



Zimbabwe Economic
Policy Analysis and
Research Unit



BEST PRACTICES FOR SUPPORTING ARTISANAL AND SMALL-SCALE MINING IN ZIMBABWE

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ACRONYMS

AfDB	African Development Bank
AMV	Africa Mining Vision
ASM	Artisanal and Small Scale Mining
AU	African Union
CABS	Central Africa Building Society
DFID	Department for International Development of the United Kingdom
EIA	Environmental Impact Assessment
EMA	Environmental Management Agency
EMR	Environmental Management Regulation
EU	European Union
GDP	Gross Domestic Product
GISP	Governance and Institutional Support Project
GoZ	Government of Zimbabwe
IIED	International Institute for Environment and Development
ILO	International Labour Organisation
MILF	Mining Industry Loan Fund
MMCZ	Minerals Marketing Corporation of Zimbabwe
MMMD	Ministry of Mines and Mining Development
MMSD	Mining, Minerals and Sustainable Development
RBZ	Reserve Bank of Zimbabwe
RDC	Rural District Council
SADC	Southern African Development Community
SEDCO	Small Enterprises Development Corporation
SHE	Safety, Health and Environment
TMAA	Tanzania Minerals Audit Agency
UNEP	United Nations Environment Program
US	United States
ZEPARU	Zimbabwe Economic Policy Analysis and Research Unit
ZESA	Zimbabwe Electricity Supply Authority
ZimAlloys	Zimbabwe Alloys Company
ZIMASCO	Zimbabwe Mining and Smelting Company
ZIMASSET	Zimbabwe Agenda for Sustainable Socio-Economic Transformation
ZIMRA	Zimbabwe Revenue Authority
ZIMSTAT	Zimbabwe National Statistics Agency
ZINWA	Zimbabwe National Water Authority
ZMDC	Zimbabwe Mining Development Corporation
ZMF	Zimbabwe Miners Federation

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FOREWORD

Zimbabwe has a diverse and well-developed minerals sector, hence the successful implementation of the country's development agenda, Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZIMASSET), is anchored on the judicious exploitation of Zimbabwe's mineral resources. The Government of Zimbabwe has observed with concern the status of Artisanal and Small-Scale Mining (ASM) sector which is characterised by low productivity; under-capitalisation; lack of technical and management skills; lack of transparency in their activities some of which are unregulated and contribute to environmental degradation. Government's desire is to bring sanity into this sector; increase the sector's contribution to mineral output; improve transparency; inculcate a culture of safe and responsible mining; reduce the use of hazardous substances and environmental degradation while fostering development of communities within the mining areas.

It is in this regard that my Ministry welcomed the financial support from the African Development Bank and the technical assistance from ZEPARU to undertake a study on the best practices in supporting the growth of the ASM sector. The study adopted a case study approach focusing on three key minerals and mining areas in Zimbabwe covering gold mining in Manicaland, chromite mining on the Great Dyke and gemstone mining in Mashonaland West.

Recommendations from this study are far reaching in that they highlight areas that deserve Government's attention in order to support orderly mining and the growth of the ASM sector. In particular, the study highlighted useful lessons drawn from other countries that are doing well in supporting and professionalising the ASM sector. The study also highlighted some good practices in Zimbabwe that we are proud of and need to scale up. One of the major accomplishments of government partnership with development partners was the establishment of the Shamva Mining Centre in 1989 whose success encouraged the replication of the model in other countries. As a Ministry, we look forward to strengthening partnership between the Government of Zimbabwe and its development partners, in supporting the development of a vibrant ASM sector in Zimbabwe.

The proposed framework for supporting ASM in Zimbabwe focuses on the following elements; technical support to the ASM sector; development of workable financial support schemes and marketing arrangements; legislative support to the ASM sector and support in health, safety and environment.

In conclusion, I want to pay tribute to the African Development Bank (AfDB) that provided funding that made this study possible and the ZEPARU research team. My tribute also extends to Government Officials who played a part in the success of this study. May we all now forge ties towards implementation of the recommendations of this study.



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EXECUTIVE SUMMARY

The developing world, particularly Africa, is awash with natural resources including unparalleled mineral endowments yet Africa is considered the poorest continent on Earth. These resources have been exploited over many centuries and exported abroad either fairly or unfairly in their raw form, a trend which has continued to the present day. Fortunately, the need to address this paradox of poverty amidst plenty is now being taken seriously in many developing countries, particularly in Africa. Many African countries have crafted new laws to govern resources exploitation to among other issues, remove colonial barriers to equitable resource access by indigenous populations. In particular, many African countries have enacted or are enacting 'mining codes' to align their mining policies to domestic needs.

Grappling with growing unemployment and poverty, these African countries have realized that artisanal and small scale mining (ASM), previously despised as a poverty-driven activity, can actually be a poverty-alleviating strategy and potentially a significant employment-generating activity that should be supported and accorded its space alongside large-scale mining ventures. This requires a re-look at ASM which has generally been associated with environmental damage, social ills, and poor health and safety practices. The Africa Mining Vision of 2009, which also covers large scale mining counsels that the way to handle ASM is to 'mitigate its negative consequences and enhance its positive benefits to transform it and maximise its contribution to poverty reduction and creation of resilient communities'. Essentially, governments and their development partners should develop sustainable ways to support ASM in order to unlock its value.

This study was carried out by the Zimbabwe Economic Policy Analysis and Research Unit in collaboration with Zimbabwe's Ministry of Mines and Mining Development to contribute to the knowledge base for the creation of a conducive environment that fosters ASM development, encourages the application of best practices for mining, occupational health and safety and promotes environmental protection within the sector. Zimbabwe has a diverse and well-developed mineral sector, which is rapidly recovering and has immense potential to anchor the country's inclusive economic growth and development. The successful implementation of the country's current development agenda, Zimbabwe Agenda for Sustainable Socio-economic Transformation (ZIMASSET), is anchored on the judicious exploitation of Zimbabwe's mineral resources.

The mining sector, including ASM, used to be supported by exceptional physical, technological and service infrastructure, which is currently in dire need of rehabilitation and expansion.

Generally, ASM activities are associated with informal, unregulated, under-capitalised, under-equipped and labour-intensive operations where technical and management skills are lacking. ASM miners are also believed to erratically produce limited amounts of minerals from uncertain reserves. A large percentage of these miners are women. They also lack financial resources with no access to bank loans. Very often, the mining operations are done haphazardly with severe consequences to the environment, the surrounding, and even distant, communities, and to the miners themselves. Lack of adequate equipment, such as drilling and pumping machines also leads miners to abandon their deposits prematurely, once hard rock or water is encountered. Without financial resources and technical and management skills, miners cannot conduct systematic exploration of the mining areas to allow long-term planning and adequate mining development.

To an extent, these characterisations of ASM were corroborated by three Zimbabwe case studies in this research which covered gold mining in Manicaland Province, chromite mining on the Great Dyke and gemstone mining in Mashonaland West Province. Apart from the field surveys, this study was also informed by a study tour of Mongolia (chosen on the basis of its world acclaimed lead in ASM practices) and a literature survey across selected ASM jurisdictions, including Zimbabwe.

The overall objective being to compile elements of the best ASM regime for Zimbabwe, this study considered that in the 1990's Zimbabwe was hailed as one of the most progressive and innovative ASM cases in the world and the starting point was to look back at how this model status had been attained. Coupling these strengths with what other countries have or are doing better would provide a base for building the best ASM practice package for Zimbabwe. This proposed ASM best practice package for Zimbabwe, presented at the end of this report, notes that the country has a sound framework for technical support for the ASM sector, but has not rendered the ASM sector sufficient support in terms of licensing requirements, access to tailored lines of credit facilities and markets, and access to prime mineral exploration space. In Tanzania, for example, certain rich mineral belts are reserved for the ASM sector to prevent large scale miners from squeezing out the ASM players.

An incentivised mineral marketing regime, rather than coercive and inflexible orders may be more sustainable.

A workable framework to take care of the welfare of ASM workers, including flexible and affordable social and medical insurance schemes, as crafted for ASM in Mongolia, should be considered as part of the ASM best practice package. The proposed ASM regime should take advantage of the ongoing decentralisation and expansion of the Ministry of Mines and Mining Development to ensure that all the technical, financial, social, legislative and other components of the package filter down to the mining sites in the various mining provinces.

I. INTRODUCTION

Artisanal and small-scale mining (ASM) is a key component of the mining sector in developing countries but the twin roles of ASM as a livelihood strategy and an economic development activity have traditionally been overshadowed by a myriad of negative perceptions such as environmental damage, social ills, and poor health and safety records. However, in the wake of major commodity booms since 2002, governments in developing countries, particularly in Africa are increasingly viewing ASM as a potent driver of economic development, prompting the development of policy frameworks and interventions such as the Africa Mining Vision (AU 2009). Within these frameworks, African states are pushing for the maximisation of economic benefits from mining and mineral beneficiation through the strengthening of state regulatory capacity. Thus, the proposed policy regime is focused on strengthening of governance and state capacity, with legalisation, institutional capacity building and formalisation as the key instruments.

Although governments have a key role to play in unlocking the potential of the ASM sector, they generally have limited capacity to support and regulate ASM. This calls for governments to collaborate with the mining industry, non-governmental organisations (NGOs), development partners and financial institutions (Hentschel et al. 2002; MMSD 2002). The key role of government is to develop a policy framework that is appropriate, consistent and transparent, and which embodies good ASM facilitation and management practices (MMSD 2002). Development partners, including Non-governmental Organisations (NGOs), generally seek to implement pilot demonstration projects which can grow into larger, self-sustaining best practice initiatives. Large-scale mining companies can engage directly and foster the culture of sustainable practice within the ASM sector.

2. METHODOLOGY

This study was based on literature review, workshop discussions with stakeholders, field visits (where questionnaires were administered), office visits (where key informants were interviewed), a study tour of a selected ASM success story (Mongolia), and analysis of secondary and primary data collected during the study.

Literature review involved a broad overview of ASM practices worldwide and in Zimbabwe primarily to identify and contextualise key indicators of best ASM practices. Two workshops were conducted in this study: an inception workshop for stakeholders to provide their input to research formulation, a validation workshop to discuss with stakeholders the key findings of the study.

A purposive sample was selected for field visits which were carried out in three areas covering three geographic provinces and three commodities in Zimbabwe (Figure 1). These are: Manicaland Province (gold), Midlands Province (chromite) and Mashonaland West (gemstones). In these surveys, 43 small-scale gold miners were interviewed in Manicaland, 25 gemstone miners in Mashonaland West and 27 chromite miners in the Midlands.

Key informant interviews were carried out with experts who are knowledgeable with and have experience working with the ASM sector. These interviews explored the experts' vision for the sector and what they considered to be successes or challenges within the sector as well their proposed solutions to these challenges. A visit to Mongolia, an internationally recognised ASM success story, was undertaken by two members of the research team to explore how the Mongolian experience can inform ASM best practice in Zimbabwe. This trip was timed to coincide with the visit by a Tanzania delegation also visiting Mongolia with a view of learning from the Tanzanian experience. The final activity in this research was to analyse the gathered data and condense it into a contextual best ASM support package for Zimbabwe.

3. ARTISANAL AND SMALL-SCALE MINING (ASM) IN SELECTED COUNTRIES

Artisanal and small-scale mining (ASM) takes place under different sets of conditions (social, environmental, geological, economic, cultural, etc.) throughout the world. Thus, globally, the definition of ASM varies from country to country. Artisanal mining and small-scale mining share many characteristics (MMSD 2002) to the extent that in some usages, the terms are treated synonymous and are used interchangeably (Hentschel et al. 2002). Thus, ASM is often perceived as a mining activity characterised by minimal use of machinery or technology; operation without legal mining title or valid contract with the title holder; low productivity; inadequate safety measures, healthcare and environmental protection; high seasonality linked to economic insecurity (Hentschel et al., 2002). ASM operations are very labour intensive because they mainly use rudimentary equipment like shovels, hoes, chisels, picks, buckets and wheelbarrows in their mining operations (Hentschel et al., 2002; AU 2009).

However, in many jurisdictions, it is important to distinguish between artisanal miners and small-scale miners. 'Artisanal miners' are usually individuals or family members involved in very small-scale manual mineral extraction without legal mining title, whereas 'small-scale miners' usually have legal mining title and their operations are larger and more mechanised (MMSD 2002). For example, in Mali, Niger and Burkina Faso, small-scale mining is distinguished from artisanal mining by the presence of permanent fixed mining infrastructure (Hentschel et al. 2002).

Globally, the ASM sector is a major employment generator and source of livelihood. In 2003, the International Labour Organisation estimated that 13 million people worldwide worked in ASM and that 100 million people derived their livelihood from ASM (ILO 2003). With unabated economic crises, and diminishing rural livelihood choices, worsened by natural disasters (droughts) and man-made disasters (wars), the ILO (2003) ASM sector statistics were predicted to treble by 2012 (AU 2009). In terms of mineral production, an estimated 20% of the world's non-fuels, 18% of Africa's gold and almost all of Africa's gemstones (except diamonds) are produced by the ASM sector (AU 2009).

The positive impacts of ASM are, however, often clouded by the negative impacts which include environmental damage, social ills, and poor health and

safety records. Lack of adequate support or neglect of the ASM sector is a key contributory factor to the negative perceptions about ASM (MMSD 2002; AU 2009).

In subsections below, the main tenets of ASM practices in Zimbabwe and those of other selected countries are discussed with the view of distilling key elements that may contribute to defining a best ASM practice for Zimbabwe.

3.1 ASM IN ZIMBABWE

ASM in Zimbabwe dates back to at least the 13th Century when the Munhumutapa traded gold with the Portuguese. Modern mining began in the 1890's with the reappraisal of ancient workings by the British South Africa Company (Viewing 1984). In 2014, Zimbabwe had approximately 500,000 artisanal miners, of which about 400,000 mined gold¹. ASM sustains the livelihood of at least two million people in Zimbabwe directly and indirectly through ancillary services and secondary economic activities (Maponga and Ngorima 2003). ASM activities are concentrated in gold panning², chromite and tantalite mining although the country is richly endowed with other mineral resources such as diamonds, iron ore, copper and coal.

ASM in Zimbabwe includes both legal and illegal operators, mechanised and semi-mechanised mines of varying sizes in terms of output, employment and capitalisation (Maponga and Ngorima, 2003). Activities are scattered around the country, with no specific areas designated for ASM activities. Traditionally, a major concentration of ASM activities has been alluvial gold mining along river banks. In 2014, alluvial mining was effectively banned through EMR (2014), which states that (p.485), 'alluvial mining shall not take place on land within 200 metres of the naturally defined banks or land within 200m 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 200m from any wetland. Subsequently, the Cabinet of Zimbabwe directed that alluvial mining be the prerogative of government through a special purpose vehicle (GoZ 2015).

¹<http://www.landscapes.org/formalizing-poverty-alleviation-zimbabwes-landscape-better-future-artisanal-miners/>

²largest segment of the sector estimated to constitute between 70-90% of ASM activities

Poverty and lack of employment alternatives due to prevailing economic hardships; low productivity and low income from farming activities, and lack of other viable non-farm activities are some of the major drivers of ASM in Zimbabwe. These developments, place ASM at the heart the rural communities where there is mineral occurrence that is amenable to exploitation by ASM. In these rural communities ASM activities have become an increasingly important source of income and livelihood option (Maponga and Ngorima 2003; Spiegel 2015). Crop failures during drought years have also contributed to increased ASM activities as households look for alternative sources of livelihood.

3.1.1 Legal and institutional framework governing ASM in Zimbabwe

At the international level, the ASM sector is governed by the United Nations Environment Programme (UNEP) Guidelines on Mining that apply to all aspects of mining activities including exploitation, mine operation, mine site rehabilitation and small-scale mining. Zimbabwe is a signatory to Rio Declaration on Environment and Development, hence its ASM activities are bound by this pact to carry out mandatory Environmental Impact Assessments (EIAs). This has since been domesticated into Zimbabwe's national environmental policy.

Small-scale miners generally have legal mining title registered with the Ministry of Mines and Mining Development and are expected to work within the provisions of the Mines and Minerals Act Chapter 21:05 (1996), the Environmental Management Act Chapter 20:27 (2002) and various other regulations such as Mining (Management and Safety) Regulations (1990), and the 2014 Environmental Management (Control of Alluvial Mining) Regulations (EMR 2014). Artisanal miners work on a scale smaller than that of small-scale miners and, though they are expected to be registered, many of them work illegally without mining title. Traditionally they have mainly undertaken alluvial gold panning and gemstone mining. In the context of alluvial mining, EMR (2014) defines an artisanal miner as 'a miner who carries out mining activities using approved tools and employs up to 50 people; these include government-registered groups or syndicates or co-operatives'. In particular, artisanal miners engaged in alluvial mining are not permitted to use mechanised equipment or motor-powered equipment (excavators, dredges, James Tables, generators, and earth-moving equipment such as front end loaders and bulldozers).

Thus, the official distinction between artisanal miners and small-scale miners in Zimbabwe is based on the scale of operation and degree of mechanisation; the law expects both categories of miners to be registered. However, in reality, small-scale miners are generally registered whereas many artisanal miners operate illegally. If the distinction is based solely on whether or not one is registered, there would be a problem of classifying registered ‘small-scale’ miners who use ‘artisanal’ (un-mechanised) mining methods.

At the local level, the ASM sector is subject to Rural District Councils Act (Chapter 29:13) that empowers the local council to impose a land development levy on any rural land owners including miners that fall within the council’s jurisdiction. In addition, the miners need to have an environmental impact assessment (EIA) approved by Environmental Management Agency (EMA). Renewal of mining licenses is dependent on the miner’s reclamation of land degraded by their mining activities.

3.1.2 Contribution of ASM to Zimbabwe’s economic growth

The ASM sector in Zimbabwe has historically largely been a subsistence activity, complementing small-scale farming (Maponga and Ngorima, 2003). In recent years, the contribution of the ASM sector to gold deliveries and hence to the national economy has been significant. For example, Zimbabwe’s 2016 National Budget Statement revealed that gold deliveries to Fidelity Printers and Refiners, currently Zimbabwe’s sole buyer and exporter of gold, increased from 1.7 tonnes in 2013 to 5.9 tonnes between January and October 2015 (GoZ 2015), amounting to about 28% of total gold produced in the country over that period. The ASM sector has also contributed substantially to mining production by tapping into mineral deposits that are of little economic value for large scale mining and in many instances, ASM is a precursor to large mines (AU 2009).

3.1.3 Challenges in Zimbabwe’s ASM sector

Zimbabwe’s ASM sector faces a myriad of challenges that affect productive capacity and compliance with the mining laws and environmental laws. The ASM sector generally relies on unskilled labour for the exploration and exploitation of minerals. Given the lack of adequate geological knowledge and mine planning skills, many ASM activities are chaotic and environmentally damaging and the workings themselves can be death traps due to poor designs. The ASM sector

in Zimbabwe has no financial capacity to mechanise mining operations due to lack of viable business plans and collateral security required to access bank loans. There are also challenges related to occupational health and safety, for example most ASM sites lack protective clothing. Unaffordable license requirements make it difficult for ASM miners to remain legally compliant.

3.2 ASM IN MALI

3.2.1 Organisation of ASM in Mali

In Mali, ASM activities are dominated by mining of gold and gemstones. Gold mining has played a key role in the expansion of great empires in the region since the 7th century (Keita 2001). The member states of the Liptako-Gourma Authority (LGA), namely Mali, Niger and Burkina Faso have developed working definitions of artisanal (traditional) and small-scale mining. Traditional (artisanal) mining is the exploitation of mineral substances using traditional techniques before the deposit is revealed whereas small-scale mining is permanent mining with a minimum of fixed facilities using semi-industrial or industrial techniques on a 'small' mine and based on prior revealing of a deposit (Keita 2001). A small gold mine is any mine processing less than 150 tonnes of ore per day and producing less than 500 kg of gold per year on a deposit containing less than 5 tonnes of metal. The two main variants of ASM gold mining are traditional gold washing and mechanised gold washing, the latter being more complex and mechanised compared to the former (Keita 2001).

The activities of the ASM in Mali are governed by family and village structures that follow a set of customary rules; violations are subject to sanction. Access to mining sites is open to all who accept and respect the regulations in force. Subject to the customary prescriptions, there are four main variants of work organisation at ASM sites in Mali (Keita 2001):

- Family-level organisation: the family head retains and manages mining income.
- Informal groups: the mine belongs to the whole group and production is shared at the end of the day among all members according to the group's rules.
- Cooperatives or associations: About 40-50 ASM workers from the same village organise themselves into a formal structure into which the community can invest to develop the project.

- Owner-worker arrangements: the owner injects capital for equipment and catering, and other operational costs. The workers (miners, diggers, washers) are paid a percentage of the production. For example, washers (mainly women) at some sites are paid one unit out of every three units of mineral extracted.

The organisational variants above are within a customary set up that includes:

- The landowner (or Dugutigui) who is the heir of the village land.
- Owner of the site (or Damantigui) who is the central authority and chief decision maker of an ASM site appointed from among notables and landowners.
- Mine police (or Tomboloma) are group village youths who are in charge of peacekeeping, enforcing the customary regulations, arbitration of disputes and collaboration with the public administration. They represent the moral authority of the Damantigui.
- Organisers of ritual sacrifices: they perform rituals to protect ASM workers from evil spirits.
- Mechanics or blacksmiths: they are in charge of equipment repair and maintenance.
- Trader or gold buyer who purchases the gold produced on the site and arranges to buy other necessities needed at the site.

3.2.2 Mining Laws in Mali

At independence in 1960, Mali inherited a mining regime based on customary law prescribed by the government order of 1899 imposed by its former colony France. The first major mining code after Mali's independence was enacted in 1963, replacing the 1899 order. This was in turn replaced by the mining ordinance of 1970 (ordinance no. 34/CMLN of 1970) which allowed private investment in the mining sector and had legal instruments concerning traditional mining and small-scale mining. This 1970 Mining Code was updated in 1991, 1999, 2005 and 2012. Through Law No. 2012-015 of 27 February 2012, the 2012 Mining Code amended the previous Mining Code, supplemented by Decree No. 2012-311/P-RM of 21 June 2012. Key aspects of the 2012 Mining Code, taken from Norton Rose Fullbright (2015) and Dempsey & Cuvex-Micholin(2015) are summarised below.

The 2012 Mining Code retains the previous mining title categories:

- Exploration authorisation: Previously this authorisation could be held for three months, and was renewable for a further 3 months. With the 2012 Mining Code the exploration authorisation can no longer be renewed and will no longer provide its holder a priority to apply for a research permit.
- Prospection authorisation: can only be awarded to a legal entity with at least one Malian shareholder and which has financial capacity.
- Exploration permit: held by a legal entity which has the technical and financial capacity to conduct exploration. This permit can be renewed twice, each renewal period being two years. The second renewal period can be extended by a further year if the purpose is to complete a feasibility study.
- Authorisation for artisanal mining: may be issued by a local authority to an individual or a legal entity incorporated under Malian law. The authorisation is granted for a period not exceeding three years, renewable successively by three years until depletion of reserves.
- Authorisation for small-scale mining: may be issued to a legal entity which is incorporated under Malian law and which has technical and financial capacity to carry out small-scale mining. A successful applicant will be granted by decree the authorisation to mine for up to four years, renewable successively by a further four years until depletion of reserves.
- Mining permit: can only be issued, for specified minerals, to a holder of an exploration permit, or of an authorisation for prospection. The mining permit can only be held by a company incorporated under Malian law.

In Mali, ASM is officially a seasonal activity due to a 1985 government ban on ASM activities during the rainy season from 1 June to 30 November of each year (Keita 2001) to cut down on accidents due to carve-ins and to divert labour back to agriculture. In recent years, this ban has been blamed for sharp declines in annual gold production, underlining the significant contribution of ASM to gold output in Mali.

3.2.3 Government support to the ASM sector in Mali

Keita (2001) documents several instances of the Malian government support to the ASM sector. In 1997, the Department of Mines and Geology conducted geological surveys to determine the mining potential of areas designated for ASM activities and resettled ASM miners in those areas. In the same year, the Malian

government, in conjunction with the United Nations Development Program, launched the Promotion of Traditional Mining and Environmental Protection Project to capacitate institutions to protect the environment, promote sustainable gold mining activities and to organise the traditional mining as a tool to fight poverty. The 1998 Project for Technical Assistance to the Mining Sector, funded by the World Bank, organised training workshops and seminars for the ASM sector, leading to acquisition of formal mining titles by participants.

However, some of the assistance programmes failed for a number of reasons, not least among them was the fact that the projects put more emphasis on the technical aspects at the expense of the vital needs of the poverty-stricken communities, and the failure to reinforce organisational capacities of local communities (Keita 2001).

More recently, the Malian government has mooted further support to the ASM sector which now produces a third of the country's annual gold production totalling around 70 tonnes. According to Mining News (2014), the government announced intentions to assist ASM miners negotiate for finance and equipment with banks, and with mine planning to minimise environmental damage and safety risks, and vowed to stop child labour within the ASM sector.

3.3 ASM IN GHANA

The Ghanaian mining industry has very ancient roots, with historical evidence suggesting that as early as the 7th century, Ghanaian artisans were trading precious metals with Arabs. Gold and diamonds are the most important minerals mined by the ASM sector in Ghana. Ghana, currently Africa's second largest producer of gold after South Africa, produced 91 tonnes of Gold in 2014, about 10% of which is ASM gold.

3.3.1 Regulatory framework for small-scale mining in Ghana

Ghana's mining industry is governed by the Minerals and Mining law of 1986 as amended by the Minerals and Mining (Amendment) of 1994, the Minerals and Mining Bill of 2005, and the Minerals and Mining Act of 2006. A summary of the regulatory framework for Ghana's ASM sector that is outlined below was taken from KPMG (2014) and DLA Piper (2012). Ghana's Minerals and Mining Act of 2006 provides for several types of license, namely:

- Reconnaissance license: granted for not more than a year, is renewable once and covers a maximum of 5,000 contiguous blocks (each block is = 15 square seconds = 21.4 ha). The holder can only engage in photo geological work, remote sensing, geochemistry and geophysics, without excavation or drilling.
- Prospecting license: this gives the holder the exclusive right to search for specific minerals or commodities by conducting geological, geophysical and geochemical work as well as drilling and excavation. The license is for three years and for a maximum of 750 contiguous blocks and can be renewed for three year periods. At the end of the initial term, the holder surrenders at least half the number of blocks as long as a minimum of 125 blocks remains.
- Mining lease: Covering a maximum of 300 contiguous blocks, this lease to mine can be issued for 30 years and can be renewed for another 30 years if the Ministry of Lands and Natural Resources is satisfied that the mineral sought by the holder exists in commercial quantities.
- Restricted license or lease: either of these is issued for 15 years and is renewable for a further 15 years for the exploration of industrial minerals, including construction materials.

ASM activities in Ghana remained unregulated and rather neglected until the mid-1980's when the Economic Recovery Plan was launched to revitalise the economy. Gold output had declined from 900,000 oz in 1960 to 232,000 oz in 1982 (Hilson 2002). Foreign investment was promoted into Ghana's large scale mining sector and for the first time the government discussed formalisation of Ghana's ASM sector, which had progressed significantly by 1989 (Hilson 2002). This vibrant small scale mining sector is dominated by gold and diamond mining, but until 1989 only diamonds could legally be mined by the ASM sector.

3.3.2 Organisation of ASM operations in Ghana

A summary of the organisation of Ghana's ASM sector by Hilson (2002) is presented here. ASM gold operators are awarded licenses by the government to mine in a designated area not exceeding 12 hectares in size. The operator then employs 5 - 20 groups of about 10 workers each for gold mining and processing. The groups retain two thirds of the output and the remaining one third goes to the operator. The workers use simple tools such as shovels, picks, wheelbarrows, sluice boxes and occasionally compressors and water pumps. A similar system obtains in the diamond mining sector where operators obtain tributer plots within concessions

of larger diamond companies and employ groups of workers who retain two thirds of production as payment. Gold mining and buying licenses are granted only to Ghanaian nationals who are at least 18 years of age and are registered within a designated area. According to Ghana's Mining and Minerals Act (Act 703) of 2006, an ASM license granted to a person or group of persons shall be for an initial period of 5 years and renewable for such a period as determined by the Minister. Small-scale miners are usually exempted from payment of taxes and royalties for the first three years of operation; however they are not exempted from paying local fees and taxes.

3.3.3 Support schemes for small-scale mining in Ghana

Mining is a major pillar of the Ghanaian economy. According to IIED (2015), gold contributed over 95% of the total mineral exports. In the same year, 35.4 % (1.5 million ounces) of the total gold produced in Ghana was derived from the ASM sector, compared to the 2% that the ASM sector contributed in 1989 (IIED 2015). Since 1989, the Ghanaian government has undertaken measures to support the economically and socially significant ASM sector, as chronicled by Hilson (2002) and summarised below.

- The Small-scale Mining Project was launched in 1989, with the Geological Survey, Mines Department, Minerals Commission and Precious Minerals Marketing Corporation as the initial four pillars to provide institutional support to the project. The project managed to purchase equipment for miners but terms were unfavourable or unaffordable and in the end all the equipment was sold off and remaining funds returned to the project.
- Baseline research into the needs and challenges of the ASM sector: These were carried out by the University of Ghana. Recommendations that were put forward were never fully implemented. In the early 1990's the World Bank launched the Mining Sector Development and Environment Project aimed at enhancing the economic and environmental sustainability of Ghana's ASM sector by strengthening institutions and application of improved technology.
- Establishment of district support centres: to provide regional registration and purchasing and training services to the ASM sector.
- Provision of loan facilities to the ASM sector: these were primarily for equipment purchase.
- Competitive pricing of ASM gold and diamonds: the Precious Minerals Marketing Corporation was mandated to buy ASM gold and diamonds at the world market rate, less 7% for its commission and for the Land Rehabilitation Fund.

3.3.4 Challenges in Ghana's ASM sector

Most of the efforts listed above to support the ASM sector in Ghana are commendable. However, as stated by Hilson (2002), it is also equally important to point out where such efforts have failed so that stakeholders and authorities are forearmed for implementation of future interventions. Some very captivating interventions simply fizzle out from the public domain when they fail. For example, an internet search on how the above support schemes first reported more than 15 years ago have progressed does not yield much. This suggests there could be challenges, which is confirmed by press reports of ASM sector stakeholders raising complaints on issues that the 15 year old interventions were supposed to have addressed. Thus, as a sample of challenges facing the Ghanaian ASM sector, reference to any recent press report of ASM sector stakeholders speaking out can provide a snapshot of these challenges. Myjoyonline.com (2015) quotes the Artisanal and Small-scale Mining Africa- Network (ASMAN) demanding the following from the government:

- “A progressive policy to reform and transform the ASM sector from its largely informal base to a formal one that will have at least 80-90% of the operators regularising their activities in order to effectively monitor their activities. This will also increase government’s tax revenue, since those in the informal sector do not have any obligation to the state.
- Environmental policy to manage and remedy the current environmental mess (abandoned pits, polluted water bodies and the massive deforestation) occasioned by the massive illegality perpetuated against this state by some illegal miners including foreigners.
- A policy to adopt and promote a mercury free technology among ASM operators to safeguard the environment and human life as well as depict government’s commitment to the Minamata Convention³ which Ghana has become a signatory to since 2014.
- A comprehensive policy to provide technical and financial support to ASM operators to increase productivity through efficient and best practices, as well as pay equal attention to other sectors of ASM such as Salt Mining, Sand weaning etc.
- A policy to ensure the development of ASM entities into Medium Scale Mining companies which shall bring about partnerships between Ghanaians and foreign partners as part of efforts to do away with the cancer of illegal foreign workers in the industry.

³ Recognizes that mercury is a chemical of global concern owing to its long-range atmospheric transport, its persistence in the environment once anthropogenically introduced, its ability to bio-accumulate in ecosystems and its significant negative effects on human health and the environment (see www.mercuryconvention.org)

- The appointment of a deputy Minister in-charge of ASM to superintend over the sector, or at best the creation of an Artisanal & Small Scale Mining Authority (ASMA) to give priority attention to the industry concerns as well as place the contribution of ASM mining at par with whatever large-scale mining is contributing. This will ensure that Ghana focuses and develops ASM policy that will be embedded into a broader rural development strategy to contribute towards Ghana's poverty reduction efforts as called for by the Action plan of the Africa Mining Vision (AMV).
- Beyond political party manifestos, ASMAN also wishes to see the commitment of future governments (Political Parties) to include ASM issues into the National Development Planning Commission (NDPC) annual policy priorities to give it that national dimension”.

3.4 ASM IN TANZANIA

Tanzania is endowed with varieties of minerals amenable to both ASM and world class large scale mining. ASM in Tanzania dates back to the 1940's, and is mainly based on high value minerals such as gold and gemstones and, to a lesser extent, salt, limestone (aggregates and lime), kaolin, and gypsum (Dreschler 2002). Tanzania is currently Africa's fourth largest gold producer after South Africa, Ghana and Mali. In 2014 major gold mines exported a total of 1.27 million ounces of gold (TMAA 2014). It is estimated that small-scale miners account for approximately 10% of total Tanzanian gold production (UNEP 2012).

The ASM sector has increasingly become an important poverty alleviation and livelihood strategy in Tanzania which has seen the number of ASM miners balloon from 150,000 in 1987 to over 700,000 in 2012 (UNEP 2012; Masanja 2013). Masanja (2013) notes several contributions of the ASM sector to the Tanzanian economy. ASM contributes to national GDP as legitimate ASM companies pay 3% of their revenues as royalty to the government. Furthermore, income from ASM is usually invested in starting small businesses such as shops, taxis, bars, guest houses, farming, and housing. ASM has slowed down rural-urban migration as most of the mining activities are in the rural areas.

3.4.1 Regulatory framework for ASM in Tanzania

Following poor performance of the mining sector under state control in the 1970s and 1980s, the Tanzanian government embarked on a comprehensive

revision of its mining policy to ensure the country's mineral potential was harnessed for national economic growth (Dreschler 2002; UNEP 2012). In the late 1980s, the government began to support new opportunities for small-scale mining communities by liberalising the mining and selling of gold and in the 1990s, the government developed a legal and policy framework for formally integrating small-scale mining into a national mineral development strategy via the Tanzanian Mining Policy of 1997 and the Mining Act of 1998 (UNEP 2012).

More recent initiatives to support the ASM sector are enshrined in the new Mining Law of 2010, informed in part by findings of a presidential mining sector review committee. The law, which stipulates that ASM is the preserve of Tanzanian citizens, has several key legislative thrusts that support the ASM sector (UNEP 2012). These are outlined as follows:

- Designation of ASM areas: to reduce conflicts between the ASM and LSM (large scale mining) sectors, enhance equitability of mining permit allocation and create a more stable foundation for environmental and livelihood planning.
- Decentralisation of permitting: permitting was decentralised to Zonal Mines Office level, making the system more efficient and integrating ASM sector into the local planning and administrative systems.
- Micro-finance policies: Banks, companies and microfinance institutions are encouraged to offer credit terms to the ASM sector. On its part the government introduced the Small-Scale Mining Development Revolving Fund to provide the ASM sector with loan facilities for geotechnical investigations and gold processing (Masanja 2013).
- Capacity building: Strengthening outreach and training programmes targeting the ASM sector has been prioritised.

Other initiatives to support the ASM sector include the World Bank- funded Tanzania's Sustainable Management of Mineral Resources Project, and the World Bank's Public Private Partnership initiative involving the government, the LSM sector and the ASM sector aiming at managing conflict between ASM and LSM sectors. Administratively, the government of Tanzania introduced a dedicated Small-Scale mining section into the structure of the Ministry of Energy and Minerals to improve efficiency in dealing with ASM issues (Masanja 2013).

3.4.2 Challenges of ASM in Tanzania

Masanja (2013) lists key challenges within Tanzania's ASM sector as follows:

- Low level of productivity due to use of inappropriate technology, and poor practices in mining and processing.
- Inefficiency in exploitation and processing of minerals (low recovery).
- Lack of financial record keeping.
- Lack of transparency in ASM operations, including tax avoidance.
- Market barriers.
- Uneconomical decisions in investment.
- Lack of capital, and reluctance of banks and financial institutions to provide loans and other financial assistance to ASM (especially the unregulated sub-sector).
- Limited government capacity to enforce laws and regulations related to ASM. Zonal Mines Offices have inadequate resources and capacity to issue and track licenses effectively. Zonal Mines Offices are responsible for conducting extension services, but limited funds have hampered their capacity to do so.
- Limited areas suitable for ASM.

3.5 ASM IN BOLIVIA

Bocangel (2002) provides a useful characterization of the Bolivian artisanal and small-scale (ASM) sector to the turn of the 20th century. The author notes that in Bolivia the ASM sector is dominated by cooperatives, but also includes private companies and concession holders, the main criterion being that ASM miners treat less than 500 tonnes of ore per day. The ASM sector dominantly targets metals (zinc, lead, antimony, gold, wolfram and copper) and subordinately non-metals (ulexite, boric acid, barytes, amethyst, and arsenic trioxide). As at the year 2000 artisanal mining accounted for 85% of the employment generated by mining industry as a whole compared to only 30% in the 1980s, a phenomenal growth rate attributed to the closure of the state-owned mines and the shift to capital intensive technology by the medium scale mining sector (Bocangel 2002). Further, Bocangel (2002) divides the Bolivian ASM sector into traditional cooperatives working tin and wolfram, cooperatives working alluvial gold deposits, cooperatives working primary gold deposits and informal miners, including gravel scratchers, individual miners and tailings retreatment workers. In Bocangel (2002)'s definition, informal miners are individuals or groups who

work without concessions, stealing high grade material from mines or mine dumps from concession owners, or work on their own outside concessions. Ordinarily, cooperatives are groups of 50-80 people who come together to work on concessions granted by the state, but there are some larger mechanised operations with as many as 500 workers in terraces or river banks using excavators, bulldozers, loaders and dump trucks moving more than 2,000m³ per day who, because of their cooperative nature, are considered ASM (Bocangel, 2002).

3.5.1 Regulatory framework governing the mining industry in Bolivia

Mining in Bolivia is regulated by general and complementary rules. The Mining Code of 1997 (Law 1777) was replaced by the Mining and Metallurgy Law (Law 535) of 2014 as the general, basic mining regulation in Bolivia. Barrenechea and Moreno (2015) explain and discuss the implications of the Mining and Metallurgy Law. They note that the major difference between the Mining Code and Mining and Metallurgy Law is a change from the concession system to a contract-based system. Under the Mining Code, mining rights (and ownership rights over surface or land) were granted through special exclusive concessions (licenses) over a defined territorial space for an unlimited period of time. Under the Mining and Metallurgy Law, mining rights are granted through mining contracts over a defined territorial space for a limited period of time without granting any sort of ownership over surface or land.

The most important complementary regulation governing mining in Bolivia is Environmental Law 1333 of 1992 which requires mining operations to be developed with a consideration of the comprehensive utilisation of raw materials, waste treatment and safe disposal of tails, tailings and connectors, and to have a closure and rehabilitation plan (López and Quiroga 2015).

3.5.2 Support to the ASM sector in Bolivia

The Bolivian mining laws have of late been explicit about state support to the ASM sector. Article 22 of the Mining Code of 1997 declares that the state would establish mechanisms to help develop the small-scale and cooperative mining sector through technical and developmental assistance and through financial

support. Incentives for the mining industry to promote the protection of the environment would also be put in place. Over the years Bolivia has implemented several initiatives to support the ASM sector in conjunction with development partners such as Danish Agency for Development Assistance (DANIDA), Canadian International Development Agency (CIDA), the Swiss Agency for Development and Cooperation (SDC), the European Union, the World Bank, the Nordic Fund, and the International Labour Organization (ILO). The support rendered to the ASM sector through the cooperation between the government and these development partners has been technical, financial and environmental.

3.6 KEY INDICATORS OF GOOD ASM SUPPORT PRACTICES

A benchmark ASM support regime should 'ensure that the ASM does not in the long run produce any harm to the communities but induces positive elements for poverty reduction and sustainable development' (Hentschel et al. 2002: 16). In order to achieve this, governments, in collaboration with stakeholders/ partners need to address known ASM key issues pragmatically. These well-known or traditional ASM issues including policy, legislation, environmental, technical, marketing, financial and value addition issues are discussed below.

3.6.1 Mining policy and legislation

A consistent policy regime is a prerequisite for a sustainable ASM sector which contributes to poverty alleviation and rural development, and is integrated into the formal economy (Hentschel et al. 2002; MMSD 2002). Some key tenets of such a policy, as envisaged by Hentschel et al. (2002), include:

- Availability of demand-oriented services (technical, legal, socio-economic and environmental).
- Incentives for formal (legal) ASM e.g. import duty exemptions, taxation relief to upcoming ASM companies, improved access to finance/ credit, and access to free markets.
- Harmonisation of government departments and other stakeholder institutions into the ASM sector policy administration and implementation. In Zimbabwe this is particularly important where a multiplicity of agencies separately seek to collect fees from, and regulate, ASM activities.
- A transparent and appropriate legal framework.
- Strict monitoring of compliance with the legal framework and penalties against violations.

3.6.2 Technology

In general, many ASM enterprises use basic tools for mining, ore handling and mineral processing, leading to strenuous chores of low productivity. Appropriate ASM technological interventions can enhance the economic sustainability of such ventures without compromising on their environmental sustainability. Filling this technological gap is one way of transforming artisanal mining into vibrant small scale mining ventures. Similarly, it is possible to upscale from small-scale mining to medium-scale mining by upgrading the operational environment, including technology/ equipment.

3.6.3 Tenure and formalisation

Many ASM activities are informal and some prefer to remain informal for a number of reasons:

- Lack of incentives to legalise,
- Bureaucratic procedures and heavy fees to become and remain legal,
- Lack of capacity of the government to enforce penalties, and
- Non-provision of benefits which should be associated with legalising activities.

A supportive ASM regime should encourage and incentivise legalisation or formalisation of ASM. To this end, governments should ‘develop objective, consistent, transparent and non-discriminatory regulatory mechanisms, which offer easy access to mining titles and legal production’ (Hentschel et al. 2002: 31).

3.6.4 Technical support

According to Hentschel et al. (2002), most ASM problems are technical and require appropriate technical solutions implemented in an integral approach. The technical solutions have to be commensurate with the economic potential of the target group and need to be accompanied by education and training, and be affordably replicable.

3.6.5 Social support

Traditionally, support to the ASM sector has largely been technical and financial, and rarely social. Supporting the ASM sector through provision of health and

social insurance cover is likely to become an important yardstick against which to judge how fairly a country treats its ASM workforce. Mongolia (see Section 6) is currently carrying out vigorous campaigns across mining and herding areas raising awareness of the need for insurance cover among herders and ASM workers, and advising them to obtain insurance cover on negotiated terms.

3.6.6 Environment, health and safety

Small-scale mining generally has a greater environmental impact per unit output compared to large-scale mining (Hentschel et al. 2002; MMSD 2002). The environmental problems associated with ASM include: mercury pollution, cyanide pollution, acid mine drainage, river siltation, erosion and deforestation, landscape destruction and cultural damage. Governments are expected to enforce legislation to protect the environment and the health of communities and miners, but legislation and enforcement alone are not enough. A realistically supportive ASM regime should couple enforcements with awareness campaigns about the risks of unsafe work practices, and to proffer safer alternatives compatible with local cultural, social and economic norms (MMSD 2002).

In Zimbabwe, the cost of environmental compliance, administered via the Environmental Management Agency (EMA), is beyond the reach of many ASM workers who are already burdened with a plethora of other licensing fees from several other agencies/ government departments.

3.6.7 Minerals marketing

Typical market problems in the ASM sector include lack of direct markets (going through intermediaries), stringent market regulations and illicit trading (largely due to poor government policies). Decentralisation of markets helps curb illicit dealings by cutting off unnecessary exploitative intermediaries, who are the main culprits in smuggling (Hentschel et al. 2002), while at the same time ensuring that miners get higher profits for their produce. Profit margins can also be increased by assisting the ASM sector to establish local processing industries that add value to mining products. A benchmark ASM support regime promotes fair trade initiatives that give miners the opportunity of trading their produce under the best selling terms and conditions (Hentschel et al. 2002).

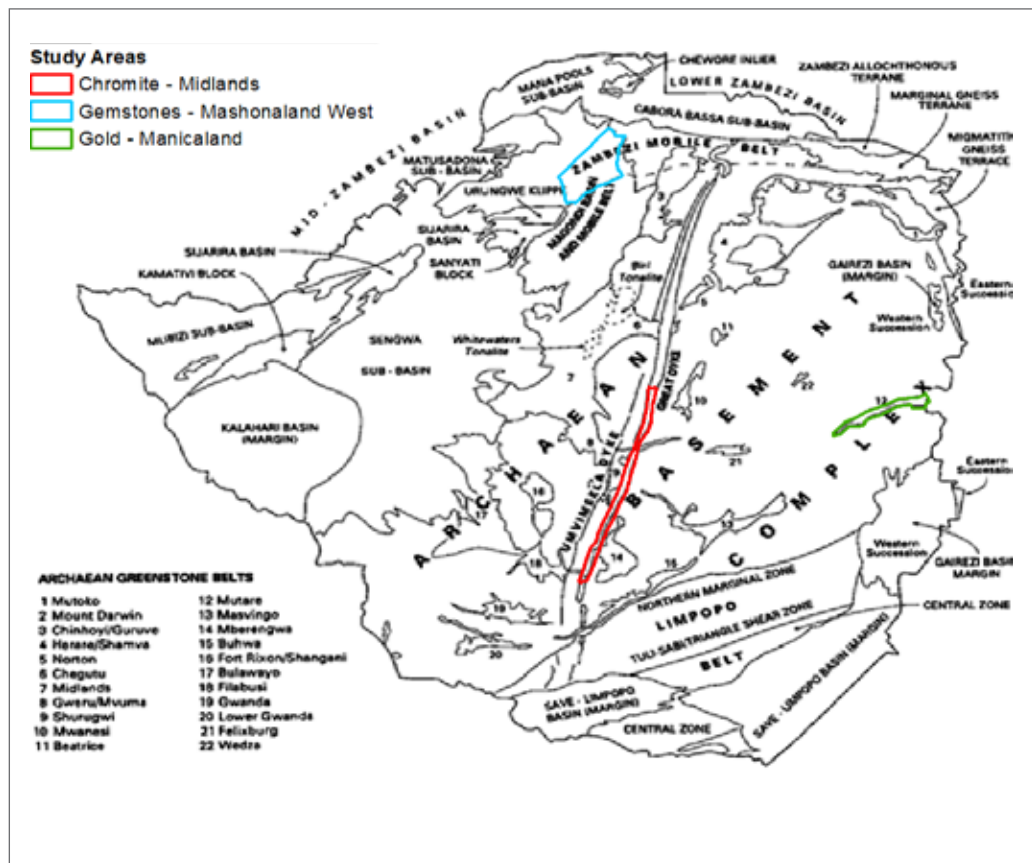
3.6.8 Access to credit and finance

The lack of access to credit by the ASM sector is considered a major impediment to the sector's growth and sustainability. Many banks consider loans to ASM to be high-risk, which is largely true because the sector generally has no capacity to provide bankable mineral resources estimates. Unfortunately the challenge is cyclic because it is not cheap to hire experts to conduct bankable resource estimates. There is therefore need for technical and financial support to the ASM sector before projects can be regarded bankable thereby enhancing their chances of getting loan approvals from banks. In Zimbabwe, traditional banks are generally considered less supportive to the ASM sector compared to micro-finance institutions that are prepared to take risks of potentially bad loans. Government of Zimbabwe itself runs the Mining Industry Loan Fund which has previously supported the ASM sector.

4. CASE STUDIES

In this study, ASM surveys were undertaken in three mining areas in three different administrative provinces of Zimbabwe. Different commodities are mined in each of the three mining areas as follows (Figure 1): gold in the Mutare-Odzi Greenstone Belt (Manicaland Province), chromite along Zvishavane-Shurugwi-Lalapanzi stretch of the Great Dyke (Midland Province) and gemstones in the Mwami Mica Field, Karoi (Mashonaland West Province). A total of 98 mining sites were visited in the three areas and at each visited site, questionnaires were administered. In all the three areas, questionnaires were orally administered, face to face with respondents, effectively making them structured interviews.

Figure 1: Map of the case study areas.



4.1 SMALL-SCALE GOLD MINING IN MANICALAND PROVINCE

Manicaland Province was chosen as a study area due to the concentration of gold mining activities along the Mutare-Odzi Greenstone Belt (Figure 2). Forty three ASM sites were visited and a questionnaire was administered to a representative at each site. Actual site selection was based on the convenience sampling technique where those miners who were found at their mining sites were approached for interview. This was done in such a way as to spatially cover as much of the belt's extent as possible (Figure 2).

The Mutare-Odzi Greenstone Belt is one of more than 20 greenstone belts on the Archaean Zimbabwe craton (Figure 1) and has been described by several authors (e.g., Phaup 1937, Swift 1956, Bartholomew 1990, Pitfield 1994 and Chenjerai 1995). The belt is a significant historical gold producer with 68t (93%) of the total historic production of 73t having been mined from the Penhalonga Valley in the North North East (NNE) part of the belt within the Mutare segment (Figure 2). The greenstone belt is under-explored and most of the deposits have not been fully delineated, giving the impression that they are mostly amenable to small-scale mining. Consequently the belt is dominated by the ASM sector that targets both alluvial and hard rock deposits. The only large-scale mines are situated to the northeast of the belt, and include Redwing, Rezende and Penhalonga mines.

4.1.1 Demographic information

Table 1 suggests that women are generally under-represented at the mining sites visited on the Mutare-Odzi Greenstone Belt, with only two women out of the 43 questionnaire respondents. The visited mining sites had a total of 787 workers, of which only 17 were women, the same as the average number of workers for a single mine. Only one of the 43 mining sites visited was owned by a woman and of the 34 managers at sites that had appointed managers, only two were female. The visited sites had a total of 58 mining committee members and only six of these were female.

Table 1: Gender statistics of the visited mining sites within the Mutare-Odzi Greenstone Belt.

Demographic attributes of visited sites	Female	Male
Number of respondents	2	41
Number of workers	17	770
Number of committee members	6	52
Number of managers	2	32
Number of mine owners	1	21

Source: Questionnaire Results.

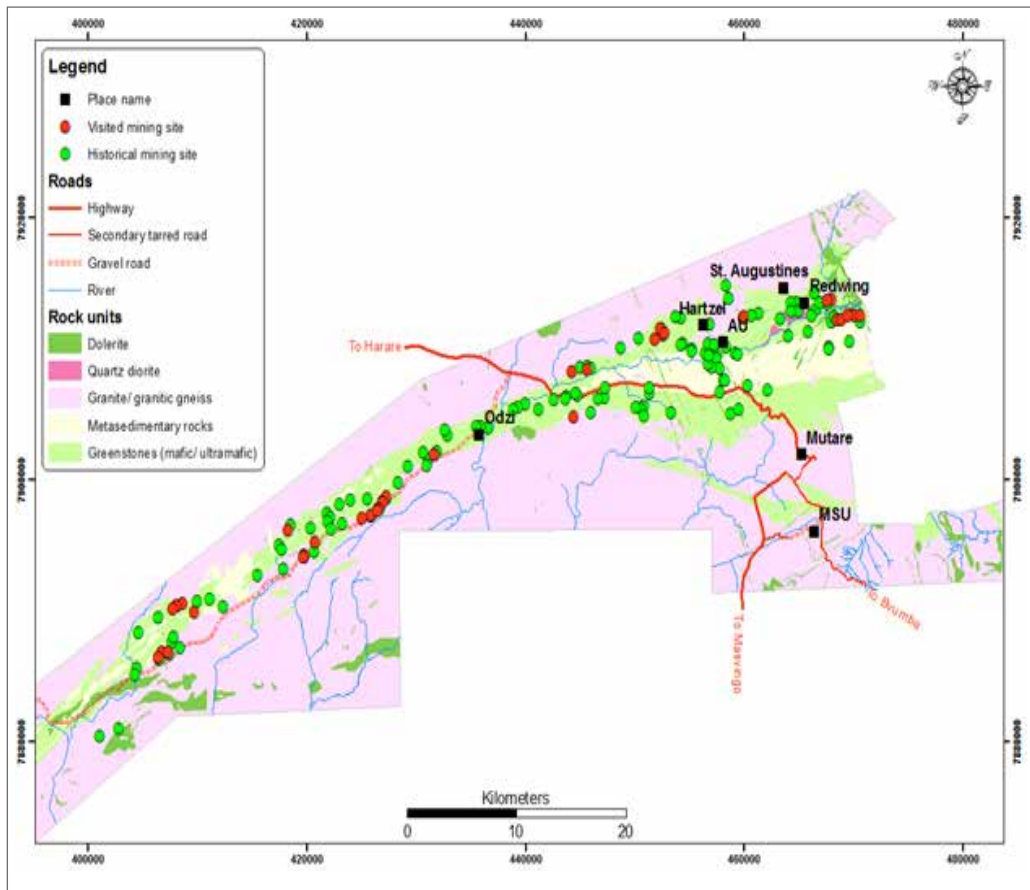
The age profiling of respondents (Figure 3) showed that most of the miners (75%) were 25-45 years old, 16% were 18-25 years old and 9% were over 55 years old. This would suggest that mining is considered by the economically active population to be an important economic undertaking. Importantly, a significant proportion of the youth have taken up mining in the Mutare-Odzi Greenstone Belt.

4.1.2 Mobility in the ASM sector

In order to assess mobility within and seasonality of the ASM sector in the Mutare-Odzi greenstone Belt, miners were asked which times of the year they mine, how long they have stayed in the mining area and why they moved to the mining area. Nearly half (47%) of the interviewees indicated that they worked throughout the year and the rest worked less than the full year, such as seasonally, or did not respond to the question.

Figure 4 shows that some 58 % of the respondents have lived in the mining area for at least ten years whereas 26% have stayed in the mining area for 2-5 years. The rest (16%) were in the area for two years or less. In a follow-up question, respondents were asked why they moved to the mining area: 62% moved into the area for mining, 16 % for agriculture and 11% were born in these areas (Figure 5). This suggests that small-scale gold mining is not necessarily nomadic and appears not to be entirely influenced by what happens in other sectors such as agriculture and retail. Small-scale miners appear to be motivated by mining, as evident from the investment in capital intensive mining methods and in milling equipment.

Figure 2: Mining sites visited within the Mutare-Odzi Greenstone Belt, Manicaland, Zimbabwe.



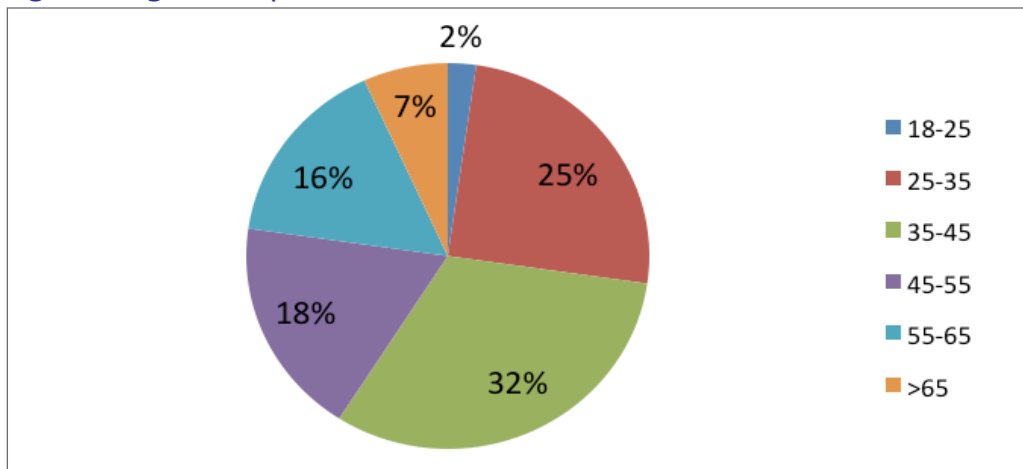
Source: Field Survey.

4.1.3 Education and training

Figure 6 shows that respondents in the survey had at least primary school education, with 22% having attained tertiary education including university degrees (11%) and postgraduate education (2%). This suggests that the ASM sector in the Mutare-Odzi Greenstone Belt has literate people with the capacity to undertake relevant mining courses to improve productivity and enhance environmental sustainability.

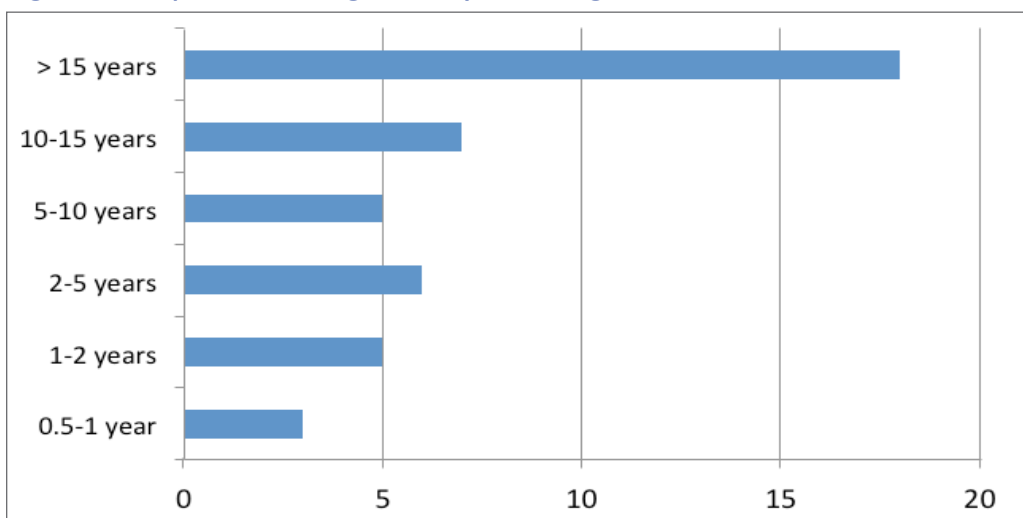
In terms of mining experience, 60% of the respondents have been involved in mining for ten years or more, 12 (28%) have 2-5 years of mining experience and the rest have only up to two years' mining experience (Figure 7). These statistics seem to suggest stability of the ASM sector in Manicaland, with most of the respondents having remained in the sector for a relatively long time.

Figure 3: Ages of respondents.



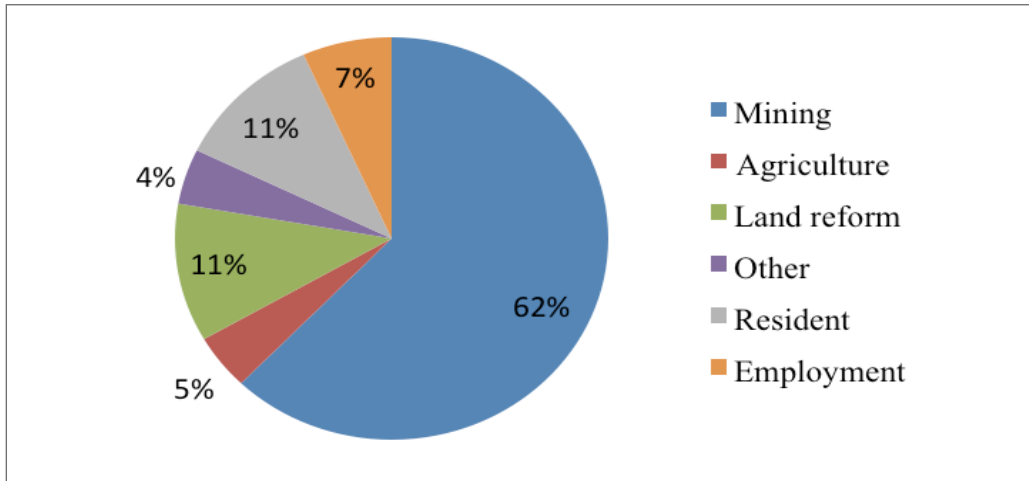
Source: Questionnaire Results.

Figure 4: Respondents' length of stay in mining area.



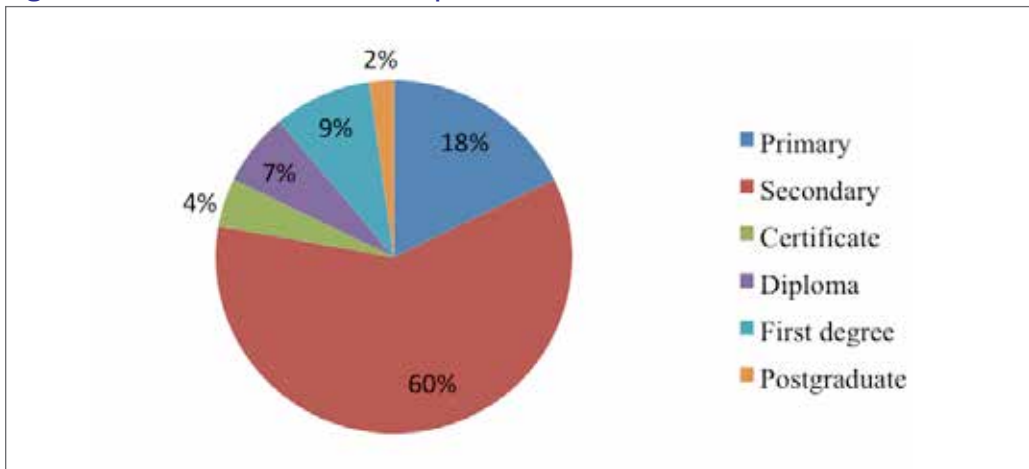
Source: Questionnaire Results.

Figure 5: Respondents' reasons for moving into mining area.



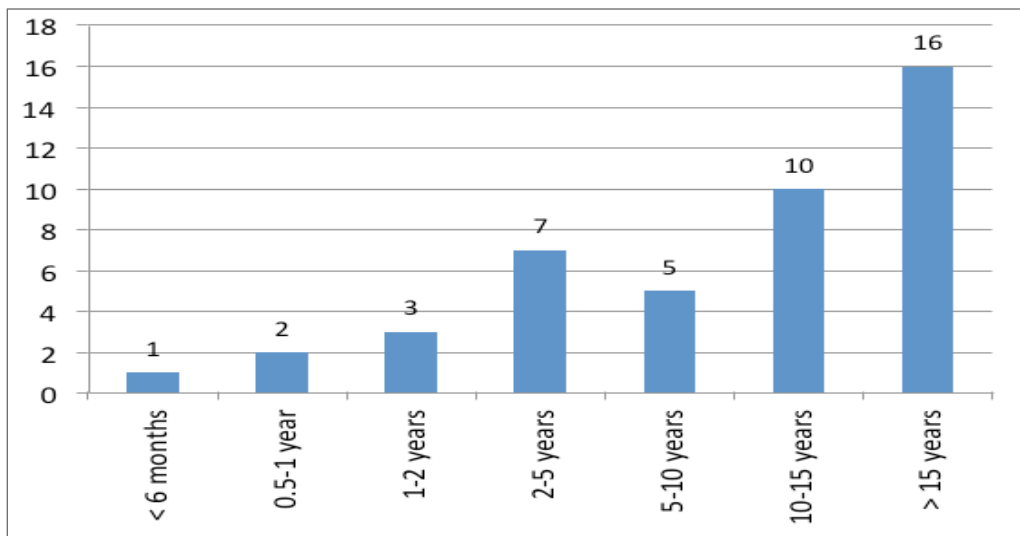
Source: Questionnaire Results.

Figure 6: Educational levels of respondents.



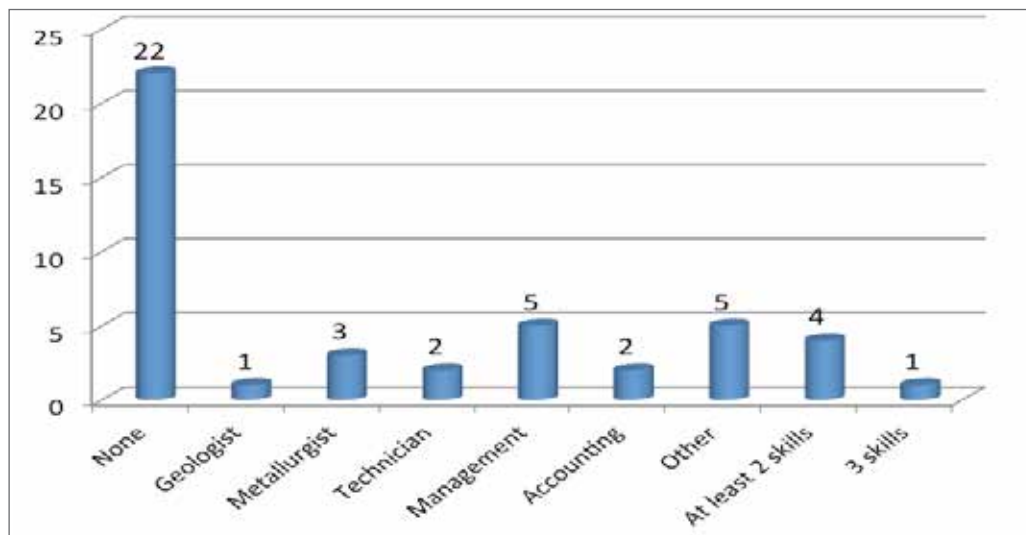
Source: Questionnaire Results.

Figure 7: Mining experience among respondents.



Source: Questionnaire Results.

Figure 8: Mining skills of respondents.



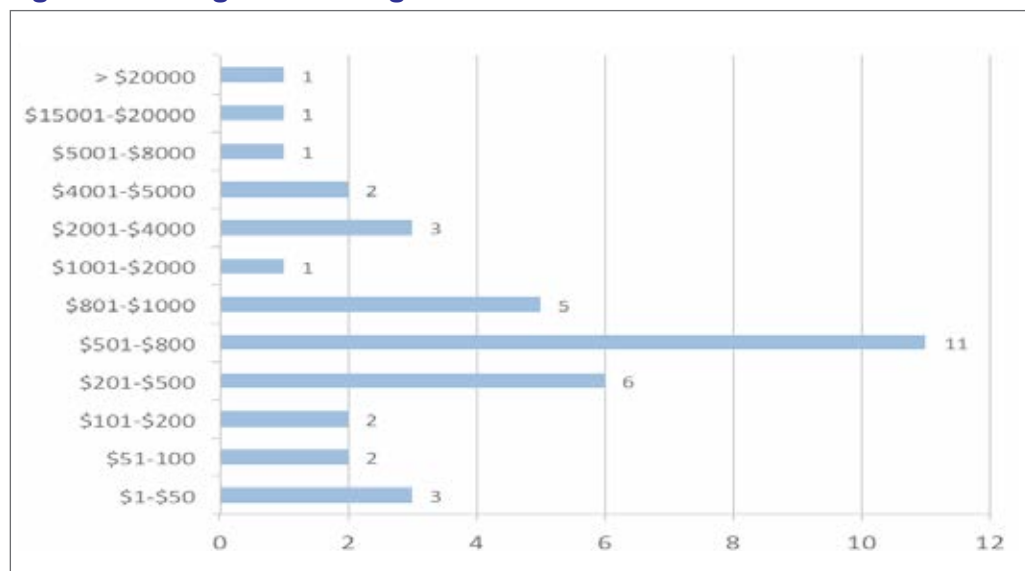
Source: Questionnaire Results.

Figure 8 shows that out of the 43 people in the survey, 22 (51%) had no formal mining training of any kind, 6 (13%) had technical mining skills and the rest had management or business skills. Five people (11%) had more than one skill. In general, these statistics indicate the need to avail relevant training courses to the ASM sector in Manicaland.

4.1.4 Earnings from mining

A key aspect of any business undertaking is the earnings from that business. Figure 9 depicts earnings in \$US per month for ASM sector workers in this survey. Some 26% (11) of the respondents earn US\$500-800 from mining per month, 36% (14) more than US\$800, and 30% (13) earn US\$500 or less from mining per month. The rest (14%) did not respond to the somewhat sensitive question on earnings. Except for the 5 (12%) who earn \$US200/ month or less, the earnings of the rest of the ASM workers in the survey are at least the same as the average earnings from formal employment in Zimbabwe currently. This would suggest that small-scale gold mining is, at least economically, a viable business and a livelihood option worth supporting.

Figure 9: Earnings from mining in Manicaland Province.

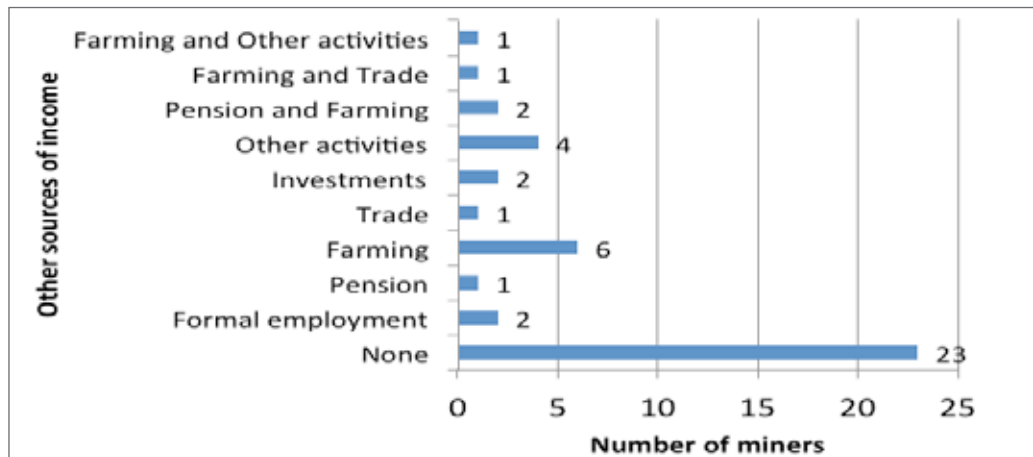


Source: Questionnaire Results.

The adequacy of small-scale gold mining as a source of livelihood can be assessed by finding out what the ASM sector workers currently do to supplement their incomes and what else they would do, given the opportunity, apart from mining. Figure 10 shows that on the Mutare-Odzi Greenstone Belt, 54% of the respondents are dedicated miners with no other source of income.

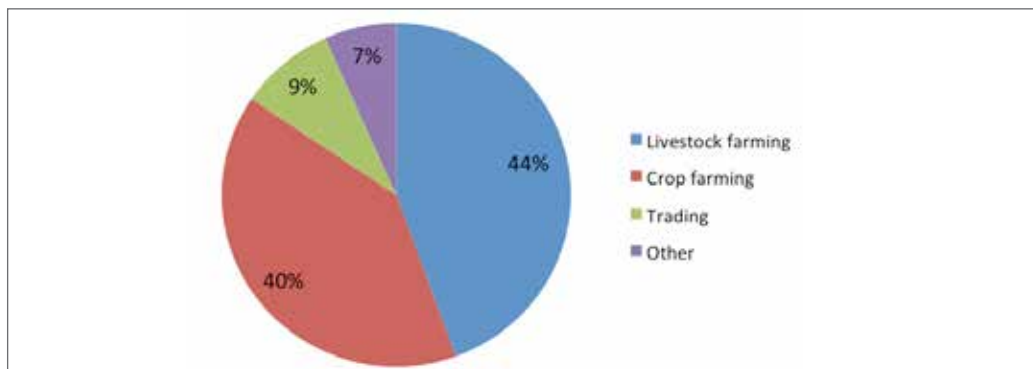
The most popular source of supplementary income to mining is farming; 6 (14%) of the miners are also farmers.

Figure 10: Other sources of income for the ASM sector workers in Manicaland Province.



Source: Questionnaire Results.

Figure 11: Alternative livelihood options for ASM miners in Manicaland Province.



Source: Questionnaire Results.

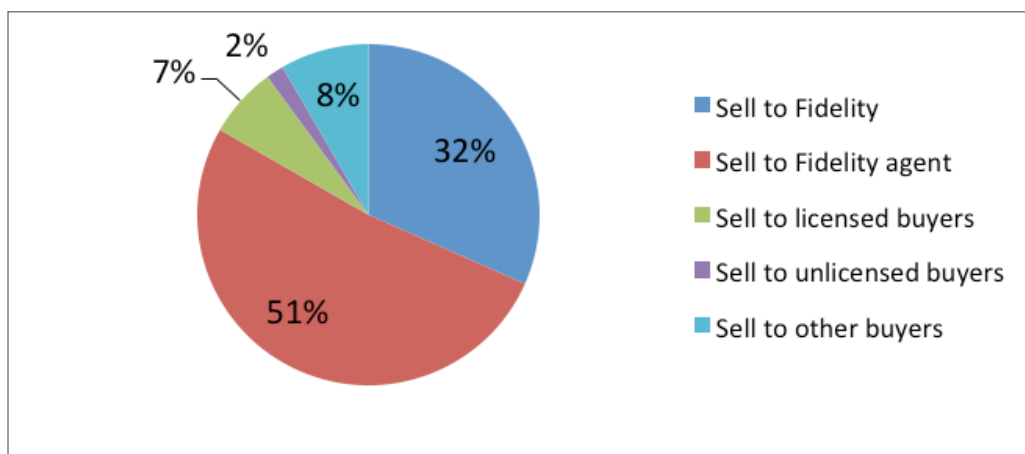
Given the resources and necessary start-up support, ASM sector workers on the Mutare-Odzi Greenstone Belt would take up farming as their main livelihood option (Figure 11).

4.1.5 Gold marketing

In Zimbabwe, the ultimate buyer of gold is Fidelity Printers and Refineries ('Fidelity'), a subsidiary of the Reserve Bank of Zimbabwe. Miners can sell their gold directly to Fidelity or through its authorised agents. All approved custom millers are now required to be agents of Fidelity with gold buying licenses so that they buy on behalf of Fidelity all the gold they recover from their mills. There are other licensed buyers who must also sell the gold to Fidelity. Figure 12 shows who buys gold produced at the ASM mining sites visited in Manicaland Province. The Figure shows that 83% of the respondents sell their gold to Fidelity or its agents. Only 2% of the miners say they knowingly sell their gold to unlicensed buyers.

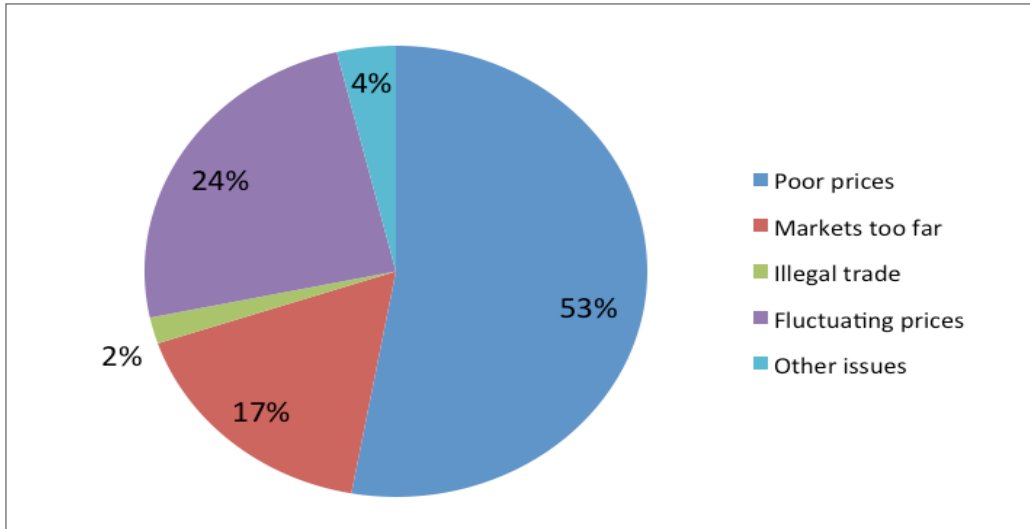
The ASMs in Manicaland indicated that they face challenges in marketing their gold (Figure 13), with 77% of them saying the prices were too low or were unstable. Furthermore, 17% of the miners indicated that the markets for their gold were too far away.

Figure 12: Gold buyers for the ASM sector in Manicaland Province.



Source: Questionnaire Results.

Figure 13: Gold marketing challenges within the ASM sector, Manicaland Province.



Source: Questionnaire Results.

Table 2: Perspectives on ASM licensing, Manicaland Province.

Licensing aspect	Response	
	Yes (%)	No (%)
Licensing system is right	12 (29.3)	29 (70.7)
Licensing not necessary	1 (2.5)	39 (97.5)
Licenses expensive	29 (72.5)	11 (27.5)
Required licenses too many	24 (60.0)	16 (40.0)
Licenses should be combined	18 (45.0)	22 (55.0)

Source: Questionnaire Results.

Small-scale miners in Zimbabwe have had issues with the licensing or registration system required for their operations. Table 2 shows that 98% of the respondents in Manicaland felt that ASM licensing was necessary but 71% of them suggested that the system must be improved, one way being to reduce the licensing costs (73%).

Table 3: ASM loan application success rates, Manicaland Province.

Description	Percentage
Proportion applied for loans	91%
Proportion successful	47%
Proportion unsuccessful	44%
Proportion never tried	2%
Proportion missing	7%

Source: Questionnaire Results.

Access to funding is key to success in mining, including the ASM sector. In this survey, the loan application success rates within the ASM sector were investigated. The findings shown in Table 3, suggest a success rate of 47%. Lack of collateral was cited as the main hurdle among the 44% (Table 3) whose applications for funding were unsuccessful.

4.1.6 Other challenges facing small scale gold mining

Discussions with small-scale miners also revealed a lot of challenges which need to be addressed if small scale gold mining is to progress in Zimbabwe. This study tried to get an understanding of the licensing costs, to measure its affordability by small scale miners. Before a small-scale miner can operate legally, there are several licenses (Table 4) which the miner has to pay for. At the time of the survey, the costs were generally too high and unaffordable for many small-scale miners. However, at the beginning of 2015, the government reduced some of the charges and the new figured are depicted in Table 4.

Table 4: License costs for small scale miners and millers.

Name of license	Authority where paid	Frequency	Amount
Environmental Impact Assessment certificate	EMA	Once off	\$4,000
Discharge permits (water mercury, solid waste slime)	EMA	Once off	\$3,000
Prospecting license	MMMD	Annually	\$150
Pegging fee	MMMD	Once off	\$400
Application fee	RDC	Once off	\$200
Carbon Transportation permit	EMA	Annual	\$500
Custom Milling license	MMMD	Annually	\$5,000

Source: Questionnaire Results.

Table 4 shows that miners and millers are required to pay for several licenses to different authorities. This makes it difficult for the miners, not only to know about all the requirements, but also to travel to the different institutions to make the necessary payments. A one-stop shop where all regulations and approvals are done would go a long way in minimising time and travel costs associated with the payments.

One of the main challenges that small-scale miners face is access to mills. At the time of the study only few gold milling facilities in the area were operational. Thus, the small-scale miners are struggling with transport costs, which are charged based on the ore tonnage, which is heavy for the long distance they have to travel. Long queues formed at the mills visited as miners waited for their turn to mill their ores (Figure 13). Based on interview results, a gold stamp mill costs about \$30,000, and to connect the mill to the electricity grid costs the small-scale miner a further \$28,000. In addition the miller would need to pay \$5,000 per annum in custom milling license charges (reduced from \$8,000). These costs are generally prohibitive and some small scale miners are using their mills to process only their ores as custom milling without a license is considered a serious offense. There is therefore significant underutilised capacity at such mills, which is also a potential loss in terms of revenue accruing to the economy. Similarly, the lack of elution facilities required for final recovery of gold has seen miners travel long distance to Harare or Kwekwe for the service. To transport the material for elution, a transportation permit worth \$500 (Table 4) is required.

Although there are license fees payable to rural district councils (RDCs), service delivery is poor and millers and miners have to pay for access roads which they have to maintain on their own. Thus, capital and operational costs of small-scale gold mining are high. Miners with economically viable deposits should be assisted to boost their production. Financial institutions should come up with tailor-made financial products to assist deserving small-scale miners as there is scope for increasing profitability of small-scale gold mining activities.

Figure 14: Ore milling queue at one of the operational mills in the area.



Figure 15. Examples of some gold ore processing equipment in the area.



Source: Field Survey.

4.2 CHROMITE MINING IN THE MIDLANDS PROVINCE

The target commodity in the Midlands Province in this survey is chromite which principally occurs along the Great Dyke and secondarily in ultramafic intrusions proximal to the Great Dyke. A total of 27 chromite mining sites were visited and, like the Manicaland gold ASM survey (section 4.1), actual sites were selected based on the convenience sampling technique whereby those miners who were found at their mining sites were approached for interview.

4.2.1 Geology of the study area

The study area is the stretch of the Great Dyke within the Midlands Province. The Great Dyke is a mafic-ultramafic intrusion, which cuts across the Zimbabwe Archaean craton (Figure 1, Figure 16), is 550 km long, strikes NNE and is 3-11 km wide. The Great Dyke contains the world's second largest platinum reserve, after the Bushveld Complex of South Africa, and hosts world-class resources of metallurgical chromium. The chromium ore (chromite) occurs in seams that separate olivine-bearing layers of the Great Dyke. The chromite seams measure 5-180 cm thick and eleven of them are laterally persistent and account for more than 10,000 million tonnes of chromite which currently is mainly mined by small-scale miners. This mode of chromite occurrence in layers constitutes stratiform chromite. There is also chromite that does not occur as seams, but rather as pods in ultramafic intrusions associated with greenstone belts off the Great Dyke. This style of chromite mineralisation, exemplified in this study in the Shurugwi area, is known as podiform chromite. Other significant deposits of podiform chromite are found at Mashava.

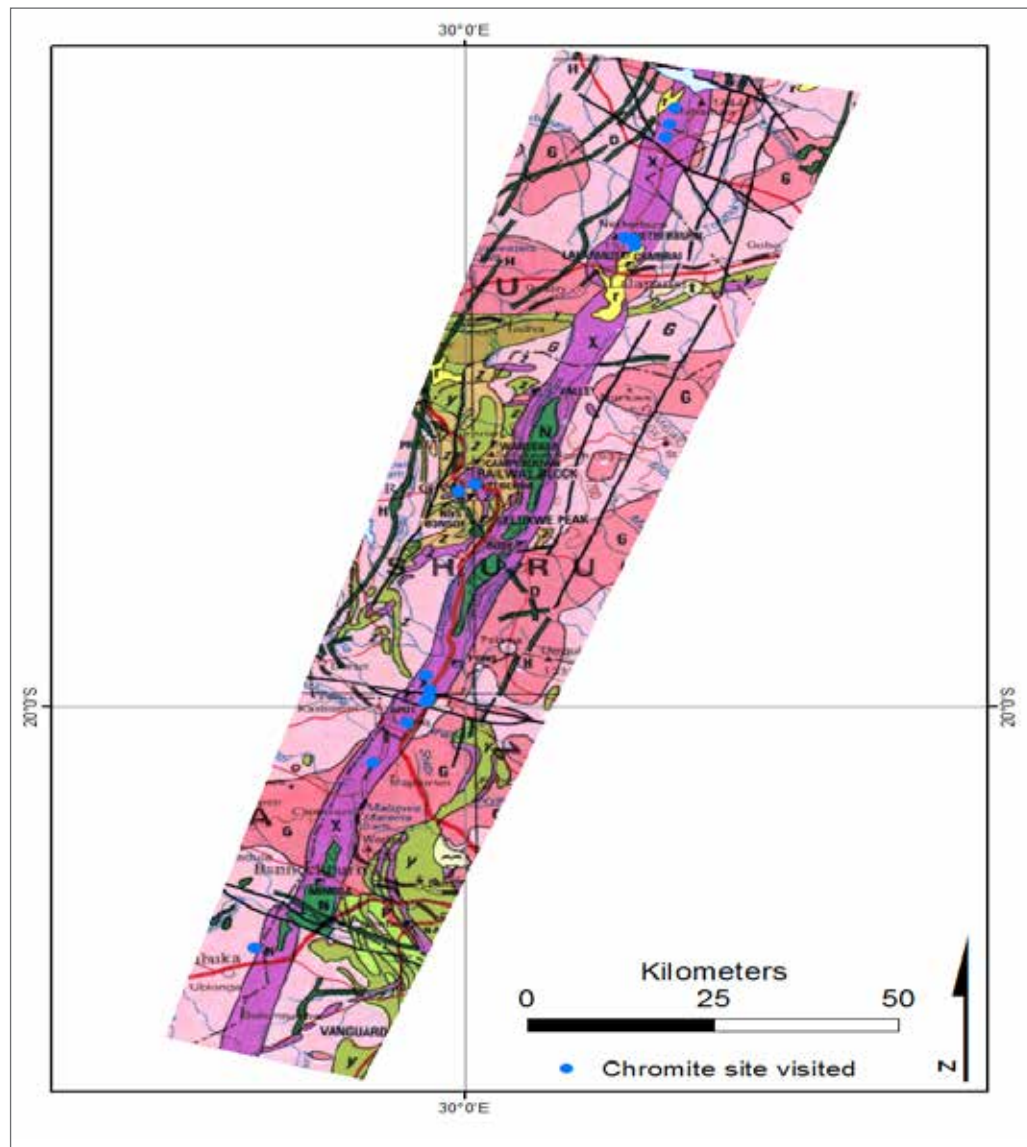
Most of the chromite claims on the Great Dyke are owned by the Zimbabwe Mining and Smelting Company (ZIMASCO) and the Zimbabwe Alloys Company (ZimAlloys). For more than 15 years now, ASM miners are the ones undertaking most of the mining on these claims under tribute arrangements. The company ('grantor') provides a chrome mining site or sites, mining and transportation equipment to a small small-scale miner ('tributor') who employs his or her own labour to mine chromite which must be sold to the grantor at a price determined by the grantor. There is currently resurgence in chromite mining activities following the recent lifting of a 2011 ban on raw chromite exports intended to promote value addition within Zimbabwe. Chromite miners have traditionally derived 100% of their livelihoods from chromite mining (Dreschler

2002). In this regard, the ban in raw chrome exports induced a decline in demand of chrome ore from the ASM miners whose livelihoods depended on selling this product. The lifting of the ban came as a welcome relief to distressed miners who have been holding on to their chromite stockpiles for the better part of the 4 year duration of the export ban. The government has recently set up a special purpose vehicle to handle the mining and marketing of chromite by the ASM sector. The royalty fees for chromite were raised from 2% to 5% but the export tax of 20% was removed.

4.2.2 Demographic aspects of the Midlands Province ASM survey

Twenty seven small-scale chrome workers were interviewed at their mining sites. Of these 27 respondents, 21 were male and 6 were female. This makes the sample male-dominated suggesting that in the study area chrome mining is male dominated, although this may not necessarily be the case. The age distribution (Figure 17) shows that 62% of the respondents are within the 25-45 age bracket, 16% are 18-25 years old and 22% are over 55 years old. The dominance of the economically active age group suggests that chrome mining is a prime activity in the area. Chrome mining is so important in the area that a significant proportion of youth (16%) is already engaged in the business and a significant proportion of retirees (over 55) persist in the business. Looked at differently, this may imply lack of alternative livelihood options in the area.

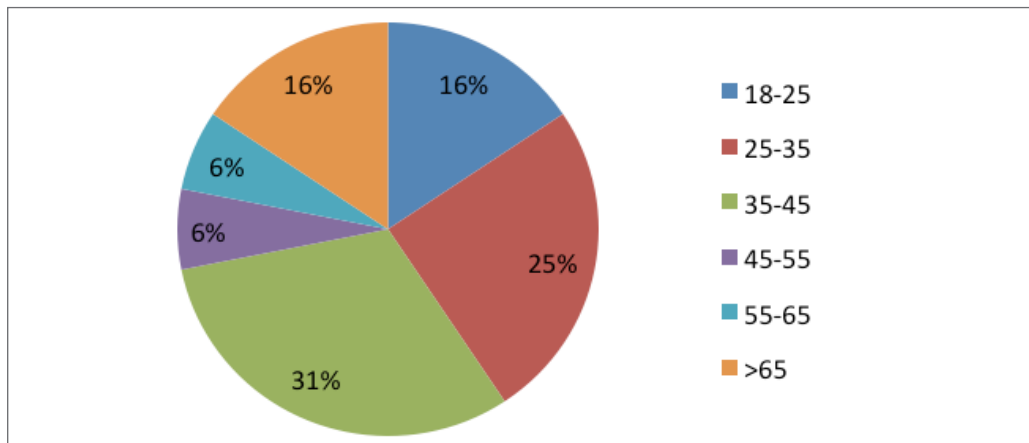
Figure 16: Chromite mining sites visited during the survey. The background is the 1:1 million geological map of Zimbabwe (Sithole 1994), showing the Great Dyke (main purple with green unit running NE-SW through the middle, in association with granitic rocks (shades of pink) and greenstone belts (leaf-green) of the Zimbabwe craton).



Source: Field Survey.

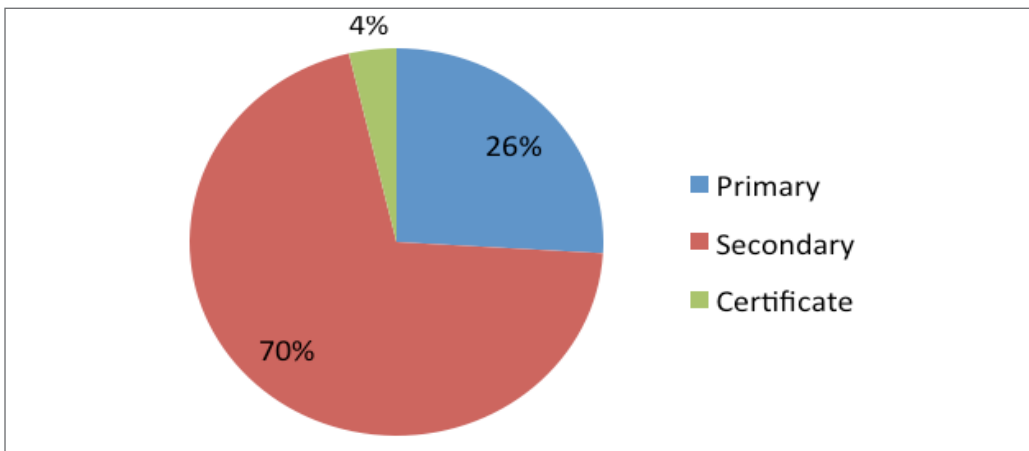
Educationally (Figure 18), a 100% literacy rate was recorded among the respondents who all attained at least primary school education. Seventy percent of the respondents attained secondary school education, and 4% attained post-secondary school certificates.

Figure 17: Age distribution among chrome miners in the Midlands Province



Source: Questionnaire Results.

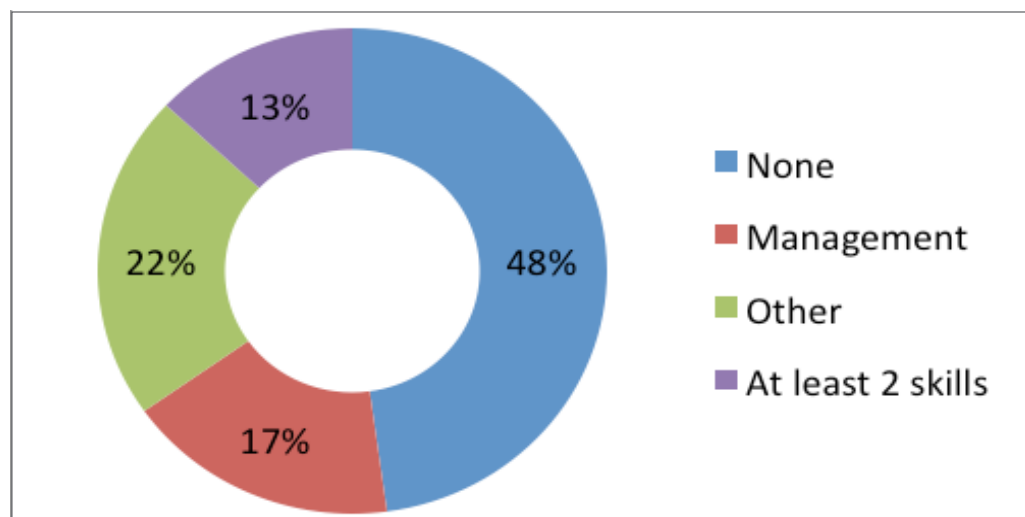
Figure 18: Educational attainment among ASM survey respondents, Midlands Province.



Source: Questionnaire Results.

A paucity of formal mining training is evident among the respondents, with none of them having gained any technical mining qualification (Figure 19). The figure shows that 48% of the respondents did not have any formal technical training in mining. However, some attained management training, and ‘other’ training, which in some cases meant safety, health and environment (SHE) training. Both mine management and SHE are important training courses in mining, but among the workforce must be personnel equipped with mining technical skills. However, the lack of formal mining technical skills may partially be compensated by the finding that 70% of the respondents had at least 10 years’ mining experience and 93% had at least 5 years mining experience. This further suggests that the chrome miners are not only dedicated to mining but need capacity building and technical support to upscale their activities.

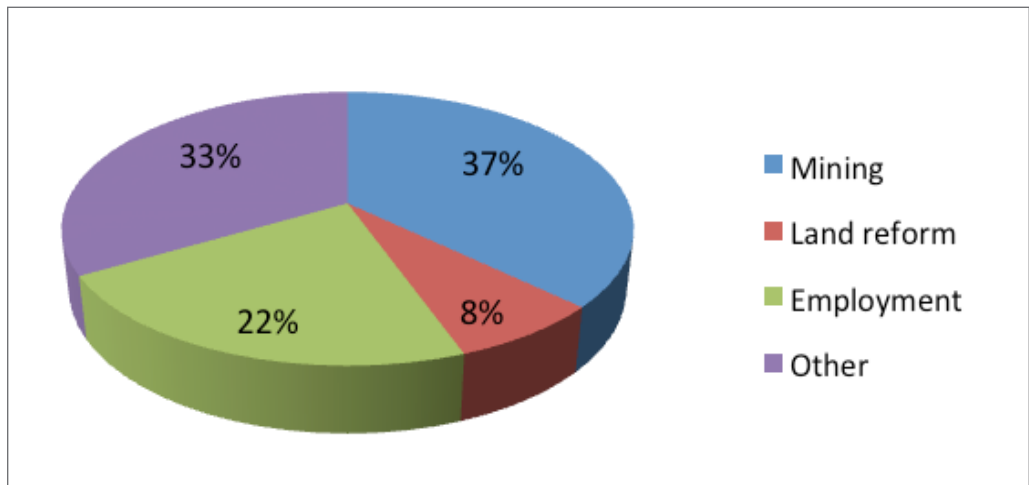
Figure 19: Mining skills among respondents, Midlands Province.



Source: Questionnaire Results.

Each of the respondents in this survey has lived in the area for at least 5 years, 82% for more than 10 years and 63% for more than 15 years. The chrome miners are thus local residents striving to benefit from their local resources. Originally, they would have come from different areas due to different pull and push factors. According to Figure 20, 37% of the respondents migrated to the area for mining, 22% for other employment, 8% for farming and 33% for ‘other’ reasons.

Figure 20: Reasons for moving to chrome-mining area, Midlands Province.



Source: Questionnaire Results.

4.2.3 Earnings from chrome ASM in the Midlands Province

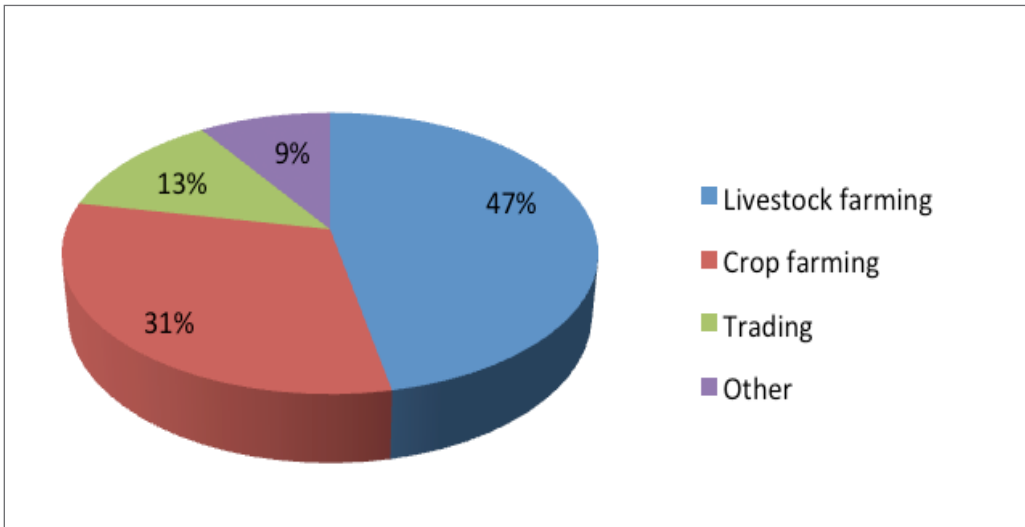
The main income brackets of the respondents in this survey are US\$101-200, US\$200-500 and US\$500-800 per month (Figure 21). This would seem to suggest that ASM chrome mining was not, at the time of the survey, a lucrative business, though it still provided a livelihood. At the time of the survey, a chrome export ban imposed in 2011 had just been lifted and miners were holding meetings with government officials and officials from the Minerals Marketing Corporation of Zimbabwe and many had not resumed operations. It is therefore not surprising that 78% of the respondents indicated they would, given resources and the opportunity, switch to farming as a livelihood alternative option (Figure 22). Currently although 44% of the respondents are dedicated chromite miners, 22% are already part-time farmers (Figure 23).

Figure 21: Earnings from chrome ASM, Midlands Province.



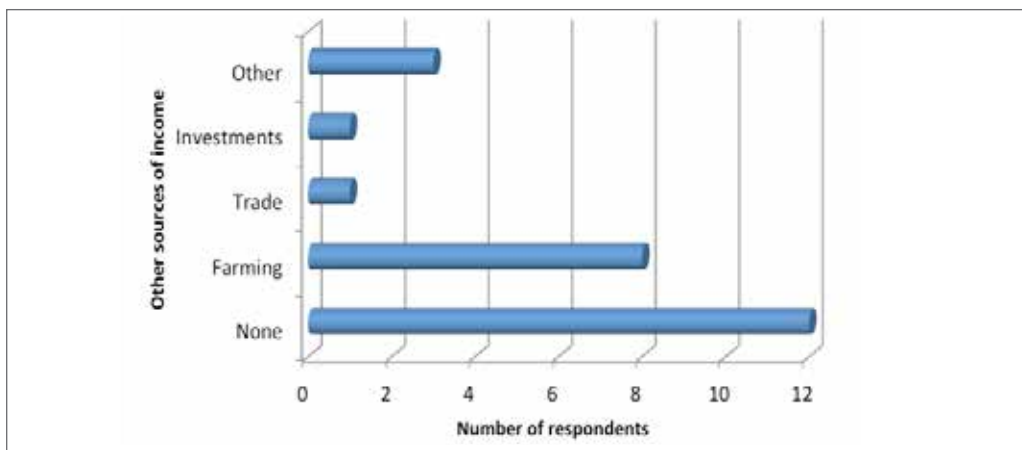
Source: Questionnaire Results.

Figure 22: Preferred alternative livelihoods, Midlands Province.



Source: Questionnaire Results.

Figure 23: Other sources of income for chrome ASM workers, Midlands Province.



Source: Questionnaire Results.

4.3 GEMSTONE MINING IN MASHONALAND WEST PROVINCE

4.3.1 General demographics

A total of 25 participants were interviewed on the field survey in Hurungwe District, Mashonaland West Province. All the respondents interviewed were male and 84% of them were owners on the mine whilst the remaining 16% were divided equally between the miners/diggers and those that undertook other functions (Table 5). The workforce composition at the mining sites was heavily skewed in favour of men.

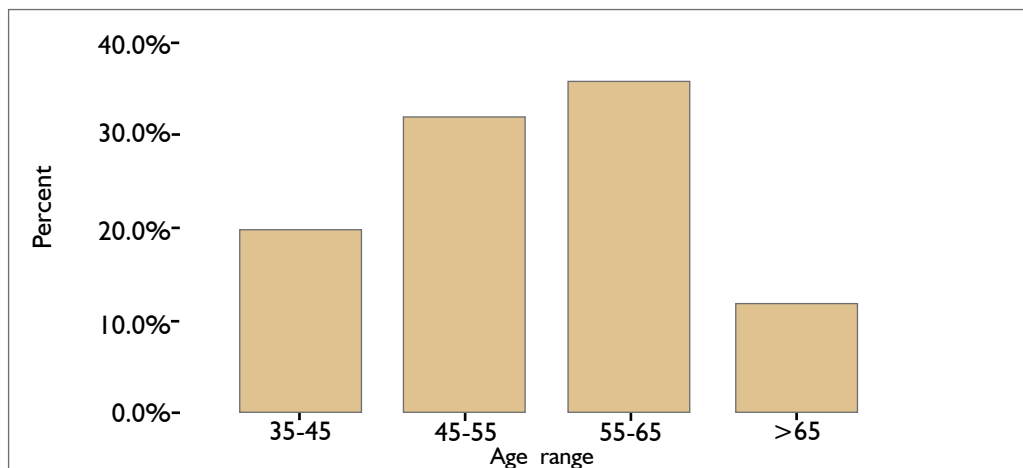
Table 5: Gender dynamics in artisanal mining of gemstones.

		Sex		Total
		Male	Female	
Role at mining operations	Owner	84%	-	84%
	Miner/Digger	8%	-	8%
	Other	8%	-	8%
Total		100		100%

Source: Questionnaire Results.

In terms of age, most of the respondents were in the 55-65 years age group followed by those in the 45-55 age group (Figure 24). This was mainly due to the fact that the majority of the mining activities are undertaken in the backyard and farmland in which these older villagers claim ownership/title (mainly communal land).

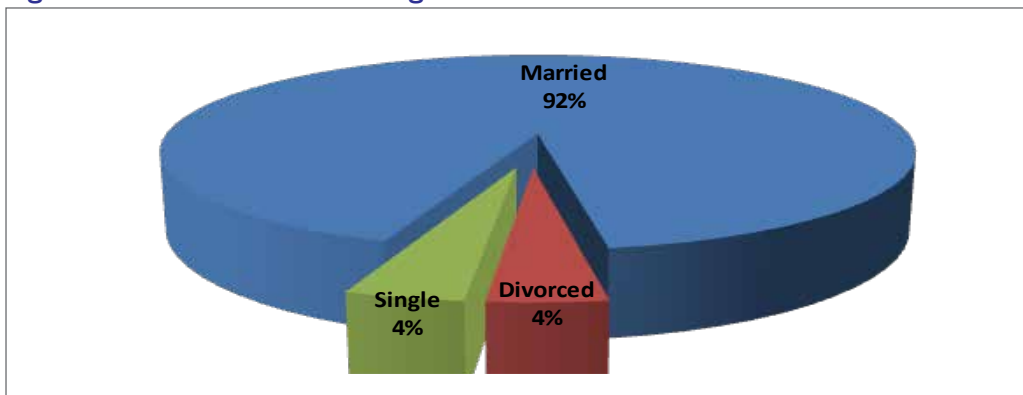
Figure 24: Age distribution among interviewees.



Source: Questionnaire Results.

About 92% of the respondents were married whilst the remaining 8% were either single or divorced (Figure 25).

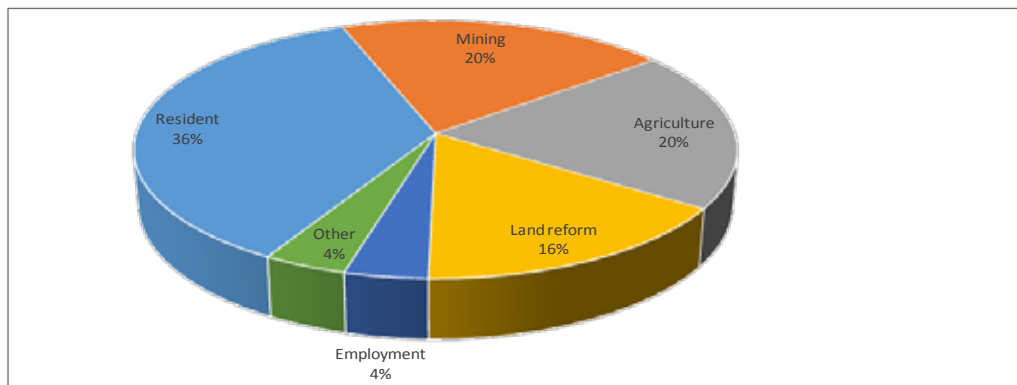
Figure 25: Marital Status of the gemstone miners.



Source: Questionnaire Results.

Figure 26 shows that 36% of the respondents were born and raised in the area, whilst others moved into the area due to the land reform program (16%) or to undertake agriculture activities (20%). Only 20% moved into the area to mine.

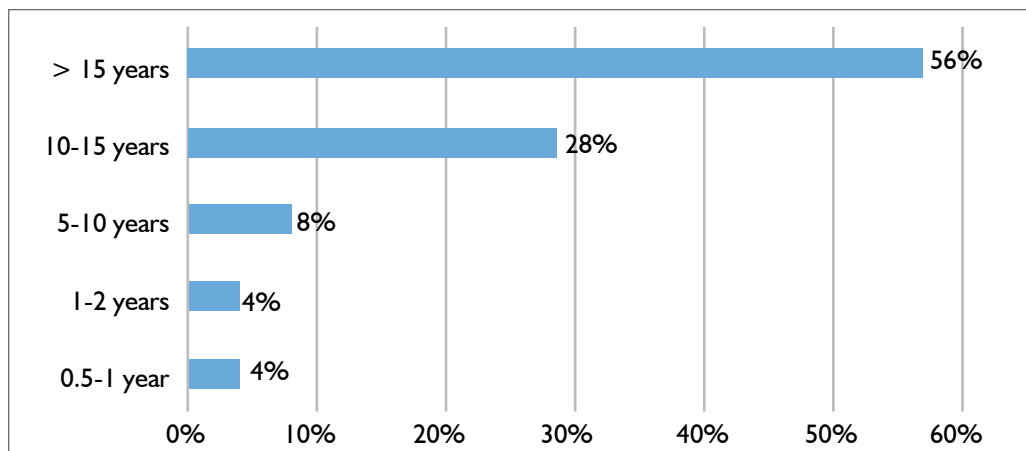
Figure 26: Reasons for moving to area.



Source: Questionnaire Results.

In terms of duration of stay, about 84% of the respondents have been staying in the area for at least 10 years; 56% highlighted that they have been staying in the area for at least 15 years, whilst 28% have stayed for between 10 and 15 years (Figure 27).

Figure 27: Length of stay in the mining area.



Source: Questionnaire Results.

The most popular reasons for undertaking small-scale mining according to the respondents were mostly economic reasons rather than social reasons as this relates to 68% of the respondents. Such economic reasons include the fact that mining pays well, failure to secure employment, livelihood, easy money and the belief that mining pays more than agriculture (Table 6).

Table 6: Reasons for involvement in small-scale mining.

	Frequency	Percent
Have a passion for mining	4	16.0
Mining pays well	4	16.0
Could not secure permanent employment elsewhere	1	4.0
As last resort, my livelihood options are limited	4	16.0
Mining is a quick way of getting money	4	16.0
Mining pays more than agriculture	1	4.0
To get additional income	3	12.0
To utilise of our local resources	2	8.0
Inherited this mine	2	8.0
Total	25	100.0

Source: Questionnaire Results.

4.3.2 Household size and income

The average household size for the respondents was 8 people with a maximum of 22 people and a minimum of 2 people. However, there is no correlation between the size of the household and earnings from mining activities. The Pearson correlation coefficient and the p-value statistics indicate an insignificant or no relationship between household size and the earnings from mining operations (Table 7).

Table 7: Correlation between household size and earnings from mining activities per month.

	Pearson Correlation Coefficient	P-value (1-tailed)	Conclusion
Correlation between household size and household earnings from mining activities per month	0.015	0.472	Insignificant

Source: Questionnaire Results.

On the other hand the average number of people contributing to the respondents' household income was 2 with a maximum of 6 people and a minimum of 1 person. The Pearson correlation coefficient and the p-value statistics indicate an insignificant or no relationship between the number of people contributing to household income and earnings from mining operations (Table 8).

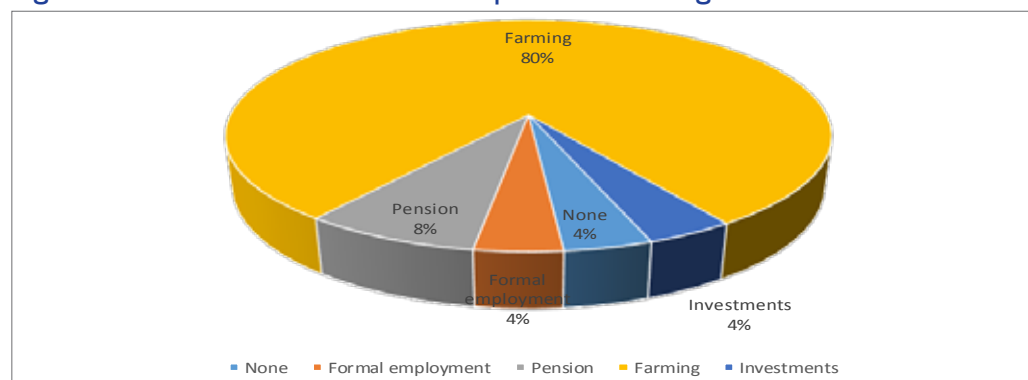
Table 8: Correlation between the number of people contributing to household income and household earnings from mining activities per month.

	Pearson Correlation Coefficient	P-value (1-tailed)	Conclusion
Correlation between the number people contributing to household income and household earnings from mining activities per month	0.111	0.303	Insignificant

Source: Questionnaire Results.

In addition to mining, 96% of the respondents highlighted that they have other sources of income with farming being the dominant source of additional income as most of the ASM activities are undertaken in a farming community, followed by income from pension pay-outs (Figure 28).

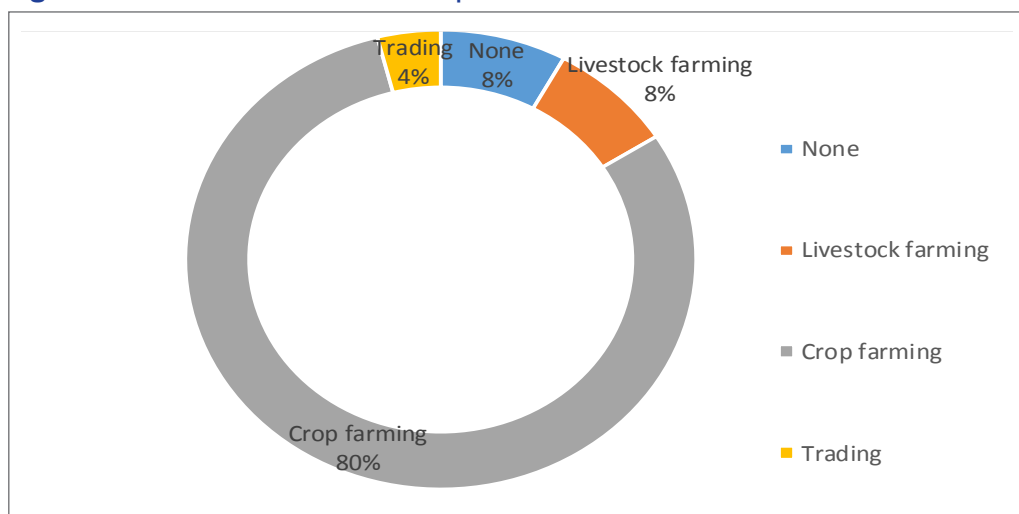
Figure 28: Other sources of income apart from mining.



Source: Questionnaire Results.

In the event that mining activities become subdued or are no longer attractive, 80% of the respondents indicated that they would instead pursue crop farming, while 8% indicated that they would pursue livestock farming (Figure 29).

Figure 29: Alternative livelihoods options.



Source: Questionnaire Results.

4.3.3 Mining skills and training needs

In terms of education, all the respondents interviewed had at least primary school education. About 48% attained only primary education whilst 52% additionally attained secondary education (Table 9).

Table 9: Highest educational qualification attained.

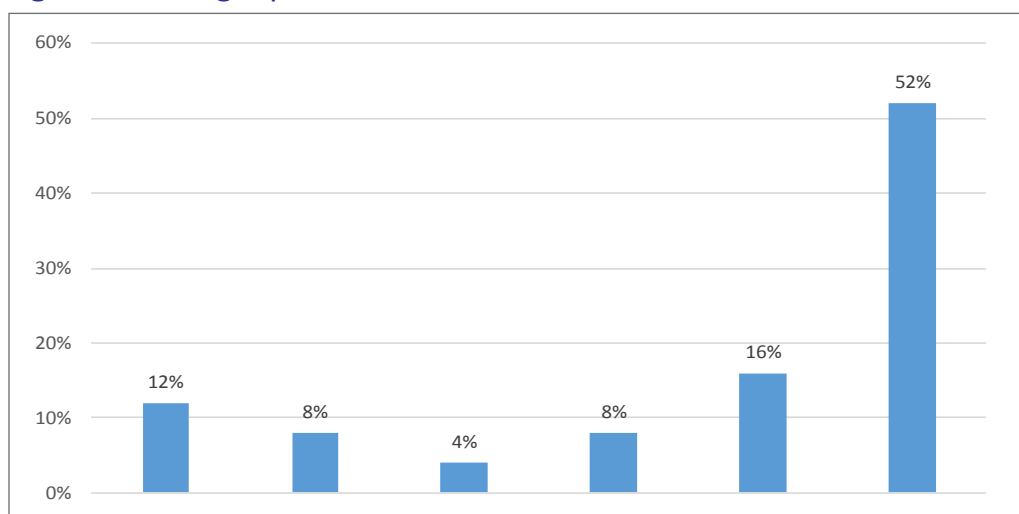
Educational Level	Frequency	Percent
Primary education only	12	48.0
Primary and secondary education	13	52.0
Total	25	100.0

Source: Questionnaire Results.

In terms of mining skills, the majority of the ASM miners indicated that they had acquired informal skills in gemstone identification (52%), mine management (20%) and mining (4%). Forty four percent indicated that they did not have any mining skills.

About 52% of the respondents highlighted that they had more than 15 years' experience in mining, 16% had between 5 and 10 years' experience in mining, and 12% had less than 6 months' experience in mining (Figure 30).

Figure 30: Mining experience.



Source: Questionnaire Results.

In view of these skills gaps, the respondents highlighted that the most popular training courses they would need training assistance would be on; explosives & blasting; health & safety, and rock & mineral identification with the least popular training courses being mine management, mine planning and business development.

4.3.4 The extent to which government support services are reaching ASM

The majority of the respondents (96%) highlighted that they are not receiving any form of assistance or advisory service from the government through the Ministry of Mines and Mining Development, with only one respondent indicating having received assistance in the form of mining inspection advice.

It was also felt that MMCZ is not doing much to ensure that there is market access for gemstone miners. As a result, the artisanal miners sell in the informal markets as they cannot legally sell through formal channels without any registration.

4.3.5 Commodities mined and mining techniques

Many minerals (Figure 31) are mined by small-scale miners in the area study area, including the gemstones tourmaline, cat's eye, amethyst quartz, garnet, aquamarine, as well as commodities such as tantalite and mica. At the time of the study, tantalite and mica mining activities were subdued ostensibly due to lack of demand. From the field survey, aquamarine, mined by 68% of the respondents, and tourmaline, mined by 28% of the respondents, were the most popular commodities.

Figure 31: Example of mineral commodities.



Tourmaline



Aquamarine (blue)

Source: Field Survey.

The miners employ both surface and underground mining (Figure 32) and 24 of them (96 %) undertake hard rock mining and only one person carried out alluvial mining.

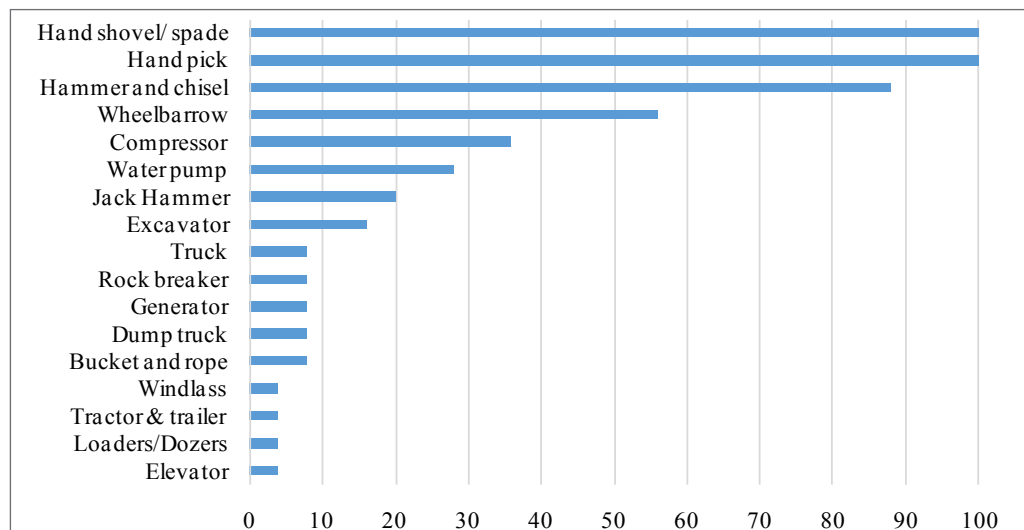
Figure 32: Example of mining method: Inclined shaft mining near Kazangarare Growth Point, Hurungwe District.



Source: Field Survey.

The assortment of tools used by the gemstone miners is shown in Figure 33, the most common being hand shovels, hand picks, and hammers and chisels.

Figure 33: Common tools and equipment used in gemstone mining, Hurugwe District.



Source: Questionnaire Results.

Most miners owned their own hand tools, but motorised equipment was generally leased/hired from third parties.

4.3.5 Market access

The majority of the ASM highlighted that they usually sell their gemstones to individual buyers both licensed and unlicensed, who attend to them either in Karoi town or at their mining sites. About 39.1 % of the ASM miners sell their minerals to licensed buyers and 30.4 % sell to unlicensed buyers, whilst 21.7% sell directly to the Minerals Marketing Corporation of Zimbabwe (MMCZ) (Table 10).

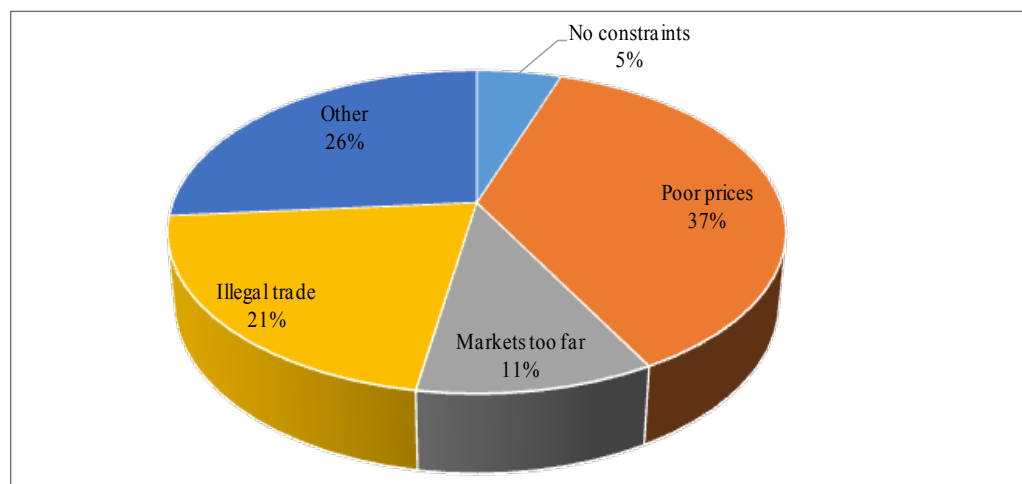
Table 10: Market access.

	Frequency	Percent
Minerals Marketing Corporation of Zimbabwe (MMCZ)	5	21.7
Other licensed buyer	9	39.1
Unlicensed buyer	7	30.5
Other	2	8.7
Total	23	100.0

Source: Questionnaire Results.

In terms of market access constraints, only 5% highlighted that they do not face any challenges whilst 37% of the respondent’s highlighted poor prices, 21% indicated the illegal nature of gemstone trading, since most are unlicensed (Figure 34).

Figure 34: Constraints to market access.



Source: Questionnaire Results.

4.3.6 Access to Finance

Whilst the majority of the ASM miners highlighted that they have never attempted to borrow from banks or other institutions for mining purposes, about 12% highlighted that they have attempted to borrow and had their applications turned down but did not disclose the reasons. This is not surprising since most are not licensed and cannot demonstrate serious commitment to the business to banks.

About 62.5% of the respondents highlighted that no-one holds a mining licence for their mine workings whilst 37.5% of the sites were licensed. While the artisanal miners believe that registration and licensing is necessary, the majority indicated that they are not registered because the licensing regime is expensive and involves too many licences (Table 11).

Table 11: Opinion about small scale licensing and registration.

	Agree
Licenses are expensive	42%
Licenses are not necessary	8%
Licensing system is ok	21%
Required licenses are too many	33%
Charges/fees for small and large scale miners should be different	24%

Source: Questionnaire Results.

4.3.7 Mine management

Since the majority of the ASM activities in the area are undertaken as subsistence and on a part time basis, most of the mines have neither mine managers nor mining committees in place with the exception of only two which were formally operating and registered. This lack of organisational structures make them ill prepared for disease outbreaks. The most common diseases and illnesses reported by the respondents in the field survey were backaches, diarrhoea and muscle pains. These illnesses are mainly related to the nature of their activities, whilst others are related to their operating and surrounding environments (Table 12).

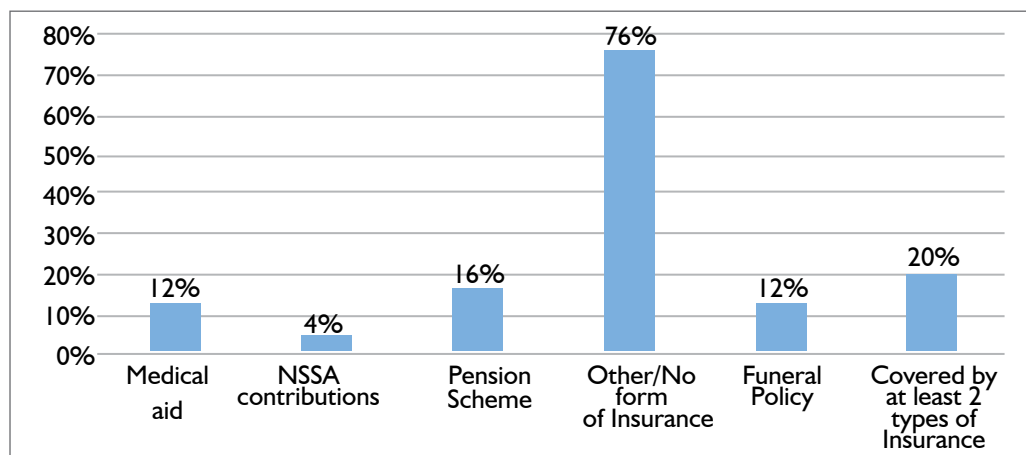
Table 12: Common diseases at mining sites.

	Frequency	Percent
None	9	36.0
Diarrhoea	2	8.0
Backaches	10	40.0
Bone/Muscle pains	2	8.0
Coughs/Flu	1	4.0
Other (e.g. Sexually Transmitted Infections)	1	4.0
Total	25	100.0

Source: Questionnaire Results.

Despite suffering from these diseases and illnesses, the majority of these ASM miners are not covered by any form of social security/insurance, with only 24% indicating that they were covered by at least one formal insurance scheme (Figure 35). However, some of these were covered through other work and not necessarily from the proceeds from the mining activities.

Figure 35: Social/health insurance schemes.



Source: Questionnaire Results.

4.3.8 Women in mining

As already indicated, there is dominance of males in the ASM sector. However, those interviewed highlighted their perspectives about women in mining, which explains their reluctance to involve women. Whilst many felt that women could not handle the hard labour involved, a significant proportion (35%) indicated that it is mostly superstition, where the presence of women in the mines is believed to make the minerals run out (Table 13).

Table 13: Opinion about women in mining.

	Agree
Hardest labour tasks not suitable for women	54.2%
Women should not enter ASM workings as this may cause minerals run out	34.8%
Many women find it difficult to enter some ASM workings	20.8%
Women should be in mining as owners or investors not as workers	16.7%
Women run ASM enterprises better than men	12.5%
Mining is men's work and women should stay away from mining	8.3%
Upstart mining cannot accommodate both sexes; women, women should come on board later	8.3%
Women are more susceptible to robberies than men	8.3%
Women more prone to being cheated	4.2%
Women are more reliable custodians of valuables	-

Source: Questionnaire Results.

4.3.9 Current support to gemstone ASM in Karoi/Hurungwe

Generally, there is not much Government support being provided to gemstone artisanal mining in Karoi and Hurungwe. The respondents were asked about the nature of support that they would need and the following issues were raised:

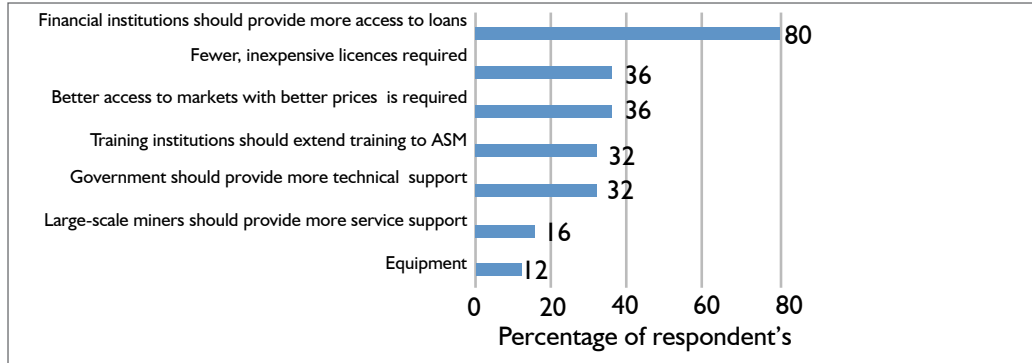
- Shortage of equipment. There is need to assist ASM in accessing loans to buy equipment especially compressors and explosives to increase their productivity;
- Reduce the following fees: mining registration; licensing and regulatory such

as EMA fees. Government should simplify the mining registration process to encourage registration;

- Police interference with mining operations;
- Challenges in selling gemstones to the MMCZ because of lack proper documentation. MMCZ should buy gemstones from miners; provide mobile agents to buy gemstones to avoid selling to unscrupulous dealers who are reaping miners off;
- Need for training in mining related skills;
- Assist with protective clothing;
- Local authorities should maintain roads;

The ASM miners also identified organisations which they believe should play important roles in supporting ASM. These include the ASM associations, large mining companies, local authorities, local leaders, local communities, training institutions, Zimbabwe Republic Police, ZINWA, EMA and ZESA. Some of the ASM miners expectations about these institutions are given in Figure 36.

Figure 36: Important factors in supporting the sustainable growth of small scale mining in Zimbabwe.



Source: Questionnaire Results.

5. KEY INFORMANT INTERVIEWS

Key informant interviews were conducted with a select group of people who were considered to be well informed and knowledgeable about aspects of the ASM sector in Zimbabwe. Their views are summarised below:

Table 14: Main points from key informant interviews in this study.

ORGANISATION	LEGISLATIVE SUPPORT	ENVIRONMENTAL SUPPORT	TECHNICAL SUPPORT	RESOURCES, MARKETS, AND FINANCE
Ministry of Mines and Mining Development (MMMD)	<ul style="list-style-type: none"> Mines and Minerals Act too old. The act was actually designed to promote small-scale mining in the then Rhodesia. 	<ul style="list-style-type: none"> Amendments necessary to differentiate environmental obligations between small and large scale miners. For EMA, ASM only require a dos/don'ts prospectus. Most ASM are registered, compliance is the issue. Environmental issues require teaching, not just policing. EMA fines heavily, miners are scared of EMA. EMA should work hand in hand with Mines ministry. 	<ul style="list-style-type: none"> MMMD requires correctly trained people to offer quality extension services. Basic tools/equipment required for the expanded MMMD. There is need to identify ASM that can be assisted to grow into medium sale mining. 	<ul style="list-style-type: none"> Mining Industry Loan Fund (MILF) undercapitalised. It is worth reviving MILF; it is one of the best ways to fund ASM as it is a revolving fund. Other schemes: SEDCO, micro-finances and banks should assist; impediment is lack of bankable ASM projects.
Zimbabwe Miners Federation (ZMF)	<ul style="list-style-type: none"> Current legislation is against ASM. Law must provide for a tier system of licensing: LSM, MSM, SSM. Zimbabwe needs ASM policy. ASM needs government support to realise full potential. 	<ul style="list-style-type: none"> ZMF negotiates with EIA consultants for favourable EIA fees. ZMF organises environmental workshops for ASM. The Act has no framework for ASM. 	<ul style="list-style-type: none"> ZMF identified equipment suppliers who can make equipment to ASM specifications. These suppliers offer equipment at zero deposit; ASM starts to pay after 4 months. 	<ul style="list-style-type: none"> System of millers is such that ASM leave 60% of their gold at miller. Millers pay less than Fidelity However, prices are good enough to curb illicit trading.
Environmental Management Agency (EMA)	<ul style="list-style-type: none"> Without EIA, your mining is illegal. EMA Act supersedes all other Acts when it comes to environment. There is a proposal to differentiate EMA charges between large-scale and small-scale miners. 	<ul style="list-style-type: none"> EMA does not just police, it educates through road-shows, at Trade Fairs, at agricultural shows, and at the office. Most people are now aware of their environmental obligations. EMA monitors so that miners don't sacrifice environment for short-term benefits. Sometimes trade-offs between enforcement and socio-economic considerations. 		

EIA Consultant				<ul style="list-style-type: none"> • Payments can be staggered to assist clients. • Miners encouraged to order their EIA in groups so that they cut on costs. • Many miners do cat-and-mouse with EMA/ police because they think EIA is expensive – terms can be negotiated.
Ministry of Youth, Indigenisation & Economic Empowerment (Manicaland)	<ul style="list-style-type: none"> • Process of legalisation too lengthy; need a fast track version for youths. • Need affirmative action for youths in the sector. 	<ul style="list-style-type: none"> • Ministry trains youth on environmental issues. 	<ul style="list-style-type: none"> • Ministry teaches youths everything mining so that they stop cat-and-mouse games with law enforcers and provides support to youths. 	<ul style="list-style-type: none"> • Ministry has never been approached to fund mining projects in the province; in any case the threshold is too low to help with mining capital requirements. • Ministry has helped youths in other sectors using the Government Youth Programme being administered by CABS.
Mutare RDC	<ul style="list-style-type: none"> • Act must explicitly state that RDCs are entitled to levies/ royalties. • There are lawsbut no one is enforcing them. • EIA enforcement must be strengthened. 	<ul style="list-style-type: none"> • ASM maraud the environment and give back nothing to the community; there is no incentive keeping them in RDC jurisdiction. • Lots of environmental damage in Mutare River; no one has been taken to account. • ASM want money at any cost. • ASM should rehabilitate as they mine. 		<ul style="list-style-type: none"> • RDC hadhoped to charge royalties/ levies, but MMMD has not supported RDC.
Jeweller	<ul style="list-style-type: none"> • Requires a license to operate legally. • Government should legislatively support rather than arrest Jewellers. • Trading of gold should be made easier. 		<ul style="list-style-type: none"> • Jewellery sector needs equipment/ machinery – smelting, cutting, polishing,. 	<ul style="list-style-type: none"> • Mainly gold jewellery; respondent buys gold from ASM • To get the gold respondent pays more than Fidelity • Buying gold from Fidelity is expensive. • Value added jewellery is 2-3 times the value of gold
Ministry of Small to Medium Scale Enterprises And Cooperative Development	<ul style="list-style-type: none"> • Current laws do not adequately support ASM. 	<ul style="list-style-type: none"> • Provides business development courses to ASM. 	<ul style="list-style-type: none"> • EMA costs too high, these breed illegal miners. 	<ul style="list-style-type: none"> • SEDCO, the Ministry's lending body is currently not capitalised.
National Youth in Mining		<ul style="list-style-type: none"> • EIA consultants expensive to hire. • EMA charges are reasonable. 	<ul style="list-style-type: none"> • Ministry of Mines should assist ASM get equipment. • Decentralize training in mining. 	
Ministry of Mines and Mining Development	<ul style="list-style-type: none"> • No need to amend the MMA, just implement the law. 	<ul style="list-style-type: none"> • EMA should strike a balance between disrupting livelihoods and protecting the environment. 	<ul style="list-style-type: none"> • MMMD currently under-resourced to function optimally 	

6. ASM STUDY TOUR OF MONGOLIA

This study included a study tour to Mongolia to learn from the Mongolian experience of formalising the ASM sector. Mongolia was selected on the basis that it is emerging as one of the world's ASM best practice cases in supporting the growth and formalisation of the ASM sector. The study tour was planned to coincide with that of a visiting delegation from the Tanzanian Ministry of Mines. Tanzania had been initially identified in this research as a best practise case on the African continent. In this regard the research team benefited from the experiences of the two countries that are taking seriously the issue of promoting the growth and formalisation of the ASM sector. It was observed that the two countries have made a strategic policy decision to recognise the potential contribution of the ASM to the national economic development. The ASM sector contributes to the local economy by creating jobs, improving livelihoods, promoting local small-medium enterprises and the development of the rural economy among other benefits.

Thus, the research team was particularly interested in studying how things could be done differently to help grow a more economically, socially and environmentally sustainable ASM sector in Zimbabwe.

6.1 SUMMARY OF PROCEEDINGS IN MONGOLIA

The Mongolian tour consisted of presentations, meetings and site visits which were platforms for discussion and experience-sharing among the Mongolian, Tanzanian and Zimbabwean delegations on ASM issues, challenges and successes in the three countries. A summary of deliberations at these platforms is shown in Table 15.

Table 15: ASM deliberations by Mongolian, Tanzanian and Zimbabwean representatives in Mongolia.

	Activity	Summary	Take-home lessons
Day 1: 17 Aug	<p>Meeting of Zimbabwean and Tanzanian teams with Mongolia's Sustainable Artisanal Mining (SAM) Project team.</p> <p>Zimbabwean and Tanzanian delegations visited Mongolia for the same objective: to learn from the Mongolian experience how governments can better support and manage ASM.</p> <p>The SAM Project summarised their activities in Mongolia, leading to an informative experience exchange discussion.</p>	<p>Mongolia: Informal ASM is a major drawback to the sustainability of the sector. Since 2005, there is a major drive to ASM formalisation in Mongolia, resulting in increased gold deliveries to the Bank of Mongolia, contributing 3.2 tonnes of gold (25% of national output) in 2014.</p> <p>Tanzania still has a major problem of informal ASM activities. The government encourages all ASM miners to belong to associations to facilitate information dissemination and encourage formalisation.</p> <p>In Zimbabwe, ASM operations are increasingly formalising, at least in terms of claims being registered with the Ministry of Mines. There is high awareness that formalisation or registration is the key to security of tenure.</p>	<p>Raising awareness among ASM workers about benefits of formalisation is the key to stamping out illegal ASM operations.</p>
	<p>Mining Rescue Service (MRS) Lecture and Display at Nalaikh</p> <p>The MRS is a well-equipped service that provides safety training to miners, and rescue services.</p>	<p>Mongolia: a well-equipped 24-hour rescue service in place to assist miners in all mining areas of Mongolia.</p> <p>Tanzania & Zimbabwe: On paper there are rescue services but they are ill-equipped and sometimes have to rely on support from large-scale mining companies, who are not always forthcoming.</p>	<p>There is need to dedicate resources to rescue miners in the event of accidents. This should be a priority in this day of 'zero harm' at workplaces.</p>
Day 2: 18 Aug	<p>Meetings with Social Insurance General Office (SIGO).</p>	<p>Mongolia: 800 insurance workers are deployed countrywide to bring herders and ASM workers onto health and social insurance plans. A key step is training/information dissemination among the target groups at mining sites. Very flexible payment plans taking into account seasonality of work are in place.</p> <p>Tanzania: there are 5 voluntary insurance schemes. Some require \$25/ month for 6 months for full membership. Uptake generally low among ASM.</p> <p>Zimbabwe: Mandatory contributions to the National Social Security Authorities by employers, but compliance is a challenge.</p>	<p>Governments should cushion ASM workers by providing affordable and flexible insurance schemes. A major drive must be to net as many ASM people as possible, allowing them to contribute what and when they can afford, but at the same time setting minimum targets for viability.</p>
	<p>Meeting with Provincial Governors:</p>	<p>Mongolia: Local governments started formally collaborating with the ASM sector in 2010, and ASM are encouraged to form cooperatives. Local government, ASM and Large-scale mining (LSM) companies work together to help ameliorate ASM problems of land access. ASM sector now pays taxes to local government and makes donations to assist local communities. They also now contribute significantly to land rehabilitation – 50%.</p> <p>In Zimbabwe and Tanzania, local governments are generally viewed as averse to the ASM sector.</p>	<p>Mutually beneficial relationships can and should be established between local authorities and the ASM sector; the ASM sector is not necessarily a 'nuisance' but is a sector with immense potential to contribute not only to the local economy but the country at large.</p>
	<p>Meeting at the Ministry of Mining, Mongolia</p>	<p>Zimbabwe and Tanzania delegations were given the opportunity to share their expectations before the Mongolian government presentation.</p> <p>Zimbabwean team expected to draw lessons on best practices in supporting ASM from the Mongolian and Tanzanian experiences. This would help in informing policy on how to ensure sustainability of ASM activities and enhance productivity of the sector as well as its contribution to the national economy.</p> <p>Tanzanian delegation was looking for ways to improve ASM productivity; and have created a department specifically for ASM and are formulating friendly ASM policies. Lack of capital, formalisation and transparency are or key hurdles. They also sought to learn from Mongolia and Zimbabwean experiences.</p> <p>Mongolia: Land access is a key issue in Mongolian ASM, though formalisation of the ASM sector has helped ease tensions. There is now clear policy on the minerals sector. Another key area is value-addition – raw exports attract penalties to encourage export of value-added products.</p>	<p>Suggestions in Zimbabwe that mineral rights should not take precedence over surface land rights (as is currently the case) should be critically debated to avoid the Mongolian case where miners have limited access to mining ground as this is occupied by agricultural and other interests.</p>

Meeting with Assay Inspection Department (AID)	<p>Mongolia: AID is in charge of assaying and alloying all Mongolian (and imported) gold before selling to the Bank of Mongolia. Any company or individual can take gold to the AID. They monitor gold returns on a daily basis. AID also conducts gemstone valuation, though no legal framework yet for gemstone marketing.</p> <p>Tanzania: Inspectors take samples throughout mining areas wherever there is gold pouring, but the Bank of Tanzania does not buy any of the gold. Licensed dealers (miners/ buyers) buy from ASM and export at 4% royalty. The government, however, is grappling with smuggling. For gemstones, teams of gemmologists evaluate gemstones at sites spread throughout the country before exports (at4% royalty).</p> <p>Zimbabwe: Only licensed dealers and millers can sell gold to Fidelity Printers, currently the sole ultimate buyer of Zimbabwean gold. It is illegal to possess gold without requisite licencing. Gemstones are supposed to be sold via the Minerals Marketing Corporation of Zimbabwe (MMCZ). There are no gemmologists evaluating gemstones (mainly semi-precious stones) in the field for ASM. Government appears to be concentrating on diamonds only.</p>	<p>To boost voluntary gold deliveries, Zimbabwe may need to allow miners and individuals to sell their gold at Fidelity Printers/ Fidelity agents, and make the cost of requisite licensing affordable.</p> <p>Semi-precious gemstone miners need government support through gemstone evaluators in mining areas. Miners are likely losing out through middlemen who may not take the gems to the MMCZ but smuggle them out of Zimbabwe.</p>
Meeting with Bank of Mongolia (BoM)	<p>Mongolia: BoM accepts all certified gold without asking any questions. Royalties were reduced and now ASM and individuals contribute 6.5Mt (37%) of annual deliveries. Smuggling to China and Russia have also been curtailed. BoM does not buy overseas gold. AID bars are further purified in Switzerland to 99.999% Au for sale to the international market.</p> <p>Tanzania: Tanzania was banned from marketing gold directly to the international market because inadequate assaying in some instances led to impure gold finding its way into the market, in some instances as low as 40% Au. Now the Bank of Tanzania buys its gold only from Switzerland.</p> <p>Zimbabwe: Like Mongolia, the Reserve Bank of Zimbabwe (via Fidelity Printers and Refiners) is the only legal ultimate buyer of Zimbabwean gold. Dealers have to buy from Fidelity, including miners and millers who would have had to sell to Fidelity in the first place.</p>	
Meeting with ASM Gold Value Addition Chain (GIZ and IMRI Team leaders)	<p>The project envisages business skills workshops, mentorship programmes, creating links with studios and designers and branding. Jewellers buy gold illegally from miners.</p> <p>Zimbabwe & Tanzania: very skilled 'underground' jewellers buy gold illegally from miners. In Zimbabwe they cite problems with getting the gold from Fidelity.</p>	<p>The value of gold can be unlocked by loosening laws prohibiting possession of gold and by encouraging open jewellery manufacturing and transfer of jewellery skills.</p>
National Statistical Office (NSO)	<p>NSO collects statistics on artisanal miners in Mongolia and analyses any changes. In 2012 conducted ASM survey to determine sectorial activities and the socio-economic contribution of the ASM sector to the Mongolian Economy. Survey provided geographic data base which provided the foundation for the design and implementation of appropriate strategies for the sector</p>	<p>Government needs to commission comprehensive country wide baseline survey of ASM activities- which captures the extent and socio-economic contribution of ASM activities to the economy. Baseline data from this survey will assist in designing and implementation of formalisation strategies</p>
Meeting with Geological Survey of Mongolia	<p>The Ministry of Mining in Mongolia consist of 5 departments:</p> <ul style="list-style-type: none"> • Minerals Policy and Strategic Department • Policy Implementation and Coordination • Fuel Policy Department • State Administration Department • Internal Audit and Monitoring Department <p>And 2 implementing agencies:</p> <ul style="list-style-type: none"> • Mineral resources Authority which has 6 divisions, including the Geological survey, • Petroleum Authority <p>The Geological Survey is a division within the Mineral Resources Authority and is staffed by 40 people. The main roles of the Survey are to supervise geological mapping (by mapping consultants) and mineral exploration (by mining companies).</p>	<p>Reconfiguration of the Zimbabwe geological survey requires a thorough analysis of how geological surveys operate and determining the best mode for Zimbabwe.</p>
Visit to "mercury-free" gold processing plant.	<p>In Mongolia it is illegal to process gold using chemicals such as mercury and cyanide which has necessitated vigorous research to optimise gold processing through gravitational methods only. Unfortunately this can recover only 75% of the gold and clandestine re-processing of gold with chemicals occurs.</p>	<p>Efficient chemical-free small scale gold processing is currently unavailable. Processes can be mercury free but they need to use cyanide and some Chinese products which are considered 'safer' than mercury.</p>

6.2 MONGOLIA VISIT: CONCLUDING REMARKS

The visit to Mongolia was an eye-opener in terms of the support that governments and their development partners can institute to support artisanal and small scale mining. The Mongolian government recognizes that ASM activities provide vital livelihoods for rural communities engaged in the extraction of gold, coal, fluor spar and other minerals. The Sustainable Artisanal Mining (SAM) Project jointly implemented by the Swiss Agency for Development and Cooperation and the Ministry of Mining, local authorities and the Mongolian ASM National Federation has helped to position the issue of formalisation of the ASM sector high on the policy agenda. The project has improved the livelihoods of more than 60,000 artisanal miners and their dependents⁴. The SAM project focuses on (i) improving the application of a human rights-based approach to community mining; (ii) economically strengthening all stakeholders along the formal gold supply chain; and (iii) creating a global knowledge hub with which to share ASM best practices⁵.

Furthermore, the Government of Mongolia has sought to address the challenges in the ASM sector which include: widespread inequalities, social exclusion and human rights violations. The ASM sector emerged in Mongolia more than a decade ago in response to the nation's economic transition and a series of climatic disasters that fuelled widespread poverty and unemployment. The first ASM legal framework was enacted in July 2010 with support from and advocacy by the SAM Project. From 2011- 2014, thousands of miners worked formally via local ASM organisations and were registered in social and health insurance schemes. In addition, this period saw the emergence of environmental rehabilitation practices, the enforcement of occupational health and safety standards, increased local development contributions, and positive engagement with the sector by government agencies.

The Mongolian experience has demonstrated how formalisation promotes responsible ASM and benefits miners, their communities and the nation at large. ASM formalisation in Mongolia is still work in progress which has seen several government institutions providing services to the sector. For example, there are noticeable improvements in ASM safety and enrolments in social and health insurance schemes. The ASM sector has registered increased contributions to the national treasury through official gold sales. By November 2015, 5.9 tonnes

⁴see www.sam.mn

⁵On 1 September, 2015, a delegation comprising of 8 representatives from the Ministry of Mines of Federal Democratic Republic of Ethiopia arrived in Mongolia to learn from Mongolia's Artisanal and Small-scale Mining (ASM) practice. Between 14-19 September, 2015, Mongolian delegation headed by Minister of Mining of Mongolia, had study tour to Colombia to learn from Colombia's Artisanal and Small-scale Mining (ASM) practice and to share its own.

of ASM gold had been sold to the Bank of Mongolia, representing 46% of all gold sales nationally. This contributed MNT 10.1 billion (about USD\$5 million) to the state budget in royalty taxes from ASM gold⁶.

In this regard, the formalization process in Mongolia is being recognized as an emerging global best practice, which has seen a number of countries visiting to learn from their experience. Furthermore, the ASM community in Mongolia has been awarded with certification for Fairmined Eco Gold⁷. Through the SAM project Mongolia developed mercury-free gold processing plants and two of these plants received official authorisation and are providing environmentally and health-friendly services to ASM communities.

Traditionally, support to the ASM sector in many countries has predominantly been technical, financial and to some extent environmental without paying due attention to social support. The Mongolian ASM support package, in addition to these traditional aspects, incorporates deliberate welfare and health support in the form of targeted social and health insurance schemes⁸. Such support can help improve productivity, improve occupational health and safety and ensure the environment is protected, all this making ASM a sustainable livelihood and economic activity. In this tour a sample of ASM practices in Mongolia, Tanzania and Zimbabwe showed that each country has unique sets of practices although there are some common features. A best practice can be built by studying systems in selected countries and adopting and infusing progressive elements with local strengths. For example, small-scale miners should not just be viewed as deliverers of gold to boost exports and government revenue. They should be considered as an important component of the workforce to whom all workplace benefits including health and social insurance should be extended.

⁶see http://www.sam.mn/news_en.php?title=Regional-conferences-highlight-ASM-contributions-to-national-and-local-development-and-the-challenges-being-faced.

⁷Fairmined is an assurance label that certifies gold from empowered responsible artisanal and small-scale mining organizations. It transforms mining into an active force for good, ensuring social development and environmental protection, providing everyone with a source of gold to be proud of.

⁸In 2014 the Swiss Development Co-operation; School of Public Health in Mongolia and World Health Organisation partnered to carry out a Rapid Assessment Survey of the Health Situation of Artisanal Miners and their families.

7. PROPOSED FRAMEWORK FOR SUPPORTING ASM IN ZIMBABWE

The support that government and development partners are expected to render to the ASM sector revolve around the ASM key issues discussed in Section 3.6. Support systems to address these issues can be categorised into legal support (supportive legislation, acquisitions, legal advice, legalisation/ formalisation of tenure etc.), technical support (geological, mining, and metallurgical advice and equipment), business development support (finance, business management courses), environmental support (environmental awareness and compliance) and social support (social and health insurance). An appropriate, mutually beneficial and environmentally and economically sustainable ASM regime for Zimbabwe can be coined by identifying and marrying Zimbabwe's key ASM strengths with those from selected jurisdictions. Such a regime can then constitute the 'best ASM practices for supporting ASM in Zimbabwe'.

7.1 STRENGTHS IN ZIMBABWE'S ASM PRACTICES

Zimbabwe has scored major successes in its ASM practices, especially in the first fifteen years of independence (1980-1995), making the country an historical international role model in the ASM industry. Appropriate interventions and support systems to Zimbabwe's ASM sector by the government and its development partners played a key role in the attainment by Zimbabwe of the ASM model status. Some of the most envied elements of this success story are the Shamva Mining Centre established in 1989 and the Mining Industry Loan Fund instituted in the 1990s, and ASM formalisation policies of the 1990s. Mining industry experts interviewed in this study indicate that Zimbabwe's ASM sector is at least 80% formalised, although achieving this required more than just the much hailed 1990's policies, but stern implementation of reforms by the state (Spiegel 2015).

Dreschler (2002) chronicles these tenets of Zimbabwe's historical ASM success story, as summarized below.

The 1945 ex-servicemen scheme trained returning world-war soldiers in mining at what later became the Zimbabwe School of Mines to enable them to start their own mining operations and reopen those operations closed during the

Second World War. Armed with the training and soft loans from the government, 221 beneficiaries managed to open or re-open 279 mines (Viewing 1984). By its nature this scheme benefited mainly while males to the exclusion of indigenous people and all women, but the scheme has been hailed as a success.

Zimbabwe's first decade of independence from 1980 to 1990 witnessed the opening up of ASM opportunities to all Zimbabweans, with the government facilitating the registration of claims, mainly of gold and gemstones, at a nominal fee. This facilitation was backed up by a number of supporting schemes:

» **The Mining Industry Loan Fund (MILF), which comprised:**

- Plant hire scheme: Small scale miners, upon presenting acceptable mining proposals, were offered mining and metallurgical equipment for hire over a period of one to three years.
- Mining and mineral beneficiation loans: Low-interest loans were offered to successful ASM applicants for the purchase of mines, development of mines or for setting up mineral beneficiation plants. Mine purchase loans were repayable over five years at 9% interest per annum. Mine development loans could be written off if through the work, no workable ore was found. The loans were therefore not strictly mine development loans; they covered exploratory work also. Mineral beneficiation loans included six months of operating costs.
- Emergency loans: These were administered by the District Mining Advisory Board to assist successful ASM applicants in out-of-hand emergencies and were repayable within one year.

The MILF was heralded as a model for integrating sector-specific training and service delivery to miners (PACT 2014; Spiegel 2015) and to date some mining professionals interviewed in this study believe resuscitation of the MILF would go a long way in growing a sustainable ASM sector in Zimbabwe.

- Government technical support: The Zimbabwe Government provided mining extension services to the ASM sector through the Ministry of Mines and Mining Development departments (Zimbabwe Geological Survey, Metallurgy Department and Chief Government Mining Engineer) and the Zimbabwe Mining Development Corporation (ZMDC).
- Partnerships between the Government of Zimbabwe and its development partners, mainly non-governmental organizations

(NGOs). Involvement of NGOs in the Mining sector flourished in the mid-1990s following the 1993 conference on small-medium scale mining sponsored by the United Nations. Dreschler (2002) lists the NGOs that have supported Zimbabwe's ASM sector:

- Intermediate Technology Development Group (ITDG): ITDG began providing technical and financial support to Zimbabwe's ASM sector before the 1993 UN-sponsored Harare ASM conference. ITDG's major accomplishment was its partnership with the Government of Zimbabwe, the Small Scale Miners' Association of Zimbabwe and development partners (GTZ, EU and DFID) to establish the Shamva Mining Centre in 1989. The Shamva Mining Centre was a training and custom milling facility whose catchment grew to a radius of more than 200km. Success of the centre encouraged its replication in countries such as Burkina Faso, Mali, and Tanzania with funding from international agencies such as the World Bank (Dreschler 2002).
- GTZ: provided funding for the Riverbed Mining Project executed in Insiza District in partnership with the University of Zimbabwe's Mining Engineering Department.
- AFSM (Austria): provided loan funding mainly to chrome mining cooperatives on the Great Dyke. The facility was later extended to the gold sector.
- SNV: a Netherlands NGO initiated a project to assist the ASM players in Inziza/ Umzingwane districts grow vibrant and sustainable ASM sector.
- EU Micro Projects: has provided funding to the ASM sector, including contributing funds to the establishment of the Shamva Mining Centre.
- Comic Relief: funded the establishment of the National Miners Association of Zimbabwe
- TDH: contributed funds for the establishment of the Shamva Mining School at the Shamva Mining Centre.
- That Zimbabwe's ASM sector is to a large extent (+80%) formalised as indicated by mining industry professionals interviewed during this study is a significant achievement in the promotion of the ASM activities. Zimbabwe's ASM sector is almost entirely formalised in the sense that most ASM workers have registered claims or are employed to work on registered claims. Formalised miners have increased access to state services and have a higher level of social participation than informal miners. A government order to stop illegal mining which was implemented by the police in 2006-2007 contributed to the formalisation of the ASM sector in Zimbabwe (Spiegel 2015; PACT 2014), although more miner-friendly policies had been initiated

in the 1990s (PACT 2014, Spiegel 2015). Illegal ASM activities and informal miners adversely affect the public perception and reputation of ASM. Best practices show that active cooperation between local governments and ASM communities is crucial in developing responsible and productive mining.

7.2 ASM SUPPORT STRENGTHS OF OTHER JURISDICTIONS

Zimbabwe's ASM sector is currently not at its best, hence the need to resuscitate and support the sector. The sector's past glory, which peaked in the 1990's can be rekindled, but even with that, there is still need to be innovative and to learn from other countries' experiences in order to compose a contemporary best practice to guide the sector. If the Shamva Mining Centre and the MILF are the signatures of Zimbabwe's past success in the ASM sector, then the country's strengths in the sector can be said to have been concentrated in the technical and to some extent, resource mobilisation areas which alone are not enough. Key ASM aspects that Zimbabwe can learn from other countries, most of which can be achieved legislatively are listed below.

7.2.1 Delineation of ASM areas

One common characterisation of ASM is that they exploit marginal or small deposits (MMSD 2001). At Zimbabwe's exploration activity peak in the 1990's, about 80% of the country was covered by Exclusive Prospecting Orders (EPOs), coffering large-scale companies with exclusive exploration rights over vast tracts of land. This excluded ASM from rich mineral belts and left only small, marginal areas for ASM activities (Dreschler 2002; Spiegel 2015). Zimbabwe can learn from countries such as Ghana and Tanzania where some prime areas are reserved for ASM activities to the exclusion of large-scale operators.

7.2.2 Relaxation of Gold Trade Act

Around the year 2000, 90% of ASM activity in Zimbabwe was centred on gold (Dreschler 2002), and today gold is still likely to be by far the most-sought out commodity in Zimbabwe's ASM sector. Zimbabwe's Gold Trade Act stipulates that the Reserve Bank of Zimbabwe, through Fidelity Printers and Refineries, is the sole buyer of gold, and only registered persons or entities can sell their gold to Fidelity. This is rather restrictive and can potentially fuel illicit trade although the government has tried to decentralise the buying points by accrediting registered

millers as Fidelity agents, and by designating certain posts such as banks as Fidelity agents. A discussion in Mongolia among Zimbabwean, Tanzanian and Mongolian delegates in August 2014 (section 6) showed that in order of restrictiveness in gold trading, the three countries can be ranked (from most to least restrictive) as:

- Zimbabwe: Fidelity is the sole buyer of gold in Zimbabwe and only registered miners or millers can sell gold to Fidelity, under a license.
- Mongolia: The Bank of Mongolia is the ultimate buyer of gold but anyone can sell any amount of gold to the bank without any questions asked.
- Tanzania: The Bank of Tanzania does not buy gold; miners or licensed buyers export gold at 4% royalty.

7.2.3 Time-limited mining and exploration titles

Time limits placed under Mali's current Mining Code, as summarised by Norton Rose Fullbright (2015) are as follows: An exploration authorisation can no longer be renewed and will no longer provide its holder with a priority right to apply for a research/ feasibility permit. With respect to the exploration permit, the length of each renewal period has been reduced from 3 years to 2 years. The holder of the exploitation permit is now required to begin exploitation within 3 years of the issuance of the permit.

There are many mining tenements in Zimbabwe that have not been meaningfully explored or exploited for several decades but remain under the same owners who can renew them as many times as they want upon payment of a prescribed fee under the current law. Zimbabwean authorities have of late pronounced themselves against mining rights granted 'in perpetuity'. This has become so important that this issue has been an item in the 2016 National Budget Statement: "The amendments to the Mines and Minerals Act primarily aim at providing mining title for a specified period, and require holders of mining titles/rights to work their claims within a specified period, that way enforcing the use-it or lose-it principle" (Government of Zimbabwe 2016: 81). Mali offers a model that can be adapted for the Zimbabwean system to ensure that large-scale and small-scale mining or exploration companies or individuals do not hold ground speculatively. However, caution needs to be exercised in enforcing the time limiting regime. Mining is generally a long-term project, and mining firms need to ensure that they have other areas to mine in the event that the ores become depleted. Thus, the unmined claims would in this case serve as reserves, which would also allow

long-term planning for the mine. Cases where mines close after the resources get depleted generally point to situations where the owners fail to plan ahead by continuing to explore other mining sites. Thus, there is need to balance between security of tenure and time limiting regime as this could scuttle investment in the sector.

7.2.4 Health and social insurance schemes for the ASM sector

The ASM sector is said to be, among other criteria, characterised by low standards of safety and health (MMSD 2002). If this is so, then it is this sector that needs health and social insurance more than any other. In Zimbabwe it is mandatory for employees and employers to contribute social security insurance of employees, but the national compliance rate was only 56% in 2014. Medical insurance is generally the responsibility of individuals although many employers make contributions to the medical insurance of their employees. In the ASM case study surveys in this research the uptake of formal medical or social insurance among participants was low, 44% in the Midlands Province and 24% in Mashonaland West Province.

In Mongolia the government, through the Social Insurance General Office, has dispatched teams to the countryside to educate herders and small scale miners about the importance of social security and encourage them to take up insurance cover on flexible and affordable terms.

7.2.5 Mine rescue service

The Mongolian Government has a well-equipped 24-hour rapid response mine rescue service to assist miners in the wake of accidents in all of its mining areas. The service also provides safety and mine rescue training to the ASM sector. In Zimbabwe the government currently has no operational mine rescue service and relies on support from large-scale mines and the police. There are therefore bound to be costly delays in emergency situations. Ideally every mining province in Zimbabwe should have at least one mine rescue team. The rescue service needs not necessarily be a government unit; in South Africa the mine rescue service is a non-profit organisation that was previously part of the Chamber of Mines.

7.2.6 Gemstone evaluation and marketing

Only one out of the 27 gemstone miners interviewed in Mashonaland West during this study had at one time encountered government officials in the field. This would suggest a neglect of the non-diamond gemstone sector by the government. In deliberations in Mongolia, Tanzanian representatives indicated that all gemstone mining sites in Tanzania are serviced by gemmologists, gemstone valuers and monitors to assist miners in pricing and marketing their gems. The Minerals Marketing Corporation of Zimbabwe (MMCZ), the exclusive agent for selling and marketing all minerals in Zimbabwe except gold, diamond and silver, had no agents and valuers in non-diamond gemstone mining areas of Zimbabwe at the time of the survey.

7.2.7 More incentives, less coercion

In October 2014, the Government of Zimbabwe reduced the royalty on gold deliveries to Fidelity Printers from 7% to 5% (large scale miners) and 7% to 3% (small-scale miners) and on September 15 from 3% to 1% (small-scale miners). According to GoZ(2015: 75), because of this, 'deliveries to Fidelity from both informal, small and large scale producers are up, with notable contribution towards the economy's export earnings' and, in particular, 'gold deliveries from small scale miners to Fidelity, which were only 1.7 tonnes in 2013, registered 5.9 tonnes for the period January to October 2015'. These incentives were however accompanied by a gold mobilisation operation, during which the police, officials from the Ministry of Finance, Fidelity Printers and Refineries and others manned gold milling plants countrywide to ensure that all gold produced was channelled to Fidelity. While these gold mobilisation operations generated results, questions may be raised in terms of cost effectiveness and sustainability of these operations which may be viewed as coercive. In this regard, there is need to explore other cheaper but incentive-compatible approaches to promote gold deliveries.

7.3 BEST PRACTICES FOR SUPPORTING ASM IN ZIMBABWE

In the 1990s, Zimbabwe was a globally recognised model for addressing real issues of small scale miners through the provision of gold processing technology through the Shamva Mining Centre, and for setting up the Mining Industry Loan Fund which leased equipment to miners and provided loans for mining capital and operating costs. However, a best practice ASM support package must include not just the technical, but also sustainable legislative, environmental, social and business support. Thus, building on Zimbabwe's historical strengths in the ASM sector, and ASM strengths in other countries as reviewed above, an ideal ASM regime for Zimbabwe would have the following elements:

» Technical support to the ASM sector:

- Well-equipped mining service centres, improving on the iconic Shamva Mining Centre. There has been a proliferation of gold milling sites since about the year 2000 at the instigation of the Reserve Bank of Zimbabwe. Many of these are now Fidelity agents but have not evolved to become centres where miners, in addition to milling gold, attend training sessions and share ideas. These centres can be established through partnerships between investors, government and the miners.
- Enhancing government technical support to the ASM sector: Technical departments of the Ministry of Mines and Mining Development (Geological Survey, Mining Engineering, and Metallurgy) are resourcing and decentralising thus getting closer to the miners. Apart from working directly with miners, these departments can also offer their services through the proposed mining centres. There is real need for capacity building in these departments.
- University Mining and Metallurgy Departments: Research and Development are key to the success of any sector. A workable framework is required to rope in university and polytechnic mining departments in providing research and development support to the government, miners and mining centres. What new technologies can be deployed to more efficiently recover minerals? What innovative mining tools/ equipment can be designed locally for the benefit of miners?
- Equipment: Equipment hire schemes, such as one component of the Mining Industry Loan Fund should be considered. The Zimbabwe Miners' Federation has entered into some terms with equipment suppliers for the hire or purchase of mining or mineral processing equipment by the ASM sector. Again, can local engineers, including those at universities help design

appropriate ASM equipment?

- Capacity-building activities for ASM sector can also be hosted through existing vocational training institutions across the country and other educational institutions.
- Based on a growing interest in exploring alternative sources of income and business opportunities among artisanal and small-scale miners, ASM communities need vocational training on different skills and professions, business development services, and financial and investment support.

» Developing workable financial support schemes and marketing arrangements

- Zimbabwe's Mining Industry Loan Fund, a revolving fund to assist miners was a model in its days, but such a model on its own is not enough. Around the year 2000, the annual allocation to the Fund was enough only to capitalize four mines (Dreschler 2002).
- Conditions should be created to encourage banks and micro-finance institutions to invest in ASM. A major challenge is lack of collateral, which goes back to technical support because collateral in mining is usually bankability of the project. It becomes a cycle: to assess project bankability via feasibility studies requires capital injections. Innovative ways of assessing small-scale mining projects to the satisfaction of potential investors are required. A basic assessment not the strict international stock exchange resource reporting requirements, should suffice.
- ASM's contribution to economic development is not reaching its full potential due to a lack of information about the market value of minerals and an inadequate trade chain that is resulting in a low evaluation of ASM labour.

» Legislative support to the ASM sector, for example the following:

- Designate some prime mining areas for mining and mineral exploration exclusively for the ASM sector.
- Impose time limits on mining title to curb speculative land-holding.
- Simplify licensing procedures for the ASM sector. Minimise the number of licenses required.

» Formalisation

In the broadest sense any ASM entity that is registered is formal. In Zimbabwe, practicing ASM without requisite registration is illegal. Thus in 2006-2007 there was a massive blitz on illegal mining activities in the country. Some in the mining industry suggest that at present the ASM sector in Zimbabwe is at least 80% formalised, with the informal artisanal workers being mainly those who stealthily encroach on other people's properties. However, there is still need to encourage those working illegally to register. Legislative support to simplify the procedure and minimise requirements, as stated above is instrumental in this regard.

» Support in health, safety and environment

- Mine Rescue Service: An official rescue service decentralised to all mining provinces should be considered.
- Small-scale miners sometimes use substances that harm the environment and themselves. Innovative, harmless and effective mineral processing technologies, such as mercury-free gold processing technologies should be introduced to miners for the benefit of their health and that of the environment.
- The Environmental Management Agency (EMA) should redouble its environmental training to miners. EMA itself should work with the technical departments of the Ministry of Mines and Mining Development in handling ASM environmental issues and come up with sound mitigation plans/strategies.

» Social support

Access to health and social insurance: Many small scale miners have no health or social insurance cover of any kind. There is need to encourage them to join affordable insurance schemes, or to create new insurance products that suit the ASM sector. The Mongolian outreach programme targeting herders and ASM workers can be emulated.

8. CONCLUSIONS

The growing awareness of the importance of the ASM sector as both an economic activity and a livelihood strategy has led to voluminous research on the topic in the past three decades. Although initially treated with disdain⁹, many governments in developing countries, particularly in Africa are increasingly appreciating the contribution of the ASM sector to gold production and therefore economic growth in their countries. There is therefore need for governments, development partners and financial institutions to support this sector. In general, small-scale mining issues are similar everywhere, characterised as they are by what have been termed traditional ASM issues. The path that a country needs to follow towards ASM best practice depends on its unique circumstances and how divergent it currently is from best practice. Zimbabwe has been among the international best in terms of innovative technical and financial support to the ASM sector. However, the three case studies of three different ASM commodity areas, the review of literature, and comparative assessment against other countries, show that Zimbabwe currently needs to retrace and improve its strategies in the sector to regain its former glory among the ASM best cases. The country has mainly lacked on the 'social and welfare' side of ASM. The framework for technical support exists in the country and can further be developed, but that framework is currently under-resourced. The Mines and Minerals Act needs to be revised or amended to specifically address ASM issues, such as ASM access to mineralised ground, simplification of licensing procedures and improved prices/ flexibility in minerals marketing. The elaboration of the legal and regulatory framework for ASM needs to take into consideration the different types of minerals being mined and the specificities of different regions and mining operations. If these and other issues can be addressed, the country has inched closer to the ASM best practice extolled above.

⁹Public awareness campaigns highlighting ASM contributions to social and economic development is needed to improve the public's perception of the sector.

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