



The contribution of artisanal and small-scale gold mining to Zimbabwe's economic growth and development

Zimbabwe Accountability and Artisanal Mining Programme



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PACT

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ABBREVIATIONS AND ACRONYMS

AMV	African Mining Vision
ASGM	artisanal and small-scale gold mining
COMZ	Chamber of Mines of Zimbabwe
EIA	environmental impact assessment
EITI	Extractive Industries Transparency Initiative
FI	Fraser Institute
FPR	Fidelity Printers and Refinery
g	gram(s)
GDP	gross domestic product
GORZ	Government of the Republic of Zimbabwe
IGA	income-generating activity
kg	kilogram(s)
km	kilometer(s)
LSGM	large-scale gold mining
MOFED	Ministry of Finance and Economic Development
MOMMD	Ministry of Mines and Mining Development
n.d.	no date available
PICES	Poverty, Income, Consumption Expenditure Survey
RBZ	Reserve Bank of Zimbabwe
SAE	Small Area Estimation
T	tonne(s)
UNCTAD	United Nations Conference on Trade and Development
US\$	United States dollar(s)
VAT	value-added tax
WGC	World Gold Council
ZAAMP	Zimbabwe Accountability and Artisanal Mining Project
ZIMRA	Zimbabwe Revenue Authority
ZIMSTAT	Zimbabwe National Statistics Agency



EXECUTIVE SUMMARY

In 2016, Zimbabwe's gold mining sector as a whole, consisting of both artisanal and small-scale mining (ASGM) and large-scale gold mining (LSGM), contributed 2.6% of gross domestic product (GDP), 18% of exports, 28% of mining output, and 1% of government revenues (royalties only) and employed 7.1% of the labor force.

ASGM is perceived to contribute significantly to these figures and, therefore, to the growth and development of Zimbabwe's economy. However, there is limited evidence of the scale of the contribution and how it has evolved over time. This study seeks to fill this knowledge gap.

This study used both quantitative and qualitative research methods to analyze ASGM's contribution at both macro- and micro-economic levels. Results show that, currently, ASGM's macro-economic contribution is comparable to that of the more-established and better-financed LSGM sector (Table A).

Table A: Gold mining's contributions to Zimbabwe's economy (2016)

	ASGM	LSGM	total gold mining
production in ounces	31,000	428,000	739,000
% of GDP	1.2%	1.4%	2.6%
royalty in US\$ (% of government revenue)	3.8 million (0.24%)	11.8 million (0.76%)	15.6 million (1%)
employment numbers (% of labor force)	500,000 (7%)	11,000 (0.1%)	511,000 (7.1%)
direct and indirect jobs	1 million	81,000	1.1 million

The study also shows that, in general, growth in deliveries of gold from ASGM to the formal market is directly related to economic growth and an increase in government revenues. This growth is even beginning to surpass that of the LSGM sector. It is important to note that the data for ASGM that was used for this study to determine macro-economic contribution is for formally traded gold. This leaves out a significant and unquantified amount of gold that is traded informally, potentially as much as 30% of the formally traded gold, which makes positive contributions at a micro-economic level.

Both ASGM and LSGM have developed upstream (supply) and downstream linkages that have resulted in multiplier effects within the economy. ASGM has been shown to have a higher proportion of local content in its production costs because the unsophisticated inputs and rudimentary and marginally advanced tools that the sector uses are locally available.

KEY CONCLUSIONS OF THE STUDY

- ASGM reduces poverty, improves food security, and has the potential to get more people out of poverty, regardless of whether it is practiced formally or informally, albeit formal operations have been shown to have a higher poverty-reduction impact than informal ones.
- ASGM's contribution to the economic growth can be improved by increasing the amount of gold that is traded formally. This requires improving access to and protection of mining claims for ASGM and establishing affordable financing and technical services (for example, exploration, mining and mineral processing advisory services) for the sector, which would improve output.
- ASGM requires improved environmental management, public health management, and mine safety to reduce its environmental and human costs. This would ensure that ASGM practices are consistent with the principles of sustainable development.

Among this study's recommendations to ASGM stakeholders, the authors propose creating an enabling environment for ASGM through bold changes to laws, policies, and how institutions implement these; developing miners' skills and granting them access to education; and promoting women's equitable participation in ASGM.



INTRODUCTION

About Zimbabwe

country context

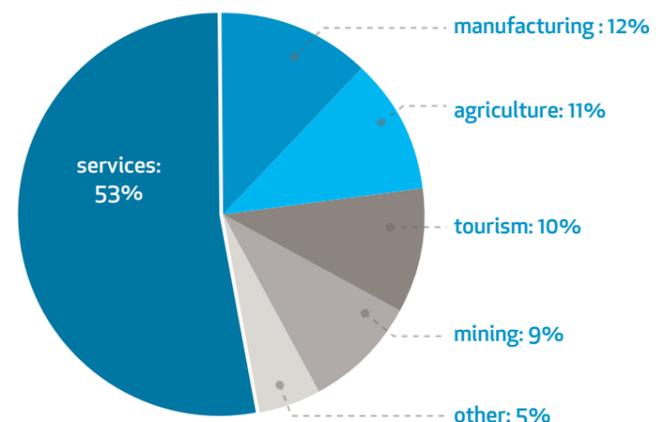
The Republic of Zimbabwe, which gained independence in 1980, is a landlocked, low-income country located in southern Africa, sharing borders with Botswana, Zambia, South Africa, and Mozambique. Of the country's 390,000 square kilometers (km) of surface area, 99% is land and the remaining 3,900 square km is water. Only 8.2% of the land area is arable.

The population of Zimbabwe was measured in 2012 at 13 million and is currently estimated at 15 million, with 52% of citizens being female. The majority of people are Zimbabweans of African origin. The major ethnic tribes are Shona and Ndebele.

The country is divided into eight administrative provinces, two cities with provincial status, and 62 districts (subdivisions of the provinces). The executive, legislature, and judicial system constitute the three pillars of government. There is a multi-party political system.

The major sectors of Zimbabwe's economy are services, agriculture, mining, tourism, and manufacturing (see Figure 1 for breakdown of the sectors' contribution to gross domestic product [GDP]). Overall, in 2014 the mining sector contributes 9% to GDP, more than 55% of exports, 11% of fiscal revenue, and 50% of foreign direct investment.¹

Figure 1: Zimbabwe's GDP²



geological make-up

Zimbabwe is well endowed with deposits of an estimated 60 minerals, approximately 40 of which historically have been exploited. The Zimbabwe Geological Survey (1990)³ identified more than 500 individual deposits of base metal and industrial minerals in the country. Its potential gold reserves (ore) are estimated at 84 million tonnes (t) at an average grade of 4.9 grams (g) per tonne.⁴

Zimbabwe is rated sixty-seventh-most attractive mining jurisdiction in the world in terms of geological prospectively, out of 104 mining countries, by the Fraser Institute (FI).⁵

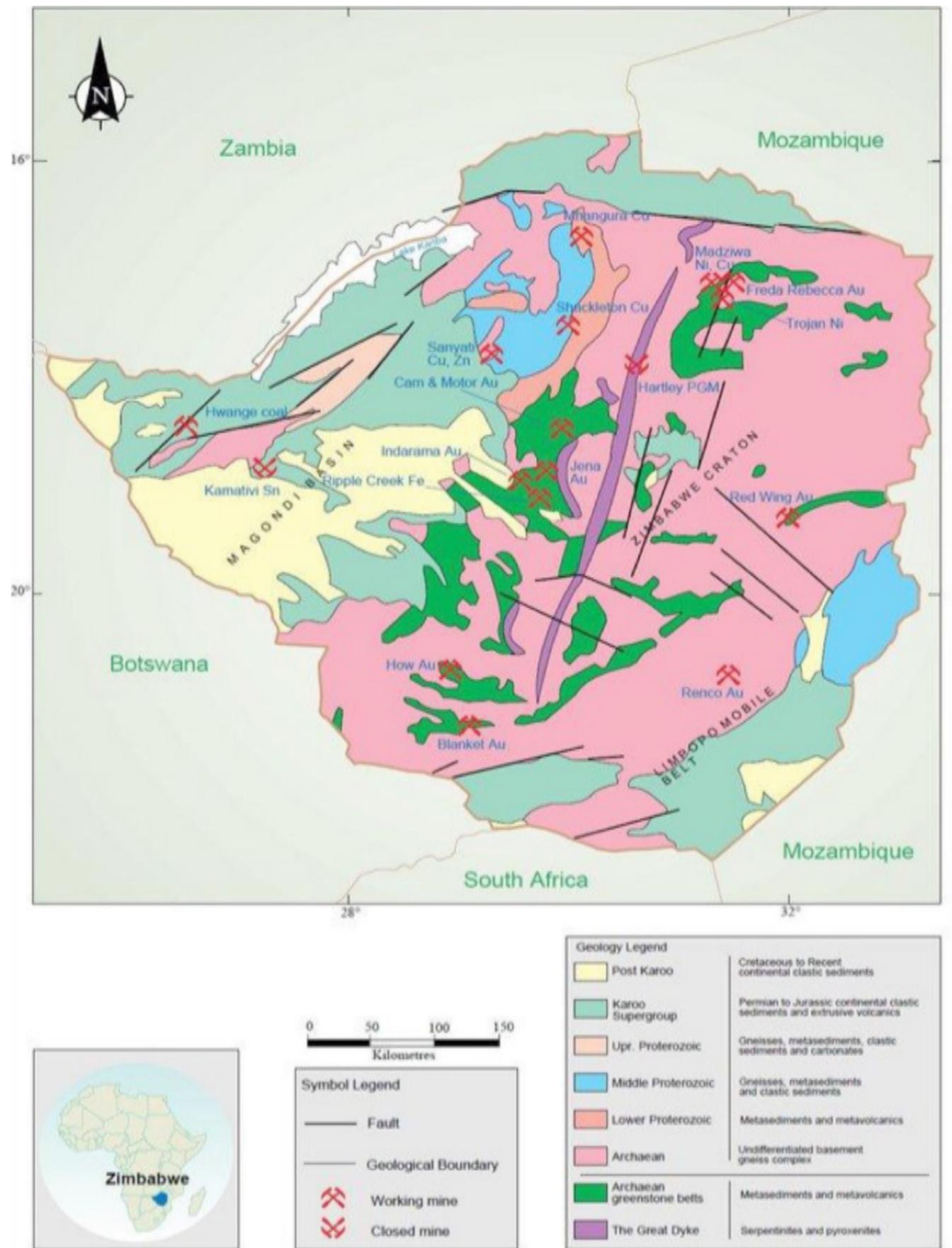
According to Sithole (1994) the geological map of Zimbabwe, shows the [Great Dyke (main purple) running NE-SW through the middle, in association with greenstone belts (leaf-green)]. The Great Dyke of

Zimbabwe is a layered mafic intrusion of igneous, metal-bearing rock that has been dated to approximately 2.5 billion years old.⁶ Greenstone belt is a zone of variably transformed mafic sequences associated with sedimentary rocks, gold and granite.⁷

The great dyke captured in Figure 2 is usually associated with economically important metals such as chromium, nickel, copper, platinum, titanium, iron, vanadium, and tin.

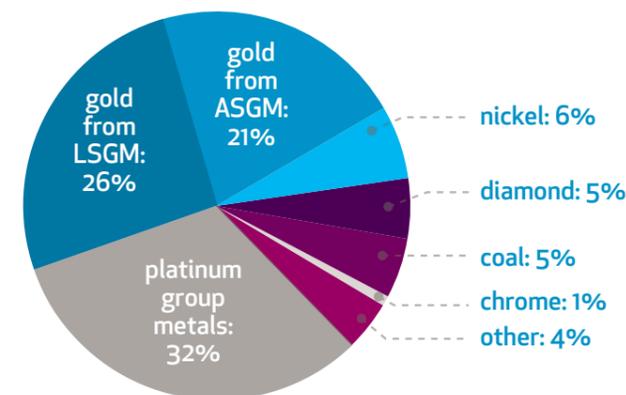
Chromium, in the form of the mineral chromite, and platinum are particularly abundant in the Great Dyke and actively mined. Major known diversified minerals in dyke feature for Zimbabwe include Platinum Group Metals (PGMs) and chrome. Zimbabwe's geological map is presented in Figure 2.

Figure 2: Geological map of Zimbabwe⁸



Only a handful of minerals make a significant contribution to the economy: gold, diamonds, platinum group metals, coal, and nickel (Figure 3).

Figure 3: Mineral share in Zimbabwe's total minerals output value, 2016⁹



Zimbabwe's gold mining sector

Gold mining makes up a significant part of the mining sector and is broadly divided into large-scale gold mining (LSGM) and artisanal and small-scale gold mining (ASGM). Zimbabwe's Environmental Management Regulations (2014) define an artisanal miner as "a miner who carries out mining activities using simple tools and employs up to 50 people; these include Government-registered groups or syndicates or co-operatives."

It is generally accepted in Zimbabwe that the distinction between ASGM and LSGM (and further, between artisanal gold miners and small-scale gold miners) is based on the scale of operation and degree of mechanization. However, the law makes no distinctions among the property rights that the different scales of mining can apply for.¹⁰

Overall, the Zimbabwean gold industry's contribution to the economy comes in several forms, which will be discussed in later sections of this report:

- Direct contribution to GDP
- Employment creation
- Foreign exchange generation
- Gross national investment
- Social infrastructure development through corporate social responsibility activities
- Direct contribution to government revenue (tax revenue)

Gold mining also provides indirect contributions, including development of upstream (supply) and downstream linkage industries and the induced effects of household spending, which together result in multiplier effects on the economy.

While LSGM continues to be seen as the main contributor to gold output, its contribution has declined over time relative to ASGM. ASGM makes both macro-economic contributions to the national economy and micro-economic contributions to livelihoods and, therefore, directly alleviates poverty.

However, ASGM is associated with environmental degradation, social ills, and poor health and safety records. The sector faces many constraints ranging from paucity of finance (due to lack of collateral security against bank loans) and technical expertise to inefficient mining and processing methods (leading to low recoveries).



About this study purpose and rationale

A review of the existing literature on ASGM in Zimbabwe showed that there are knowledge gaps; most studies focus more on the negative effects of gold panning on the environment, community welfare, and lifestyles of gold panners¹¹ and on ASGM as a source of criminality¹² than on its positive contribution. For example, studies do not pay much attention to the livelihoods, economic contribution, and experiences created by gold mining.

Against this backdrop, Pact sought to reveal the ASGM sector's contribution to economic growth and development, using time series data to show how different policies have inhibited or increased this contribution over time.

The study also aims to inform stakeholders on the need to create an enabling environment that maximizes the sector's benefits while minimizing its costs, especially during times of inflation, when gold production can be a stabilizing hedge. The study will be particularly relevant to policy-makers and regulatory authorities, like the Government of the Republic of Zimbabwe (GORZ) and local governance authorities.

ECONOMIC GROWTH VERSUS ECONOMIC DEVELOPMENT

Economic growth is defined as “the increase in the inflation-adjusted market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real gross domestic product, or real GDP, usually in per capita terms.”¹³

Economic development is defined as “efforts that seek to improve the economic well-being and quality of life for a community by creating and/or retaining jobs and supporting or growing incomes and the tax base.”¹⁴

Economic development implies much more than economic growth; it typically refers to improvements in a variety of indicators of welfare, such as literacy rates, life expectancy, and poverty rates.

objectives

The overall objective of this research was to unpack the contribution of gold mining to both economic growth and economic development. More specifically, the study:

- Assessed the combined and/or separate economic contribution of LSGM and ASGM to exports, taxes, royalties, investment, and employment
- Revealed ASGM's procurement practices, income, and expenditure patterns
- Compared ASGM's and LSGM's contribution to economic growth and development
- Compared gold sector economic contributions across different countries
- Qualitatively assessed policy issues in mining and their implications on ASGM's wellbeing
- Analyzed gold mining as a rural livelihoods and economic development strategy

At the micro level, the study looked at ASGM's contribution to rural livelihoods and sustainable economic development. At the macro level, the combined contribution of LSGM and ASGM was key.

methodology

The study was guided by the following research questions:

1. What are the trends in the contribution of gold in form of export, tax, royalties, and fees from LSGM and ASGM to the Zimbabwean economy?
2. What are the procurement practices of artisanal and small-scale gold miners with regards to services, goods, and equipment?
3. What are the income and spending patterns of ASGM miners?
4. What is the contribution of ASGM to GDP or its growth rate in Zimbabwe?
5. What are the contributions particular to ASGM to social conditions and other economic development indicators (infrastructure, consumption per capita, urbanization, and population growth)?
6. How do gold contributions in Zimbabwe compare with other countries?

The authors applied a multi-pronged approach. Quantitative methods, including regression and correlation analyses, were used to measure ASGM's micro-economic contribution. Qualitative methods, including desktop research, were used to uncover ASGM's macro- and micro-economic contributions.

The study obtained data from both primary and secondary sources, mostly spanning 2009-2016 because data on ASGM is not fully available prior to 2009. This included Pact's project data collected since 2014, particularly the scoping and baseline data on ASGM collected in 2014 and 2015.¹⁵

Secondary data for macro-economic analysis was obtained from the Zimbabwe National Statistics Agency (ZIMSTAT), the United Nations Conference on Trade and Development (UNCTAD), Chamber of Mines of Zimbabwe (COMZ), World Gold Council (WGC), Fidelity Printers and Refinery (FPR), Reserve Bank of Zimbabwe (RBZ), Ministry of Mines and Mining Development (MOMMD), and the World Bank. Review of relevant academic publications, reports, articles, and GORZ publications also yielded secondary data.





DESK REVIEW OF LEGISLATION AND LITERATURE

Review of the legal context and governance **national governance frameworks**

Zimbabwe has been exporting gold since pre-colonial times, when all gold was produced using methods that are today described as ASGM. Colonialism brought with it the large volumes of investment, expertise, and access to markets that created the LSGM sector. Formal governance mechanisms adopted during colonial times created mining property rights (both for small- and large-scale mining) that were only suited to the white minority class. The same legislation is still in use today.

The ASGM sector is governed by the Gold Trade Act of 1940 and the Mines and Minerals Act of 1961, the latter of which created the MOMMD (chapter 21:05) to regulate the sector. Small-scale gold miners generally have a legal mining title registered with the MOMMD and are expected to work within the provisions of the Mines and Minerals Act, the Environmental Management Act (2002; chapter 20:27), and various other mining and environmental regulations.

At the local level, ASGM is subject to the Rural District Councils Act (chapter 29:13), which empowers the local council to impose a land development levy on any rural land owners, including miners, that fall within the council's jurisdiction. These legal frameworks were created to suppress the ASGM sector and support LSGM. Even with different amendments to these acts, they remain detrimental to ASGM through deterrent licensing fees and registration requirements.

At the international level, the ASGM sector is governed by UNEP guidelines on mining. Zimbabwe is also a signatory to the 1992 Rio Declaration on Environment and Development, hence the country's ASGM activities are bound to carry out mandatory environmental impact assessments (EIAs). This has since been domesticated into Zimbabwe's national environmental policy.

Since independence in 1980, the GORZ has emphasized the importance of promoting the indigenous population's participation in the ownership and development of Zimbabwe's natural resources.

As a result, indigenization and economic empowerment policies and legislation were introduced in 2007 to facilitate indigenous involvement in the national economy. However, the lack of political will to create an enabling environment for ASGM, a predominantly indigenous economic activity, in the past 37 years shows that ASGM's economic contribution is largely underestimated and misunderstood by policy-makers.

Pertinent continental governance framework

The African Mining Vision (AMV) is a voluntary model developed by the African Union in 2009. The AMV emphasizes the need to leverage Africa's mineral resources to achieve broad-based development. The AMV has six tenets that all speak to the need to foster development through a deliberate transformative agenda that eventually fosters industrialization, diversification of product lines, knowledge intensification, and modernization. Despite the African Union's continental drive to formalize ASGM, some sub-Saharan African countries, like Zimbabwe, continue to criminalize and marginalize the sector. In 2014, the country effectively banned alluvial gold mining through the Environmental Management Regulations, which state that:

...alluvial mining shall not take place on land within 200 meters of the naturally defined banks or land within 200 [meters] of the highest flood level of any body of water conserved in natural or artificially constructed water storage work or stream; or any bed or banks or course of any river or stream; or land within 200 [meters] from any wetland.¹⁶

Progressively, tenet 5 of the AMV directly addresses the ASGM sector, recognizing this as a significant feature of Africa's mining industries and calling for ASGM's formalization. Table 1 compares the AMV's six tenets with Zimbabwe's draft minerals policy (not legally binding) and how the latter adheres to the former. Consideration of the draft policy, which is being championed by the GORZ through the MOMMD, is important here because it will be a major component of the policy framework governing all mining activities in the country, including ASGM. Currently Zimbabwe has no substantive mining policy; instead the AMV provides a benchmark of sorts because African countries have agreed to it.

Table 1: Comparison of Zimbabwe's draft minerals policy to the AMV⁷⁷

AMV tenet	draft minerals policy	the policy in practice for Zimbabwe
<p>1. Broad-based development based on:</p> <ul style="list-style-type: none"> • Linkages • Knowledge of endowments (resource database) 	<p>Development based on:</p> <ul style="list-style-type: none"> • Economic linkages • Funding of geological survey to enhance knowledge of endowments 	<ul style="list-style-type: none"> • Linkages with other sectors of the economy are insufficient. • The beneficiation policy is not effective because there are only pronouncements and no formal policies. • A mining promotion company has been established for exploration, but it has no capacity. • The GORZ has an information disadvantage against foreign investors on its own endowments.
<p>2. A mining sector that is fully integrated into and contributes toward industrialization impetus</p>	<ul style="list-style-type: none"> • A mining sector that is fully integrated into the economy 	<ul style="list-style-type: none"> • Downstream linkages (local use of minerals as raw materials in other sectors) with other sectors of the economy are still weak.
<p>3. Sound mineral resource governance based on transparency and accountability</p>	<ul style="list-style-type: none"> • Transparency on revenue flows and sector benefits • Affected communities to benefit • Wider benefits of mining to regional and national economies • Equitable and competitive mineral fiscal regime • Minimized social and environmental impacts (environmental stewardship) • Investing for the future 	<ul style="list-style-type: none"> • Transparency is under discussion, and the Ministry of Finance and Economic Development (MOFED) favors adopting the Extractive Industries Transparency Initiative (EITI). However, the MOMMD favors a domesticated version of EITI, like the Zimbabwe Mining Revenue Transparency Initiative. However, no progress has been observed. • Indigenization policies provide for Community Share Ownership Trusts, but the policies are not clear and there is no formal legal backing for these schemes. • Actual mining revenue amounts have been very opaque. • There is environmental stewardship in the form of enforcing EIAs, but there are no measures for inter-generational equity. A Sovereign Wealth Fund to cater for nonrenewable minerals has not yet been implemented.
<p>4. Optimal extraction of finite resources, both high value and low value minerals at all scales</p>	<ul style="list-style-type: none"> • Committed to a clear regulatory framework that is conducive to optimal exploitation of minerals • The Mines Act being amended 	<ul style="list-style-type: none"> • Emphasis is on high-value minerals, like diamonds, gold, and platinum. • Zimbabwe has missed out on benefitting from many other important minerals, including semi-precious minerals. • This is more of a value chain linkages development policy than a minerals development policy that promotes extraction best practices. • Regulatory framework is not yet finalized because the Mines Act is still under revision.
<p>5. Harnessing the artisanal and small-scale mining sector</p>	<ul style="list-style-type: none"> • Artisanal and small-scale mining to be developed and formalized 	<ul style="list-style-type: none"> • Joint monitoring between the police and the Zimbabwe Revenue Authority (ZIMRA) is carried out to increase delivery of gold by ASGM to FPR. • Attempts are underway to register syndicates of miners, which will make it easy to both monitor and support them.
<p>6. Human and institutional capacity building that fosters innovation, research, and development</p>	<ul style="list-style-type: none"> • Building capable institutions • Minerals knowledge formation (skills development) 	<ul style="list-style-type: none"> • Key institutions are losing their capacities in, for example, equipment and human resources. • Learning institutions are constricted by lack of staff and equipment, so they are producing fewer graduates, and those they graduate are possibly of poor quality.

Review of literature on gold mining's economic contribution

A review of the existing literature on gold panning in Zimbabwe has shown knowledge gaps because most studies focus more on the negative effects of gold panning on the environment, community welfare, and lifestyles of gold panners¹⁸.

Some scholars describe ways river banks are collapsing, vegetation is being lost, and soil erosion and siltation of rivers are occurring as a result of the methods used by ASGM in accessing and extracting gold (Guvamombe, 2013; Gandiwa and Gandiwa, 2012).

A body of literature detailing LSGM's economic contributions already exists, such as country-specific studies by the International Council on Mining and Minerals' *Mining's Contribution to National Economy* and WGC's periodic reports that demonstrate LSGM's global economic contribution.

WGC's publication¹⁹ reported that, in 2012, LSGM contributed US\$210 billion to the global economy, while downstream beneficiation in jewelry and investment products directly contributed a further US\$110 billion. The publication also noted that some countries are very reliant on LSGM, such as Papua New Guinea (15% of GDP), Ghana (8% of GDP), and Tanzania (6% of GDP). In others, ASGM is a key source of employment, for example, creating 98,000 jobs in China, 134,000 in Russia, and 146,000 in South Africa.

The WGC has examined LSGM's wider indirect economic impacts, including from additional taxes, secondary employment, and development of social and economic infrastructure. The research shows that, out of US\$56 billion spent in the sector worldwide, US\$35 billion (63%) went to

suppliers, US\$8 billion (15%) to wages, US\$8 billion (15%) to governments in taxes, and US\$3 billion in payments to providers of capital (including dividends and interest).²⁰

However, there is limited literature on the economic contribution of ASGM, which employs an estimated 16 million people in developing countries and up to 100 million people worldwide.²¹ Available literature suggests that ASGM in Zimbabwe sustains the livelihoods of not less than 1 million people.²²

Positive views of ASGM are uncommon in the most mining publications which are dominated by industrial mining interests. However, ASGM contributes to improved rural livelihoods and local economic development²³. This justifies that ASGM must be incorporated into the mainstream economy.

However, Mawowa (2013) posits that ASGM's contribution is unlikely to be distributed across the whole economy in Zimbabwe due to the activities of politically connected individuals who use their political stamina to acquire mines and informally buy gold.

Similarly, the Centre for Natural Resource Governance (2013) pointed out that informally traded gold is sold to markets in South Africa and Mozambique, contributing to illicit financial flows and depriving the national treasury of revenue.

In all, ASGM in Zimbabwe has received a lot of criticism from policy implementers and environmentalists.²⁴ For example, environmentalists decry ASGM's negative impact on the environment,²⁵ while sociologists bemoan the wastefulness with which many miners use their income.²⁶ This has led many researchers to focus more on ASGM's environmental effects, giving less attention to the downstream and upstream economic linkages that ASGM creates, hence the gap in literature.





TRENDS IN ZIMBABWE'S GOLD OUTPUT

Overall trends

Overall gold production in Zimbabwe post-independence can be tracked over three phases with specific characteristics (Table 2).

Table 2: Gold production phases in Zimbabwe, 1980 to present²⁷ (right)

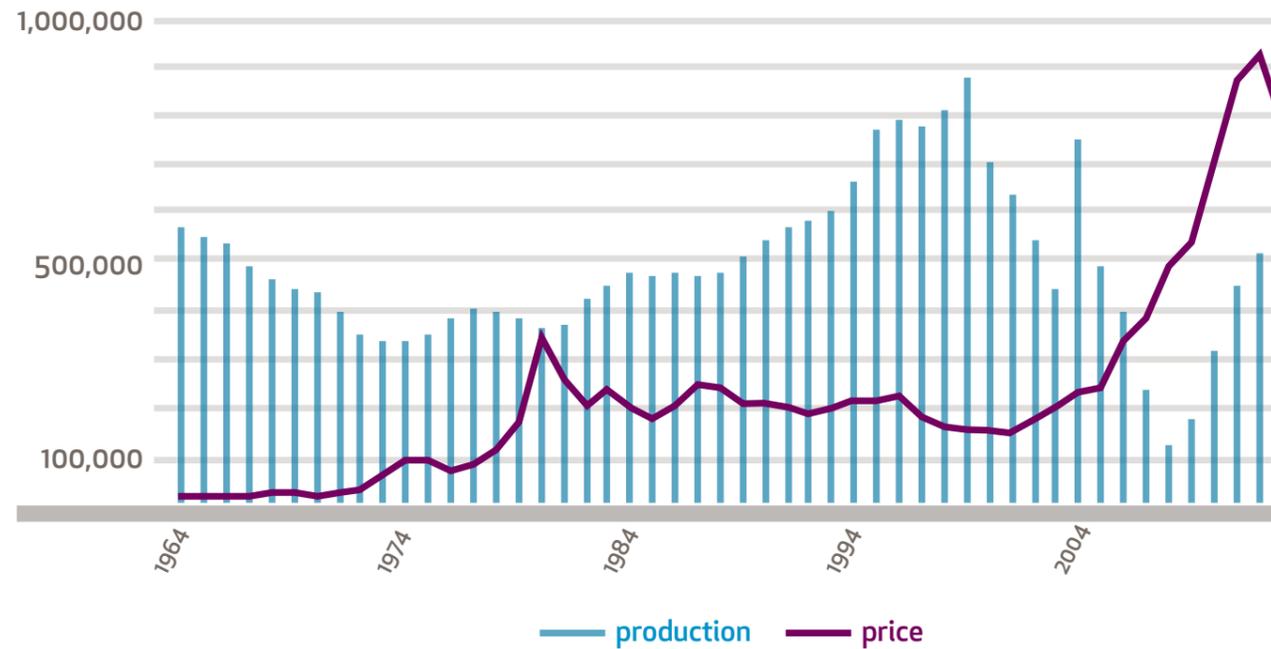
Data is available for formally traded gold from 1964 to date. The post-1965 period of unilaterally declared independence endured a 15-year decline in gold production due to international sanctions and the Liberation War. Independence created a conducive environment for the gold mining sector, which then experienced 19 years of continued growth until its peak in 1999, when Zimbabwe produced 27.1 T.

For the next 10 years, production collapsed due to the deterioration of the economy, despite the growth of ASGM, to reach a historic trough of 3.6 T traded formally in 2008. Zimbabwe unfortunately missed out on a large portion of the commodity super-cycle of 1998-2008, when prices of metals such as gold reached record highs.

phase	characteristic
1980–1999 LSGM production growth Nascent ASGM	<ul style="list-style-type: none"> Steady increase in gold production by LSGM, benefiting from relative macro-economic stability Relatively stable exchange rate Capacity utilization for LSGM was above 80% Numerous exploration activities Substantial investments in LSGM ASGM contributed a miniscule proportion of overall gold production
1999-2008 Collapse of LSGM Rise of ASGM	<ul style="list-style-type: none"> Hyperinflation 2005-2008 Price distortions due to exchange rate overvaluation Reserve Bank of Zimbabwe (RBZ) failure to pay foreign currency component to miners Lack of foreign currency to fund critical imports, notably spares and raw materials Frequent power outages resulting in mine flooding Suspension of capital budgets and exploration activities Widespread closure of most large-scale gold mines Commodity boom creating an incentive for informal gold trade Rapid growth of ASGM
POST 2008 LSGM recovers ASGM growth continues	<ul style="list-style-type: none"> Steady increase in formal gold trade from an all-time low of 3.6 T in 2008 Dollarization and accompanying macro-economic stability Rehabilitation and recapitalization of LSGM Very little exploration A number of LSGM mines still closed; as of 2014, 21 of 43 primary producers not operational ASGM deliveries to the formal market rapidly increasing from 0.3 T in 2008 to 10.7 T in 2016

Thereafter, introduction of a multi-currency regime brought recovery in production, and ASGM became significantly important to a point where it produced 45% of the total formally traded gold in 2016, the second-highest production of gold ever in Zimbabwe. Figure 4 illustrates these trends.

Figure 4: Trends in Zimbabwe gold production (ounces) and price, 1964-2016



Twenty-First Century trends

The 2000s were an especially difficult period for the LSGM sector, characterized by hyperinflation, rising cost of capital, declining returns on investment, collapse of critical infrastructure like railways and electricity, mass exodus of skilled labor, limited access to foreign currency, and artificially priced local currency.

Through the RBZ, the GORZ continuously implemented gold support price schemes with a view to compensating gold producers from exchange rate losses in order to restore viability to the industry. By 2008, virtually all large-scale gold mines were under care and maintenance, with others shutting down completely.

The dollarization of the economy in 2009 ushered in a new era of macro-economic stability, underpinned by the implementation of fairly credible macro-economic policies. Gold output responded to the stable macro-economic environment, accompanied by a boom in the gold price. Gold output increased from the low of 3.6 T to reach 14.8 T by 2012, benefitting from the commodity super-cycle and from strategic, dedicated arrangements between the Zimbabwe Electricity Supply Authority and LSGM to curtail power shortages.

The end to the commodity super-cycle was followed by progressive decline in the price of gold, coupled with attendant challenges, including high-cost structure and shortages of capital and power. Gold output flattened at around 14.1 T in 2013, undermined by the subdued gold output from large-scale producers.

However, increased deliveries from the ASGM sector as a result of measures by the RBZ, MOMMD, and the police to monitor the sector and to promote it through formalization and provision of equipment financial facilities, led to increased output of more than 20 T by 2016 and is currently projected to increase to 24 T in 2017.

Figure 5 disaggregates gold output between LSGM and ASGM over the past 20 years.

Figure 5: ASGM and LSGM production trends (kg), 1998-2016²⁸

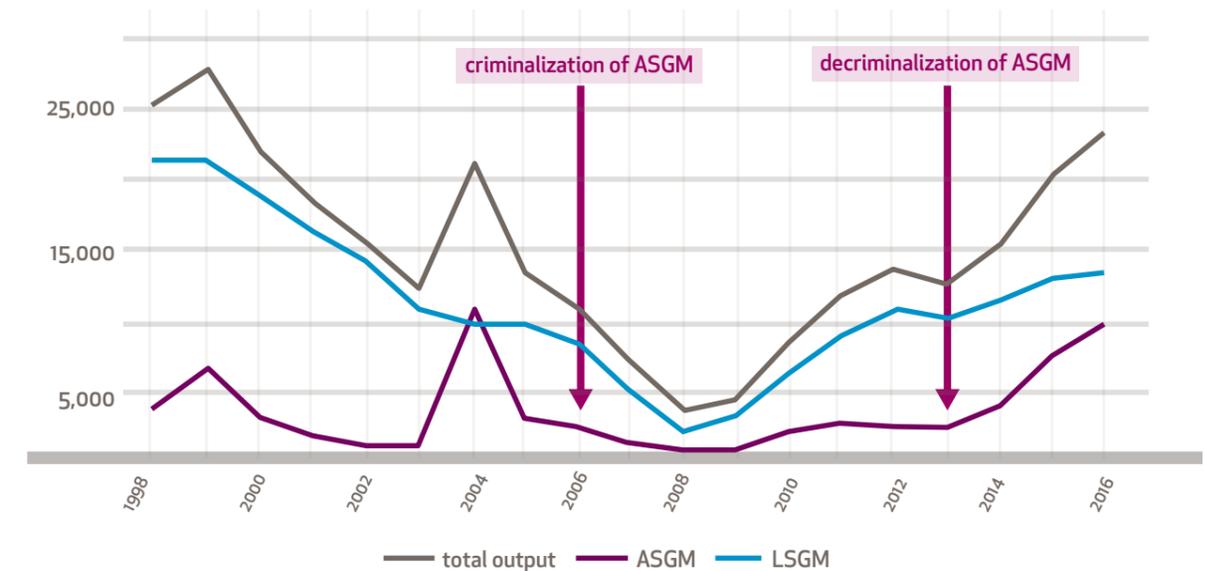
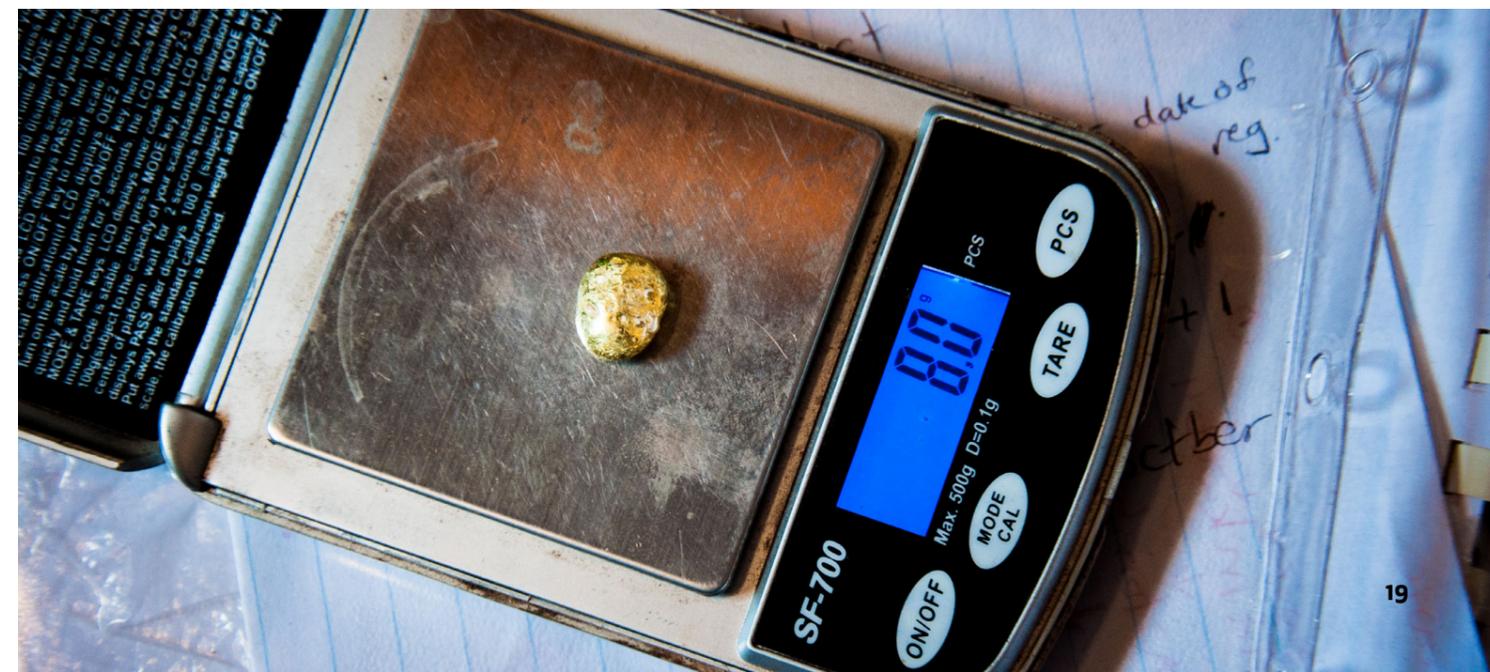


Figure 5 provides useful insight on the impact that policies can have on gold output and decisions that miners make with regards to selling on the formal or informal market. In 2006, in the face of a disintegrating economy, the GORZ insisted that all gold miners sell their gold to FPR at a fraction of the international market price. That policy pushed gold miners to the informal market.

By the end of 2006, the GORZ criminalized ASGM, further pushing miners to sell on the informal market. The GORZ decriminalized ASGM in late 2013, a shift that sparked some efforts to formalize artisanal gold mining. As a result, ASGM's deliveries to the formal market have grown exponentially to the extent of surpassing that of LSGM from June to August 2017.²⁹



Zimbabwe's contribution to world gold production

Between 1964 and 2014, Zimbabwe's percentage share in world gold production halved (Figure 6).

Figure 6: Trend of Zimbabwe's percentage share in world gold production, 1964-2014³⁰

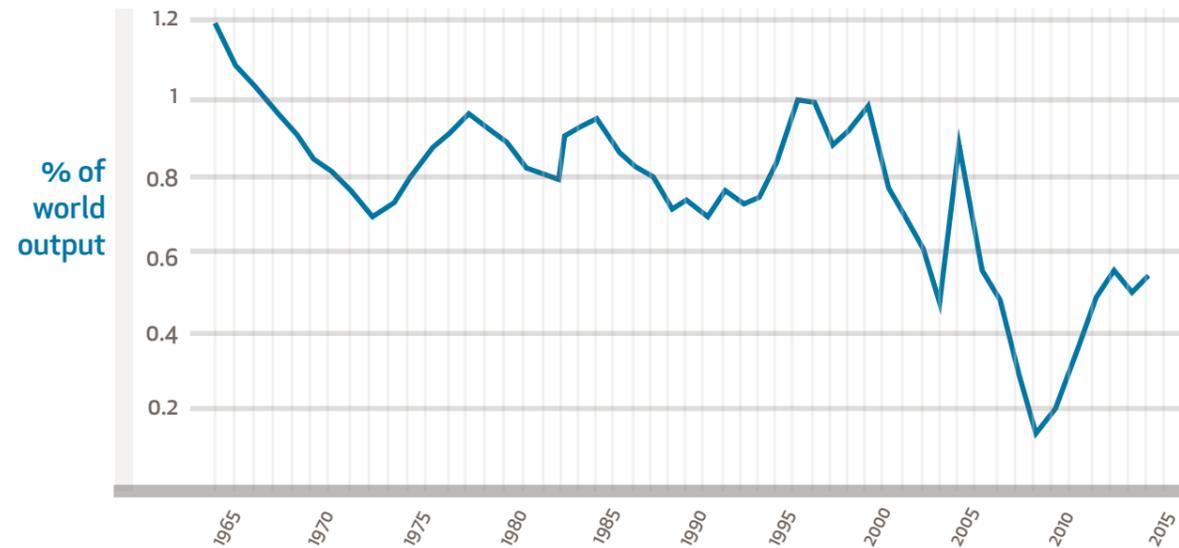
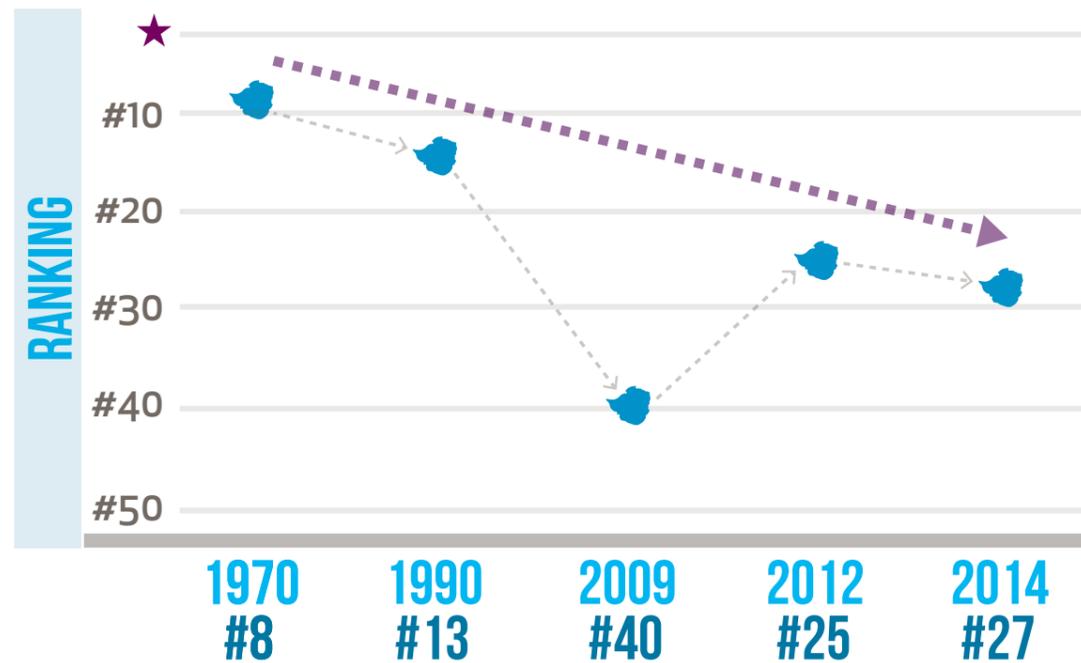


Figure 7 shows that Zimbabwe's ranking among world gold producers has on average worsened since 1970, when it ranked eighth.

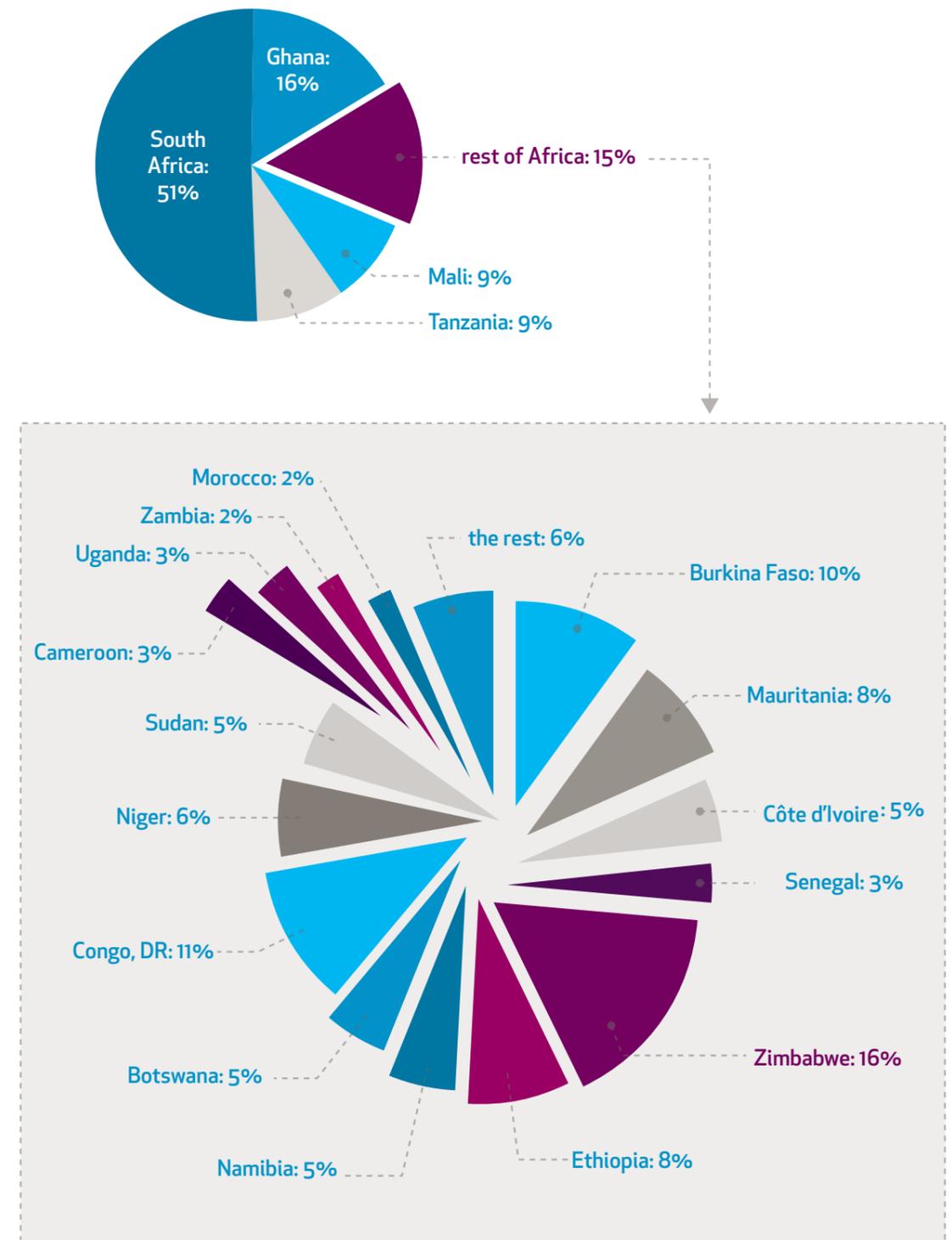
Figure 7: Zimbabwe's ranking among world producers³¹



This ranking and the generally decreasing share of the country in world production reflect a fundamental worsening of the national policy environment over time and other attendant challenges, such as high power tariffs, lack and high cost of capital (both investment and working capital), and an unstable royalty regime.

Figure 8 shows the distribution of total gold production in Africa by country averaged over the period 2005-2009. The left panel shows that South Africa led at 51%, followed by Ghana (16%), Mali (9%) and Tanzania (9%). The right panel shows the distribution of the remaining 15% among the rest of the producers. Zimbabwe's 16% among the rest converts to 2.4% of total continental production and a ranking of 5 after Mali and Tanzania.

Figure 8: Share of African gold production, 2005-2009³²





GOLD'S CONTRIBUTION TO ZIMBABWE'S ECONOMIC GROWTH

Gold mining is the main mining sub-sector, as shown by its sizable contribution to GDP, exports, and revenue when compared to the rest of the mining sector (Table 3 and Figures 9, 10, 11).

Table 3: Gold's contribution to the economy³³

	gold mining sector's share	overall mining sector's share
GDP	2.6%	9.5%
exports	18%	56%
government revenue (royalty only)	1%	4%

Figure 9: Gold's contribution to GDP and mineral output³⁴



Figure 10: Main minerals' contribution to mineral output, 2012-2014³⁵

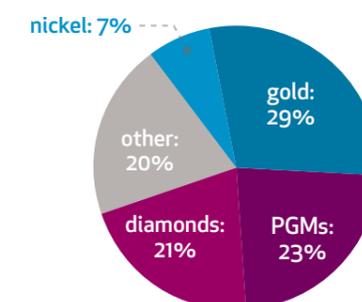


Figure 11: Share of gold exports in total mineral exports per year³⁶



Fiscal revenue

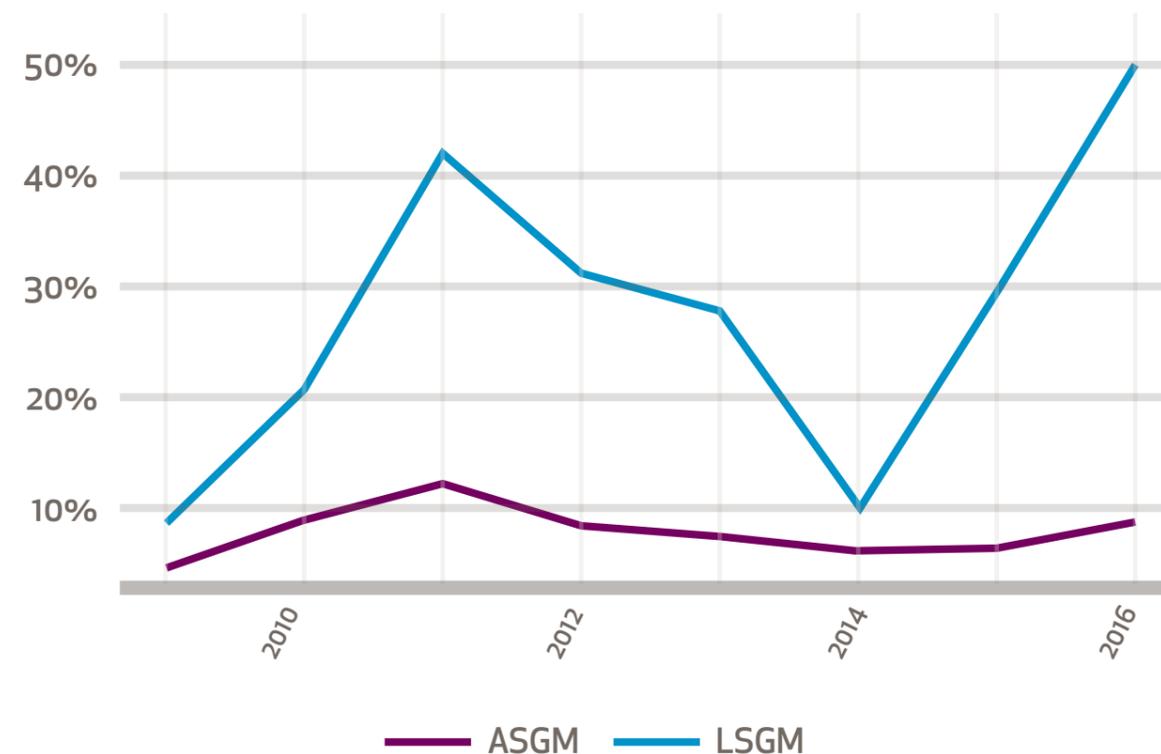
The GORZ derives fiscal revenue from the gold mining sector through royalties, corporate taxes, import duty, value-added tax (VAT), payroll tax, withholding taxes, and other fiscal charges related to the environment and rural district councils. Government revenues from mining overall have improved since the introduction of a multi-currency system in 2009, from US\$51 million that year to US\$336 million in 2014.³⁷ For the period 2009-2013, the gold industry contributed 1.3% of total government revenue, though this figure constitutes 23% of all payments made by the mining sector toward government revenue.³⁸

royalties

Royalties are by far the most consistent mining sector revenue stream for the GORZ. In Zimbabwe, royalties are charged *ad valorem*, meaning as a percentage of the total revenue generated from selling the minerals. Since 2013, the GORZ has gradually reduced royalties from 7% for both LSGM and ASGM to 3% and 1% respectively. In addition, a presumptive tax of 2% was removed for ASGM.

Gold mining still contributes more than its fair share toward royalties, though in reality LSGM contributes the most (Figure 12). For example, in 2016, LSGM produced 26% of the mining sector's output by value, but paid 49% of the sector's royalties. In contrast, ASGM produced 21% of the output, but paid only 7% of the royalties. By government design, ASGM does not equitably contribute as an incentive for compliance with the requirement for all gold to be sold to the formal market.

Figure 12: ASGM and LSGM contribution to total royalties paid³⁹



taxation policy

While LSGM's contribution to fiscal revenue is significant, it is also a disincentive to investment. Many investors have described Zimbabwe's fiscal regime as burdensome, with its multiplicity of collecting agencies. Based on FI's recent Policy Perception Index, which ranks the attractiveness of countries' mining policies to investment, Zimbabwe ranks fifth from last, after Honduras, Philippines, Malaysia, and South Sudan.⁴⁰

FI also produces the Taxation Regime Index, in which Zimbabwe ranks second worst after Bolivia, indicating that the Zimbabwe's fiscal regime seriously discourages mining investment. In contrast, Botswana and Lesotho, Zimbabwe's neighbors, are considered generally to be policy-consistent nations and are ranked fourth and fifth in the world.⁴¹

Ultimately, Trench et al. (2015) have shown that the more unfavorable the effective tax rate is in a country, the more unattractive the country is to investment (Table 4⁴²).

Table 4: Cross-country comparison of mining fiscal regimes

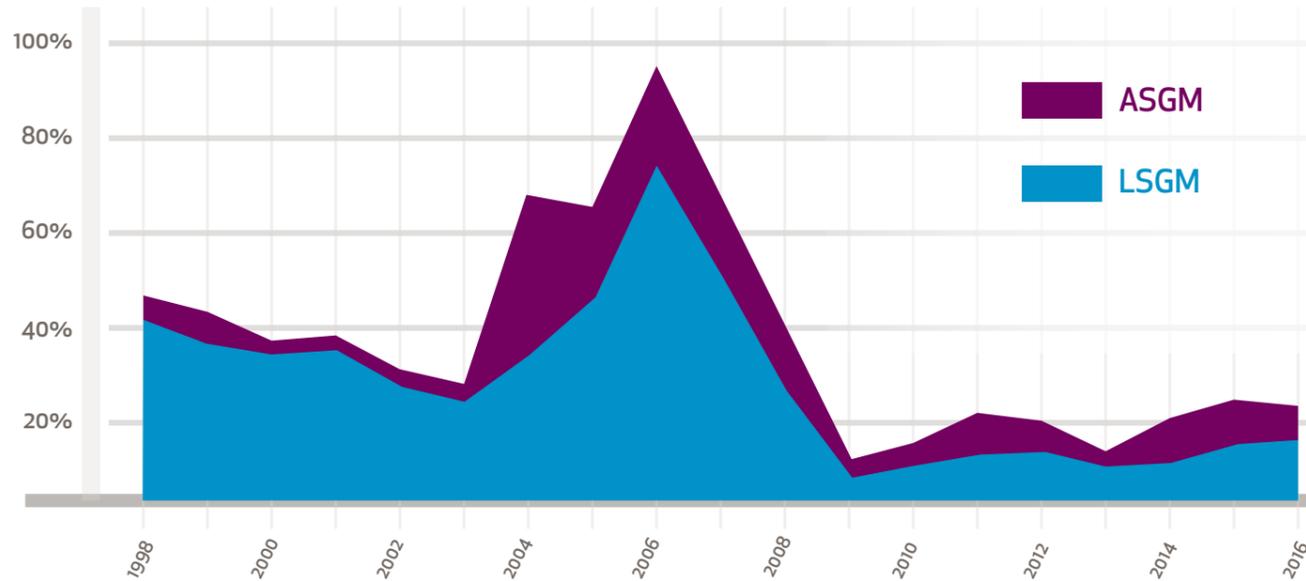
average effective tax rate	country	investment attractiveness index (FI ranking)	policy perception index (FI ranking)	taxation regime index (FI ranking)	corporate income tax on gold	royalties on gold
66.5%	Ghana	47	47	47	35%	5%
65%	Zimbabwe	Neither in the top or last 10	118	121	25%	3% LSGM 1% ASGM
63.9%	Guyana	54	59	60	40%	5%
60.4%	Mali	82	60	53	25%	3%
58.8%	Tanzania	56	50	37	30-35%	4%
58.5%	Peru	30	52	55	30%	112%
55%	Colombia	58	74	49	10%	4%
52.2%	Burkina Faso	50	36	27	17.5%	3-5%
44.8%	Brazil	52	87	105	34%	1%
44.3%	Chile	13	22	29	17%	0-14% (income dependent)
36.3%	South Africa	64	66	106	28% <i>(additional 15% payable for dividends to non-residents)</i>	0.5-7%

Export revenues

Most of Zimbabwe's exports come from the mining sector. In 2016, mining contributed 62% of exports, up from 55% in 2015 and 52% in 2014. As noted earlier, more than 95% of mineral exports are accounted for by six minerals: gold, platinum group metals, diamonds, nickel, coal, and chromite.⁴³ The agriculture, manufacturing, and services sectors contribute the majority of the rest of the exports.

Gold has always been a key export for Zimbabwe. Between 1993 and 2003, gold accounted for 57% of Zimbabwe's mineral exports. Its share dropped to 24% between 2004 and 2011 as the LSGM sector collapsed. The share has since rebounded, averaging 32% between 2012 and 2014 and reaching 47% in 2016. Moreover, gold exports accounted for 29% of all exports in 2016. At the same time, ASGM outputs accounted for 21% of mineral exports and 13% of total exports, underlining the importance of the sector to the country. These trends are depicted in Figure 13.

Figure 13: ASGM and LSGM contribution to total exports⁴⁴



The gold mining sector's importance to exports is underlined by its resilience to economic woes. While the sector collapsed during the 2000s, it fared much better than other exporting industries, and its share of the country's total exports actually rose through much of the turbulent period.

Employment

Due to the lack of recognition for ASGM during the majority of the 1900s, there are no verifiable estimates of the number of people who engaged in the sector. The first estimate of 100,000 people engaged in ASGM (about 1% of the population at the time) was made in 1990, 10 years after independence.⁴⁵ Zimbabwe experienced an upsurge in ASGM just after, largely as a result of a deteriorating agricultural sector and the layoff of public sector workers following implementation of a series of economic structural adjustment programs (see more in section 3.1).⁴⁶ The 1996 edition of the Mining Annual Review estimated that there were 420,000 artisanal and small-scale miners, of which 70% (300,000) were involved in alluvial gold panning.⁴⁷

The 2000s saw an economic meltdown, during which the economy shrunk by 45% in 10 years and inflation reached record highs. ASGM became an important means of livelihood amid the escalating poverty and lack of employment opportunities in the formal sector.⁴⁸

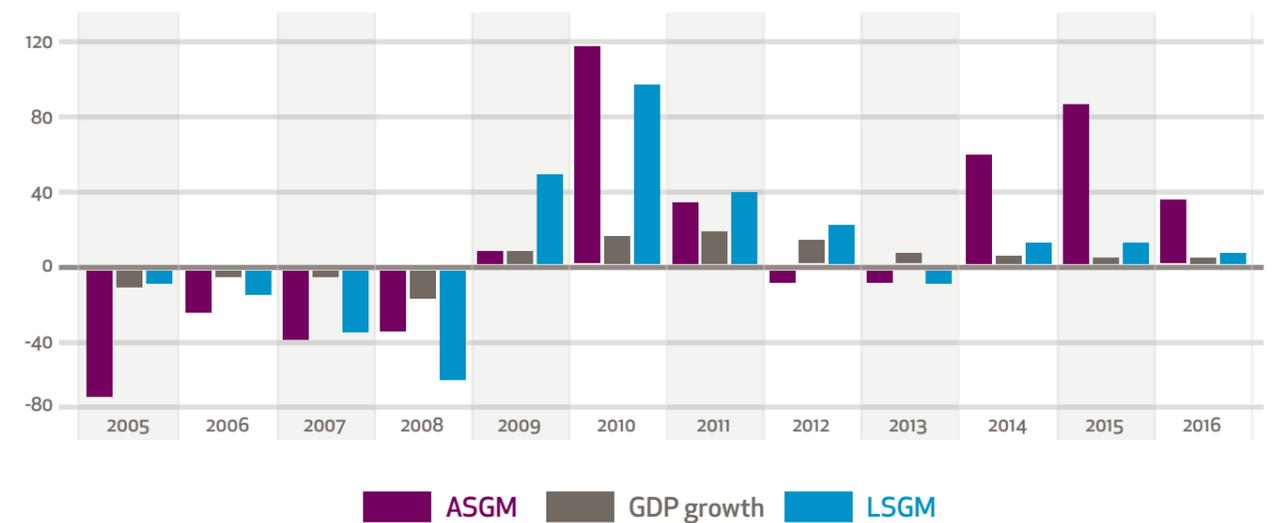
Today, the sector has directly created 35,000 formal jobs and an estimated 500,000 informal ones. Of these, 10% (50,000) are women⁴⁹ and 20% (100,000) are children under age 18 years.⁵⁰ This number represents 7% of Zimbabwe's labor force. In contrast, LSGM is estimated to directly contribute around 11,000 jobs, translating to just 0.1% of the labor force.⁵¹

The key concerns around ASGM's employment opportunities are the prevalence of child labor, gender inequality, and poor occupational health and safety practices.

GDP growth rate

Both ASGM's and LSGM's output contributions may have some effect on the GDP growth rate (Figure 14). Specifically, analysis of GDP growth rate data and contributions of ASGM and LSGM to GDP show that growth in LSGM output generally has a direct positive correlation with GDP growth rates. However, growth in ASGM has no clear correlation with GDP growth, showing an inverse relationship in some years. Further regression analysis shows a positive relationship between GDP growth rates and LSGM output, while an insignificant negative relationship between GDP growth rate and ASGM gold output growth is realized. Accordingly, the positive relationship between economic growth and gold output is not guaranteed if we consider ASGM separately.

Figure 14: ASGM's and LSGM's contribution to GDP growth rate^{52 53 54}





GOLD'S CONTRIBUTION TO ZIMBABWE'S ECONOMIC DEVELOPMENT

Community development

ASGM has been shown to contribute to community development via assets, local content, and stock of capital. Most importantly, growth in ASGM in rural areas creates an increase in income in the community, which translates to an increase in consumption, creating more demand for local service providers.

assets

Pact (2015b) found that in ASGM communities, 46% of community members who did not engage in ASGM believed that ASGM was the most profitable source of livelihood in their community.

A fifth of the miners also believed this. Interestingly, though, non-miners were found to be more likely than miners to own a TV, bicycle, or refrigerator and to have a pit latrine at home. This contradiction merits further research.

local content

In developing countries, such as Zimbabwe, mining equipment and services are often imported. *Local content*—the proportion of procured goods and services that are locally produced—is often confined to labor and services, such as water, power, construction, hospitality, and logistics.

The ASGM sector has a very high local content. Pact (2015a) found that virtually all equipment and services associated with mining equipment were procured in close proximity to the ASGM site. Figure 15 illustrates the most procured consumables for ASGM in Zimbabwe.⁵⁵ Inferably, the figure illustrates the finding that in the mining communities ASGM procure mine related consumables.

stock of capital

Income from ASGM also increases the stock of capital in rural communities. This capital is then used to invest in alternative income-generating activities (IGAs), including farming, livestock rearing, carpentry, fabrication, and small trade.⁵⁶ Pact (2015a) found that 2% and 4% of artisanal gold miners also engage in agriculture and small trade, respectively.

In 2006, the Global Mercury Project conducted a baseline survey in Kadoma-Chakari that found that farming was the most common alternative, supplementary, or seasonal IGA among miners.⁵⁷

There is a poor linkage between the formal financial sector and the ASGM sector. Most miners are unbanked and prefer to save money at home, while banks shun investing in mining because it is considered to be too risky.

Poverty among miners contributors to and detractors from poverty

The authors analyzed Pact's 2015 baseline data to demonstrate how ASGM contributes to poverty reduction.⁵⁸ A logistic regression analysis of the data shows that the higher the gold production a miner achieves, the less likely they are to be poor. Interestingly, the analysis also shows that education, age, and gender play a role in ASGM's contribution to poverty reduction.

For example, an additional year of education makes a miner 1.7 times less likely to be poor, 13% less likely to be very poor, and 126% more likely to be in the highest income quintile. Also, each additional year of age

makes a miner 8% less likely to be poor and 20% more likely to be in the highest income quintile. Men are 1.1 times less likely to be poor than women. And, miners who save money are marginally less likely to be poor than those who do not.

A key finding is that miners who use their income to invest (diversify) in farming are 0.6 times more likely to be poor than those who don't. Such miners are 18% more likely to be in the lowest income quintile and 151% less likely to be in the highest quintile. This finding is further supported by the fact that miners who converted their agricultural land into mining became, on average, 0.78 times more likely to be food secure. Mining grants better food security through increased incomes than agriculture itself.

Figure 15: ASGM consumable goods procurement

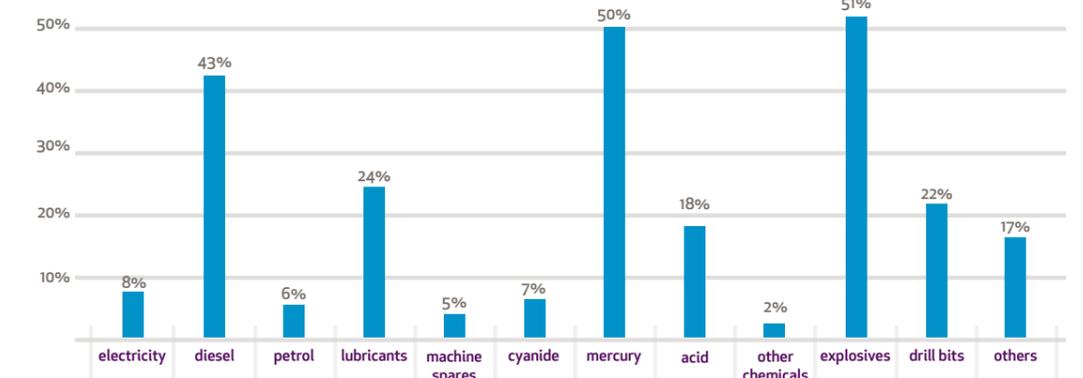


Table 5 shows the distribution of miners across the income quintiles for sampled mine sites.

Table 5: Income inequality among artisanal gold miners⁵⁹

income level	proportion of miners
very low income (very poor)	19.5%
low income (poor)	27.7%
medium income (average)	16.5%
high income (non-poor)	12.2%
very high income (affluent)	23.8%

cross-comparison of communities

Figure 16 shows that there is close correlation between Pact's 2015 poverty findings⁶⁰ among miners and those found by World Bank and ZIMSTAT via the Poverty, Income, Consumption, Expenditure Survey (PICES) and the Small Area Estimation (SAE) survey, respectively.⁶¹ These surveys are used to determine poverty levels in every district in Zimbabwe. Comparison of the three sets of research in shows that:

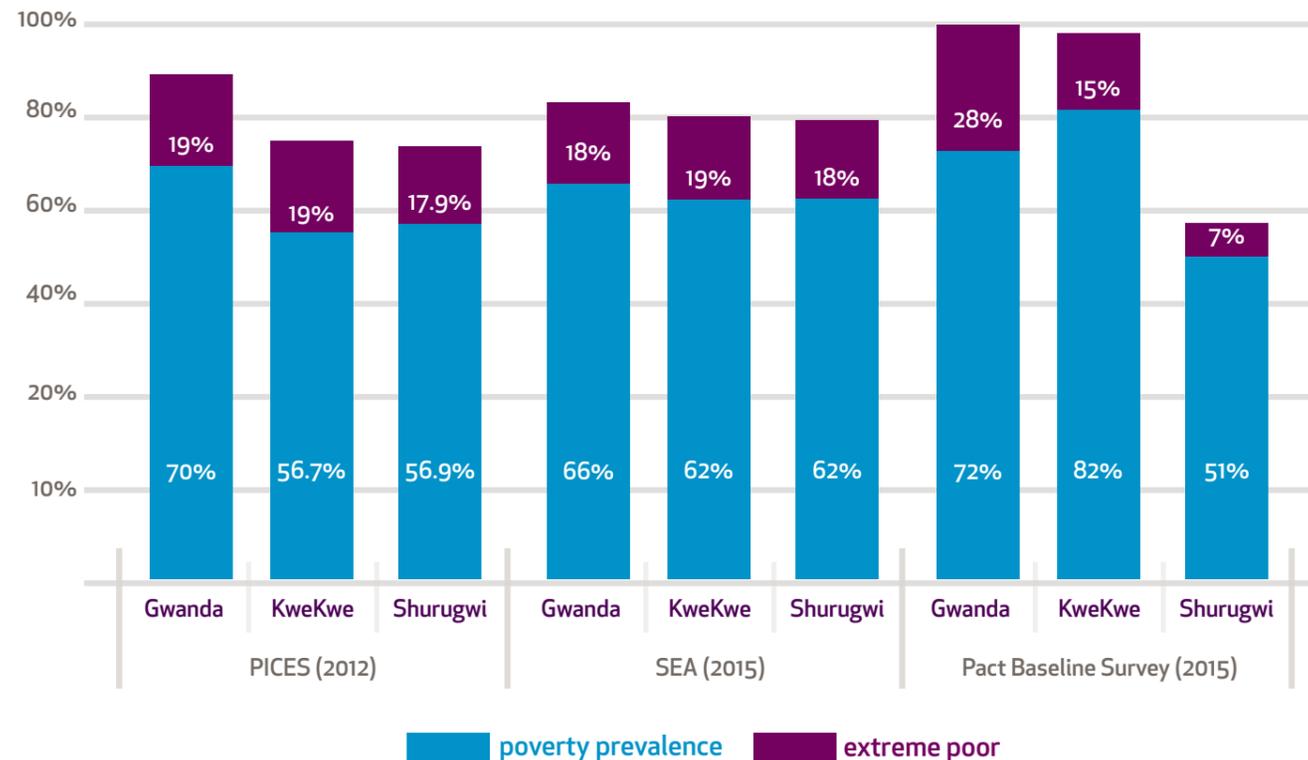
In Gwanda district, miners are more likely to be poorer than the rest of the population

In Kwekwe district, miners are more likely to be poor, but less likely to be extremely poor when compared to the rest of the population

In Shurugwi district, miners are less likely to be poorer than the rest of the population

This key finding shows that the poverty-alleviating impact of ASGM is not uniform across the country. This disparity could be due to the differing geology, with some areas having more gold-rich mining areas than others.

Figure 16: Poverty in three gold mining communities⁶²



food security

Miners tend to be more food secure than non-miners in the same communities. On average, gold miners spend 19% more on food than non-miners.⁶³ Miners were also found to be less likely to sleep hungry on account of absence of food than those who did not engage in ASGM. However, further research is required to understand infant feeding practices in those households, thus the impact of ASGM on child malnutrition and infant mortality.

A key aspect of food insecurity among miners is that its prevalence is gendered. Analysis of Pact's data shows that female miners who engaged in alternative IGAs because they are not full-time miners were 1.25 times more likely to be food insecure when compared to full-time male miners.⁶⁴ Female miners are marginalized and often relegated to doing less income-generating tasks, such as transporting and processing materials, cooking and supplying food and drinks, moving tools and equipment, and providing sexual services. These supportive roles do not improve their financial circumstances. Among married miners, men usually control the income generated from the mining.

Income inequality among miners⁶⁵

The Gini Index measures the degree of inequality in the distribution of family income in a country or community, estimated as the proportion of the number of households (percentage of the households) in the richest 20% quintile to that in the poorest 20% quintile. Income gaps are difficult to measure in Zimbabwe because most people are no longer in formal employment.⁶⁶ Using Pact's 2014/15 data, the Gini Index of inequality among a sample of 931 miners⁶⁷ was found to be 0.64.

This implies a high level of inequality among miners, which could be explained by the fact that some miners stumble on nuggets while others do not. Inequality among non-miners in ASGM communities was found to be insignificant at a Gini index of 0.04. This means that the general non-mining activities have a close income range.

Population growth and fertility

Though population growth is accounted for by various factors, the impact of the mining sector structure is worth mentioning. A sample of 10 districts with high ASGM activity was compared to five districts where ASGM is not known to occur.⁶⁸ In the gold mining districts, population growth was 1.7% higher than the national average of 2.2% and close to the highest rate found in Harare, the capital city.

Population growth is likely higher in districts with ASGM because of migration and not because of higher birth rates among miners. The analysis found that there was no difference in the birth rates of districts with ASGM and those without.



CONCLUSIONS

The importance of gold mining to Zimbabwe's economy continues to rise, partly due to continued growth in ASGM and partly due to renewal of LSGM. This study finds that ASGM makes noteworthy contributions to both economic growth and economic development. It also finds that these contributions are limited by the operating environment that ASGM finds itself in.

ASGM has grown over time to equal the size of the LSGM sector, making close to equal contributions to Zimbabwe's economic growth through GDP and export revenue. However, ASGM still contributes a smaller proportion of tax revenue owing to a fiscal regime that lightens ASGM's fiscal burden while increasing LSGM's.

The study shows that ASGM makes key economic contributions at the community level, particularly by creating a livelihood for an estimated 7.1% of the country's labor force and indirectly benefiting more than 1 million people. ASGM creates linkages through local procurement of tools, equipment, and other consumables. ASGM also creates localized stocks of capital. While this study does not attempt to estimate the amount of gold in the informal market, the income generated from informal gold trade still contributes to local economic development. Therefore, selling gold to the informal market will not block ASGM benefits accrued through economic development.

The study also shows that policies have a huge impact on the amount of contribution that ASGM can make to economic growth and economic development. Policies that create a disincentive for selling gold on the formal market limit ASGM's contribution to measures of economic growth and fiscal revenue. These include criminalization of ASGM and policies that create an artificial value for a local currency.

RECOMMENDATIONS

This study proposes the following recommendations to ASGM stakeholders.

- Create an enabling environment for ASGM through bold changes to laws, policies, and how institutions implement these. This includes creating property rights that are suitable for ASGM and deregulation of gold mining in a manner that decriminalizes gold possession, improves market access, and ensures that the GORZ benefits from ASGM.
- Quantify the environmental costs of ASGM.⁶⁹
- Develop miners' skills and grant them access to education. Improvements in these areas increase ASGM's contribution to economic development.
- Promote the development of formal financial institutions located in the rural communities (micro-finance)⁷⁰ to foster a saving culture among the miners.
- Promote women's equitable participation in ASGM.

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ENDNOTES

- ¹ Chamber of Mines of Zimbabwe (COMZ) 2015
- ² Ministry of Finance and Economic Development (MOFED) 2014
- ³ No more recent surveys have been done due to lack of funding.
- ⁴ Mlambo 2016
- ⁵ Frase Insitute, 2017
- ⁶ Worst, 1960: The Great Dyke encroaches through the even older rocks of African craton, the core of oldest rocks forming the continent of Africa. Aligned approximately NNE, this geological feature is 550km in length and 4 to 11km wide.
- ⁷ Arndt, 2011 On the geological map, the Zimbabwean greenstone belts, modified by Sithole (1994) host gold rich places such as Beatrice, Bubi, Belingwe, Buhwa Bulawayo, Chegutu, Chinhoyi, Guruve, Felixburg, Filabusi, Francistown, Ghoko, Gwanda, Gweru, Harare, Kwekwe, Lower Gwanda, Midlands, Mt Darwin, Mutare, Mutoko, Mwanesi, Nkayi, Silobela, Norton, Shamva, Shangani, Shurugwi, and Wedza.
- ⁸ Adapted from Sithole, 1994
- ⁹ COMZ, 2016
- ¹⁰ However, generally artisanal miners are understood to be unregistered, hence they have no property rights.
- ¹¹ Shoko 2002
- ¹² Guvamombe 2013; Gandiwa & Gandiwa 2012
- ¹³ Statista 2017
- ¹⁴ Salmon Valley Business and Innovation Centre 2011
- ¹⁵ The data was originally collected from four pilot sites in four districts: Gwanda, Kwekwe, Shurugwi, and Kadoma. It was collected through three questionnaires: household questionnaires for artisanal and small-scale gold miners, questionnaires for government agencies, and questionnaires for other stakeholders, including local leadership and traditional leaders. Interview guides were used in individual interviews and focus group discussions.
- ¹⁶ GORZ 2014, p. 485
- ¹⁷ Mlambo 2015
- ¹⁸ Shoko 2002
- ¹⁹ World Gold Council, 2012
- ²⁰ Stamps 2015
- ²¹ International Labour Organisation 1999, p. 6
- ²² Mlambo 2015, p. 12
- ²³ Hilson 2002b
- ²⁴ Gandiwa & Gandiwa 2012
- ²⁵ Murwendo et al. 2011; Gwenero 2013
- ²⁶ Mapuva & Dube 2016
- ²⁷ Adapted from Mlambo 2016
- ²⁸ COMZ 2016
- ²⁹ FPR 2017
- ³⁰ U.S. Geological Survey (2014); Statista 2017
- ³¹ Vallieres, 1993; NumberSleuth.org n.d.; WGC 2016
- ³² Gajido et al. 2012
- ³³ COMZ 2016
- ³⁴ Ministry of Finance and Economic Development
- ³⁵ COMZ 2016
- ³⁶ ZIMSTAT 2016
- ³⁷ MOFED 2014
- ³⁸ ZIMRA 2014
- ³⁹ MOMMD 2016; MOFED 2015
- ⁴⁰ FI 2015
- ⁴¹ Fraser Institute 2015
- ⁴² Trench et al. 2015, p. 1
- ⁴³ Segula 2015; COMZ 2016
- ⁴⁴ UNCTAD 2016; ZIMSTAT 2016
- ⁴⁵ World Bank 2016
- ⁴⁶ Gandiwa & Gandiwa 2012
- ⁴⁷ Chimsasa 1996
- ⁴⁸ ZIMSTAT 2015
- ⁴⁹ Pact 2015a
- ⁵⁰ Pact 2015a
- ⁵¹ ZEPARU 2016
- ⁵² World Bank 2016; RBZ 2016.
- ⁵³ GDPGROWWB denotes the GDP growth rate given by the World Bank
- ⁵⁴ Gold production in tonnes was accessed from RBZ before converted to growth rates.
- ⁵⁵ Pact 2015a
- ⁵⁶ Pact 2015a; Mungoni 2008
- ⁵⁷ Metcalf and Spiegel 2007
- ⁵⁸ Pact 2015b
- ⁵⁹ Pact 2015b
- ⁶⁰ Based on Pact's 2015 baseline data (Pact 2015b), the authors calculated poverty prevalence as the proportion of households that were not able to meet a total expenditure threshold of US\$550 per month on food and non-food items. Extreme poverty was considered when one is unable to spend US\$150 per month on food items.
- ⁶¹ World Bank 2012; ZIMSTAT 2015
- ⁶² ZIMSTAT 2015; PACT 2015b; World Bank 2012
- ⁶³ Pact 2015b
- ⁶⁴ Originally, data seems to have no such disaggregation because the ASGM trade is male dominated.
- ⁶⁵ Based on income and expenditure estimates from Pact 2015b data
- ⁶⁶ ZIMSTAT's Inequality indices are based on formal surveys for those who can explicitly reveal their monthly expenditure/income.
- ⁶⁷ According to sampling methods, such as those suggested by Saunders et al., with an estimated 500,000 artisanal and small-scale gold miners in Zimbabwe, 684 is valid at 99% confidence interval. Hence, 931 from Pact is good for any extrapolation and inference.
- ⁶⁸ ZIMSTAT 2012
- ⁶⁹ Here environmental costs are interpreted broadly to include negative effects on the physical and social environments and—most pertinent to the latter—safety and health issues.
- ⁷⁰ This is being suggested for Savings and Credit Cooperative Organizations (SACCOs) which are owned, managed and run by ASGM members who have a common bond.

