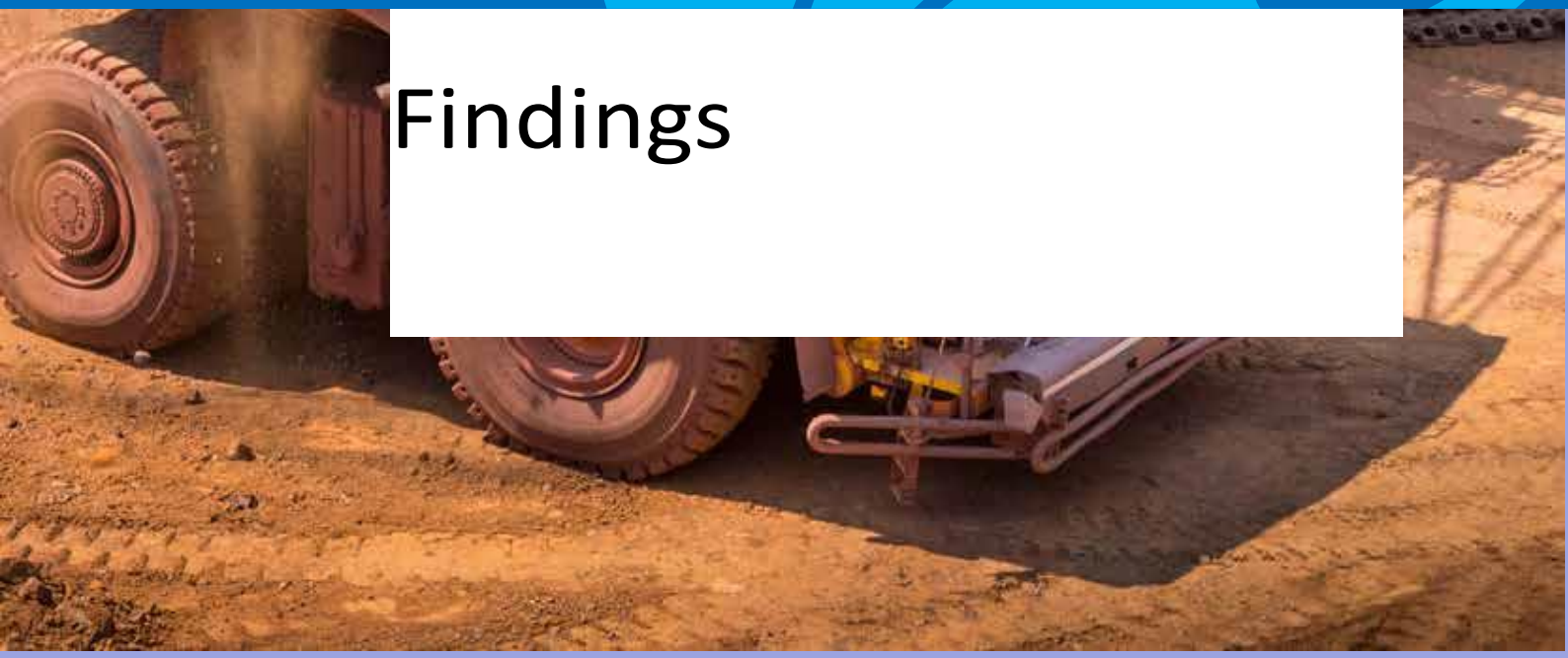
Data gathering was conducted by interviewing some of industry key stakeholders. Interviews were conducted in English and virtually. Interviews were recorded with the respondents’ permission and notes taken.

Some common perceptions from stakeholders, in summary include:

- Small scale and artisanal miners have difficulties in accessing funds and licensing permits because of technical competency issues, including health and safety and environmental compliance compared to large scale miners
- Small scale and artisanal mining activities, similar to large scale mining can cause long term environmental harm
- Small scale miners due to lack of technology will lag in the mining modernisation process, therefore they should be involved in the process
- For Small scale miners, health and safety compliance and ESG goals are not a primary focus compared to maximising profit
- Mining communities may be the sole beneficiaries of the wealth produced, however this, in some cases, is diminished by migration patterns
- Technology should be made affordable for Small scale and artisanal miners
- There is a business case in the diamond, clay and quarry commodity mining for small scale miners as there is less mineral processing compared to the gold commodity
- There is substantial loss in revenue and employment opportunities, environmental pollution and crime is increasing at an unprecedented rate due to unregulated artisanal mining
- Legalize illegal mining by developing legal frameworks, adopting incentives, skills training and empowerment initiatives to regulate and channel the revenue into the mainstream economy



Findings



4. FINDINGS

Zama-Zama type mining

Unlike in South Africa, ASM in the international context is conducted for subsistence and not commercial purposes. There is currently not much data on the extent of small scale mining activities in South Africa. However, from available literature and reports, it can be deduced that the ASM sector in South Africa consists of three broad activities: registered operations that are legal, the 'traditional' activities operating outside the legal framework (also referred to as informal mining operations), and the Zama-Zama type mining. The latter group consists of artisanal and small scale miners who also operate outside the legal framework, and their activities are associated with criminality and organized crime. These miners operate mostly in abandoned shafts or owned licensed operating mine shafts with no health and safety compliance (Nhlengetwa and Hein, 2015), (Hilson and Gatsinzi). These mining activities exacerbates crime in mining communities, particularly in the gold and chrome commodities. The mining sector has lost tens billions in revenue in the illegal trade of precious commodities.

Further, literature indicates some key challenges facing the ASM sector may include access to mineral rights, access to capital, access to markets, technology and skills, and institutional support (DMRE, 2021).

Access to mineral rights

The MPRDA (Act 28, 2002) recognizes all form of mining activities, including small scale mining. While the Act does not clearly distinguish between the different categories of mining, it makes provisions for small- scale mines in the form of a mining permit. A mining permit is a document issued by the Department of Mineral Resources which allows one to conduct mining operations. The mining permit was introduced solely to provide a platform for HDSAs that is affordable and easy to access. The DMRE differentiates small scale mining activities into three types, namely artisanal or subsistence mining operations (new entrants), suboptimal formal mining operations, and entrepreneurs with upfront capital.

Although mining permits are less costly compared to mining rights, small scale miners are expected to meet the requirements with respect to the Environmental Management Plan, consultation with the landowner/ occupier and affected parties, financial provision for rehabilitation, and proof of technical ability. The requirements and compliance of the mining permit may not be easy, nor affordable for the small scale miner.

Access to funds

Small scale miners have difficulty in accessing funds. Small scale miners are usually funded through the government initiatives, donor organizations, and/or middlemen (buyers) (Dreschler, 2001). The latter option is most common where miners enter into contracts with buyers to invest into the business (e.g. in the form of capital or equipment) in exchange of selling products solely to them or at pre-determined prices. In the majority of cases, this has not proven feasible and has resulted in exploitation because of inequalities in bargaining powers (e.g., tiger's eye mining in Northern Cape Province) (Ledwaba et al., 2013).

Access to Markets

Industrial minerals are defined as 'any rock, mineral or other naturally occurring substance of economic value, exclusive of metal ores, mineral fuels and gemstones. Regarded as high-volume and low-value minerals, industrial minerals remain underexploited in South Africa and hence present opportunities for small scale miners. Some of these potential opportunities include salt production and sandstone mining. Salt resources in South Africa are estimated at 53 Mt and currently only 50 per cent of the demand is met (DMR, 2007). This presents a potential opportunity for salt miners in South Africa. There are also opportunities in the sandstone industry. While South Africa holds significant sandstone deposits, end-users are importing sandstone from neighbouring countries, chiefly Lesotho. There are a number of domestic market opportunities for small scale operators, particularly those producing industrial minerals and construction materials. In addition, one commodity with the prospects of economic developments is diamond. There are less mineral processing upstream operations required, reducing operational costs and maximizing profit in sale of mineral (DMRE, 2021).

Technology

The technology deployed in the ASM sector is low. It ranges from rudimentary tools (no mechanization) to mechanization on a limited scale. The majority of operations depend on manual labour and the use of basic tools (such as pick and shovel) is very common. The need for appropriate technology in the sector is driven by the need to improve operations to ensure that they are organized, safe, and environmentally sound (DMR, 2011). It is indicated that the technology developed by OEMs should be more affordable to enable easier access for small -scale miners.

Skills

The need for training and skills was identified as a requirement for the ASM sector. While the shortage of skills in the mining industry is not unique to the ASM sector, small scale miners often lack the primary skills to conduct mining operations (DMR, 2011).

The indication is that ASMs should be given necessary training and educative material for them to acquire knowledge to undertake their activities with no harm. Training programmes which suit the needs for ASM need to be developed. Miners can get training from the decentralized legislative ASM mining districts at scheduled intervals (Zvarivadza, 2014). Training workshops can also be arranged where ASM gather together and share workable experiences. Community radios can be utilised in educating ASM miners on ways to mine with less harm to the environment (Zvarivadza, 2014). Training enables cooperation than monitoring and violent enforcement of the law. Mwaipopo et al (2004) bring to light that technical expertise in terms of advising, training, and educating ASM miners ensure ASM compliance with the overall country mining policy and legislation on ASM. The challenges of woman abuse and child labour in ASM is better addressed through training and education. Miners may engage child labour through ignorance of the negative consequences. Educating ASM ensures they are aware of these consequences and cooperate in sending their children to schools which can be established in ASM centres (Zvarivadza, 2014). Children need to be given a fair chance to develop them in all facets of life at the same time being allowed to help their parents in ASM as it is a family business. Formation of ASM associations and training members on how to run them discourages the discrimination and ill-treatment of women since they will have same rights as other association members. Jaques et al (2004) point out that any development policy on ASM has to be hinged on education and technical training for it to be successful (Zvarivadza, 2014).

Institutional Support

Government had established several programmes to facilitate the development of the ASM sector. These included the National Small Scale Development Framework (1999), National Steering Committee of Service Providers (NSC) (2000), Small Scale Mining Directorate (2004), and Small-Scale Mining Board (2006). The principal objective of these initiatives was to provide technical, managerial, and financial support to small scale mining projects (Dreschler, 2001; Department of Mineral Resources, 2011). DMRE has a Directorate that assists small scale operators. The services provided include the establishment of a legal entity, guidance towards the identification of mineral deposits, the compilation of environmental impact assessments (EIAs), reserve estimation, and mining feasibility and market studies. So, while there are a number of stakeholders with the necessary experience and expertise to address the challenges experienced by small scale operators, there is a need to establish synergies and collaborative efforts between different stakeholders.

Further, mining claims allocated to a particular ASM association becomes an asset for that association and the members of that association jealously guard against invaders (Zvarivadza, 2014). For this to be fruitful, all interested and affected parties must be consulted. Members of the community in which the claims are located need to be consulted and if possible, some of them become part of the association. Failure to do this may result in members of the community working against the ASM association and even violently take over the association's investments into those claims (Zvarivadza, 2014). Legal authorization without community consent is practically null and void as the association is considered not to have the social license to operate. Profitable mining claims may be located in traditional farming land and there is need for discussion with the farming landowners to find a way forward. Allocation of mining claims must never be imposed on the community since this leads to conflict which is counterproductive (Zvarivadza, 2014). Where there is a stale mate in negotiations, concerned parties need to reach a reasonable compromise by exploring alternatives. Hinton et al (2003) point out that formal incorporation of gender issues and the adoption of holistic approaches to artisanal mining communities through technical assistance and community development programmes are key factors to the success of ASM (Zvarivadza, 2014).



Community benefits of small-scale mining

5. COMMUNITY BENEFITS OF SMALL-SCALE MINING

Overall, analysis from the preliminary findings and literature review demonstrates that the artisanal small scale mining (ASM) is embedded in the local economy and is a source of livelihoods for community members. This section explores community benefits associated with small scale mining.

Formalizing the sector would bring ASM's informal income-earning activities and economies into the formal sector through legal, regulatory and policy frameworks. The sector represents an important livelihood and income source for the poverty affected local mining population. Furthermore, women and children will be protected, environmental care, good standards for health and safety practices will be implemented. (DMRE, 2021).

Literature suggests that artisanal mining has become an important part of our society and the mining sector, it's a reality that should be acknowledged by mining companies and the government, and then try to move and work together to try and formalise it, legalise it, and provide structures for it to be conducted safely, in a healthy manner and with accepted structures.

The positive effects and benefits of ASM are centered around the income benefits and opportunities for livelihood diversification, especially to improve resilience in the case of hardships and shocks (Tschakert 2009).

Further, ASM provides direct employment for millions of vulnerable people from communities where there are mining operations (Kumah et al. 2020; Hilson and Maconachie 2020) and serves as an important means of coping with unemployment for communities (Nyame et al., 2009). Small scale mining creates new communities and bring wealth to those already in existence and if formalized and acknowledged by mining companies and the governments can benefits communities through the creation of new projects. New projects can bring jobs, business activities, roads, schools, and health clinics to remote and previously impoverished areas.

From literature, as cited above, it is suggested that regularization could ensure livelihoods for thousands of skilled ex-miners who had lost their jobs due to a decline of formal large scale mining South Africa. Further that artisanal and small scale mining contributes significantly toward socioeconomic development of communities where it occurs, significant employment to local population, and many social interventions such as rural electrification, provision of drinking water, construction of classroom blocks, provision of scholarships, and medical supports in the impoverished communities where the mining is practiced. It is concluded that ASM is an indispensable economic and social venture that requires technical and financial support from government, stakeholders, and financial institutions to improve operations and ensure sustainability in the industry to derive maximum benefits. Mining companies could potentially provide training, supervision, personal protective equipment (PPE) and health monitoring for such miners.

ASM has become an important supplementary income to farming and extra source of income during hardship. Many families engage simultaneously in both ASM and agriculture, transferring labor and finance from one to another (Hilson and Garforth 2012; Maconachie and Binns 2007; Pijpers 2014).



Conclusion

6. CONCLUSION

The study has suggested that ASM generates employment and income, but it is not always safe, well – monitored, legal or regulated. ASM activities can cause substantial negative environmental, health and social impacts, and its informal nature also can make ASM an easy source of income for organized crime and armed conflicts. (Hilson & Maconachie, 2020).

It is recommended that ASM make associations, cooperatives, and joint ventures with other interested parties to increase their bargaining and marketing power. This also makes it easy to engage government and other financing institutes as they speak with one voice (Zvarivadza, 2014).

There has to be in place training and educational facilities in decentralized mining administration centres so that ASM is equipped with best practice for achieving sustainable development. This involves capacitating ASM so that they eventually become self-sustaining by utilizing appropriate technology and mining methods as well as efficient management skills. Information of ASM best practices can also be disseminated through community radios accessible to all ASM as well as use of non-boring visually appealing and entertaining booklets (Zvarivadza, 2014).

The ASM sector is an important sector in the economy. It cannot be ignored. Experience in other countries suggests that if the sector is supported, it could potentially result in socio-economic benefits for local mining communities and the country as a whole.



2017 Z1027.5



References

7. REFERENCES

- Department of Mineral Resources. 2007. Structure of the salt industry in the Republic of South Africa. Mineral Economics. Report R62/2007. Pretoria.
- Department of Mineral Resources. 2011. Nurturing Junior Miners of the Future: A Strategic Framework to facilitate the growth of small scale mining sector in South Africa. Pretoria.
- Department of mineral resource and energy. 2021. Draft artisanal and small scale mining policy. Government gazette, 2(44538), 7 – 34.
- Dreschler, B. 2001. Small scale mining and sustainable development within SADC region. Minerals Mining and Sustainable Development (MMDS) Report. no. 84. August 2001.
- Government Gazette. 2002, Mineral Petroleum Resource and Development Act (No. 28 of 2002) (MPRDA). Republic of South Africa. 10 October 2002.
- Hilson, G., Garforth, C., 2012. “Agricultural poverty” and the expansion of artisanal mining in sub-saharan Africa: experiences from southwest Mali and southeast Ghana. *Popul. Res. Pol. Rev.* 31 (3), 435–464.
- Hilson, G. and Gatsinzi, A. 2014. A rocky road ahead? Critical reflections on the futures of Small – scale mining in Sub-Saharan Africa. *Futures*, 62(2014), 1 -9.
- Hilson, G. and Maconachie, R. (2020). Artisanal and small scale mining and the Sustainable Development Goals: Opportunities and new directions for sub-Saharan Africa. *Geoforum*, 111, pp. 125–141.
- Kumah, C., Hilson, G. and Quaicoe, I., 2020. Poverty, adaptation and vulnerability: An assessment of women's work in Ghana's artisanal gold mining sector. *Area*, 52(3), pp.617-625.
- Ledwaba, P., Malatsi, R., Moeletsi, R., and Mosena, C. 2013. Understanding the small scale mining industry in the Northern Cape - Primary focus on tiger's eye. Internal Report. Mintek, Randburg, South Africa.
- Maconachie, R., Binns, T., 2007. “Farming miners” or “mining farmers”? : diamond mining and rural development in post-conflict Sierra Leone. *J. Rural Stud.* 23 (3), 367–380
- Minerals Council South Africa. 2019. Artisanal and Small scale mining. Position paper. 1 – 8.
- Minerals Council South Africa. Opportunities and challenges for junior miners and emerging miners.
- Nhlengetwa, K. and Hein, K. 2015. Zama-Zama mining in the Durban Deep/Roodepoort area of Johannesburg, South Africa: An invasive or alternative livelihood? *The Extractive Industries and Society*.
- Nyame, F.K., Grant, J.A. and Yakovleva, N., 2009. Perspectives on migration patterns in Ghana's mining industry. *Resources Policy*, 34(1-2), pp.6-11.

Ofosu, G., Dittmann, R., Sarpong, D. and Botchie, D. (2020) Socio-economic and environmental implications of artisanal and small scale mining (ASM) on agriculture and livelihoods, *Environmental Science and Policy* 106, April, 210-220. <https://doi.org/10.1016/j.envsci.2020.02.005>.

Pijpers, R., 2014. Crops and carats: exploring the interconnectedness of mining and agriculture in sub-Saharan Africa. *Futures* 62 (A), 32–39

Tschakert, P. (2009). Recognizing and nurturing artisanal mining as a visible livelihood. *Resources Policy*, 34:24–31.

Umirzoqov, Azamat & Abdurashidovich,. (2020). International Journal of Academic Multidisciplinary Research (IJAMR) Prospects for the Development of Small Scale Gold Mining in Developing Countries. *Academic Research International*. 4. 38-42.

Verbrugge B, Geenen S. (2019). The gold commodity frontier: a fresh perspective on change and diversity in the global gold mining economy *The Extractive Industries and Society* - ISSN 2214-790X - Oxford, Elsevier sci ltd, 6:2, p. 413-423.

Zvarivadza, T. (2014). Artisanal and Small Scale Mining as a challenge and possible contributor to Sustainable Development. *Australian Centre for Geomechanics*.