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Artisanal and Small-Scale Mining (ASM) in Ghana - Creating Value or Destroying Value: The Search for a Way Forward

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About the series:

The United Nations University-Institute for Natural Resources in Africa in collaboration with the University of Warwick's Centre for the Study of Globalization and Regionalization, University of Leiden-African Studies Centre, Universidade Eduardo Mondlane and University of Ottawa's Centre on Governance undertook a joint United Nations Economic Commission for Africa funded project on "Engaging the Private Sector for Inclusive Extractive Industries and Sustainable Value Chains in Africa." The project was carried out through the study and analysis of four country case studies: Ghana, Tanzania, Zambia and Mozambique. The two-year study examined and prioritized backward linkages in Africa's mineral extraction and natural resources sectors, contributing to on-going efforts at answering the central problematic of how to leverage the latter industries to support, encourage, facilitate, and drive broad-based and sustainable economic growth and development, both transitionally and in key case study states.

Abstract

In Ghana, ASM continues to be an important source of livelihood for many people. However, ASM has many externalities that come with it. Traditionally ASM was a way to diversify livelihood, as farming was the mainstay activity. In this complementary role, the externalities of ASM could be controlled. This was because the farmer-miner could weigh the benefits and payoff and choose an optimal level of ASM activity that provides the resources to invest in agriculture without destroying the basis of this other important livelihood. However, in recent times, ASM has attracted new players who are not connected to the land and who are indeed itinerant. Thus, the checks and balances have gone with the new dynamic. Now the beneficiary of ASM and the one who bears the externalities are different.

Artisanal and small-scale mining (ASM) activities are now threatening the very basis of sustainability through wanton environmental destruction. Yet ASM still holds the promise of driving rural and economic transformation in general. Significant inflows are generated from ASM activities and if they are redirected to rural areas they can help to boost consumption and also provide the investment resources to support transformation. For this to happen there is a need to rethink the governance of the ASM sector and how it is organised and incentivised. Its governance needs to be fully decentralised and transferred to traditional authorities who managed it in the past. Policy should be directed towards helping flows from the sector boost rural consumption and transformation, rather than towards collecting taxes and royalties for the central government.

I. Introduction

Artisanal gold mining has a long history in Ghana and the colonial name of Ghana was 'The Gold Coast'. Between 1493 and 1600, Ghana was the largest producer of gold in the world, accounting for about 36 per cent of the world output, an enviable feat achieved with the support of a vibrant gold sector¹ (GOG 2014). This underscores the prowess of the sector and the special place that gold has played in Ghana. This is also visible in the resplendent displays of traditional kings who are richly adorned in gold. Therefore, it is more than a just a livelihood but part of the culture². Thus, artisanal gold mining and goldsmithing have a special place in Ghana.

The term 'artisanal and small-scale mining' (ASM) is generally distinguished from large-scale mining (LSM) or formal mining by its relatively low levels of capital investment, mechanisation/technology and production/recovery of minerals; a high degree of labour intensity; the exploitation of marginal deposits; informality and a haphazard nature; and poor occupational health, safety and environmental safeguards (Lahiri-Dutt, 2004). Mining activities classified as ASM span a continuum. It ranges from loosely organised manual activities like panning gold in abandoned mines (tailings), generally referred to as 'artisanal', to organised operations using machinery such as excavators and drilling machines at the other end of the spectrum, generally referred to as 'small-scale' (Buxton, 2013). Artisanal and small-scale mining activity can also be temporary as it sometimes complements other livelihoods, and this is done when the agricultural season is over, whereas LSM tends to be more permanent.

McQuilken and Hilson (2016) define artisanal and small-scale mining (ASM) as a collective term referring to low-tech, labour-intensive mineral processing and extraction. The International Council on Mining and Metals (ICMM 2009) has classified ASM into five categories³: Traditional – Artisanal and small-scale mining that has occurred for generations in a given area and may form part of traditional livelihoods; Seasonal – Artisanal and small-scale mining that complements other seasonal livelihoods, such as agriculture or the rearing of livestock; Permanent Co-habitation – Artisanal and small-scale mining that takes place in areas connected with large- or medium-scale mining, such as miners working in abandoned areas, in tailings dams, or downstream of the larger operations; Shock – When unexpected events, such as drought, economic collapse, commodity price fluctuations, conflict, retrenchment from mining parastatals, and unexpected commercial mine closure drive individuals into ASM; Influx – The opportunistic in-migration or an influx of ASM miners to an area where minerals have been discovered.

In Ghana, the term is used almost exclusively to refer to licensed operations based on a concession not exceeding 25 acres, along with several other pre-qualifications legislated by the Minerals and Mining Act, 2006 (Act 703). This requires that a small-scale mining license applicant must be a citizen of Ghana and must be at least 18 years old. The duration of a small-scale mining license is five years and renewable upon satisfactory performance during the first term (Minerals Commission 2015). Note that artisanal and small-scale mining (ASM) is subsumed under small-scale mining (SSM). Therefore, even though Act 703 refers to small-scale mining, this includes the artisanal operators (Minerals Commission, 2015).

Artisanal and small-scale mining activities in Ghana are regulated by the Minerals Commission of Ghana which serves as a technical adviser to the Minister for Lands and Natural Resources. Beyond regulating the activities of ASM, the Minerals Commission also provides support to ASM. As of 2018, the Commission has seven district offices covering ASM activities in Ghana. Other state institutions regulating ASM activities include the Environmental Protection Agency, the Forestry Commission, the Water Resources Commission,

¹Note that at this time gold was produced by local miners using traditional mining techniques that will in today's terminology be referred to as artisanal and small-scale Mining (ASM).

²Thomas Bowdich, a British envoy, was one of the first Europeans to venture into the interior of Africa's fabled Gold Coast, in 1817. Bowdich was stunned to behold a local chieftain encrusted in glittering gold jewellery. 'One wrist is so heavily laden with gold,' he wrote, 'that it is supported on the head of a small boy.' For centuries among the Akan people of southern Ghana, kings and their retinues have proclaimed their status in spirited public festivals, where they parade with dazzling gold regalia: necklaces, rings, bracelets, amulets, even gilded muskets and gilded finials for umbrellas.

Read more: <http://www.smithsonianmag.com/arts-culture/west-african-gold-out-of-the-ordinary-109183799/#Cpx5lzfYw56GAR3.99>

³They point out that these categories are by no means mutually exclusive, and a combination of these categories will generally be found in any given ASM location.

the Geological Survey Department and the Lands Commission. The key documents regulating the sector are the Mining and Minerals Act of 2006 and the Ghana ASM Policy framework.

Artisanal and small-scale mining is an important commercial activity in Ghana. Indeed, ASM is crucial to rural livelihoods. Hilson et al (2013) point out that ASM provides hope for the inhabitants of the poverty-stricken northern regions of Ghana. According to the study, considerable wealth has been injected into rural northern localities, helping to stabilise and alleviate the poverty of tens of thousands of hitherto farm-dependent families. However, ASM activities come with significant externalities that are borne by others. For instance, farmers bear the brunt of environmental degradation wrought by ASM including the diversion of rivers and mercury contamination. This will be discussed later.

This paper seeks to explore the ASM landscape in Ghana with the aim of providing policy approaches to make it a driver of sustainable rural development. Section II looks at ASM and the economy, section III looks at the challenges of ASM, section IV looks at emerging developments in Ghana's ASM landscape, section V explores potential pathways for ASM to support sustainable development, section VI looks at actions needed to re-orient and upgrade ASM, while section VII concludes.

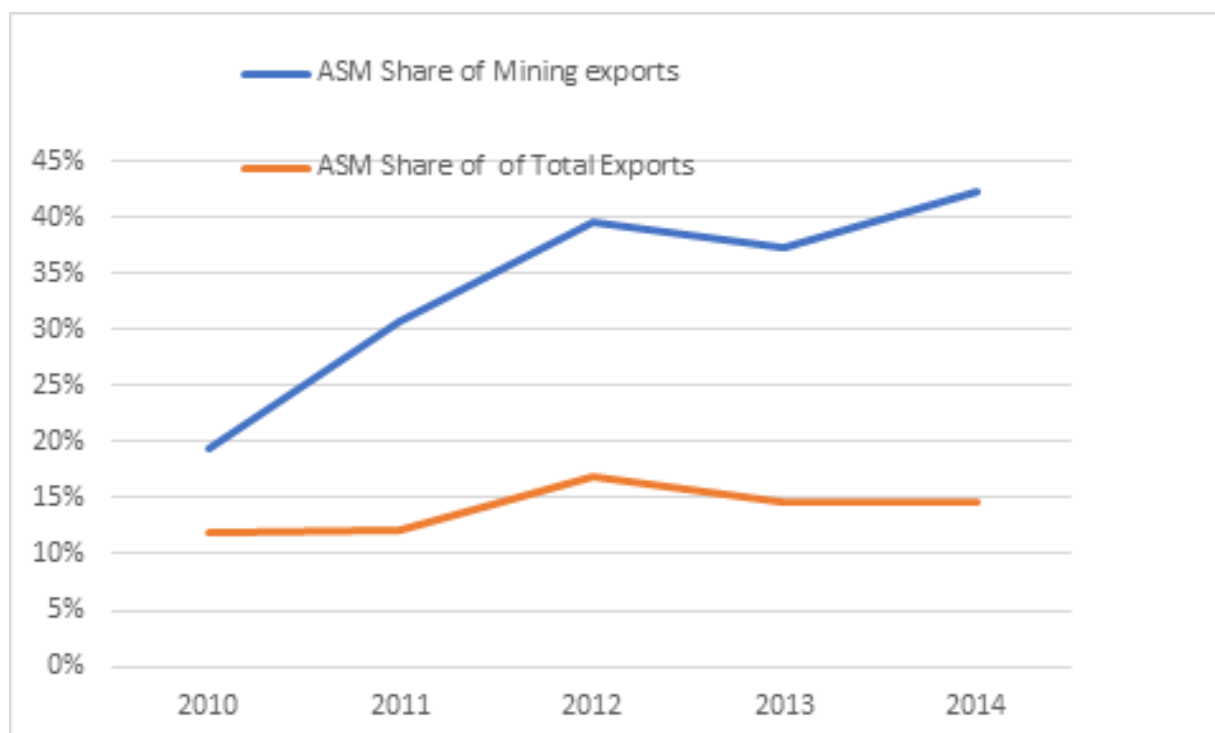


<https://africanminingbrief.com/lifting-the-lid-on-ghanas-illegal-small-scale-mining-problem/>

II. Artisanal Mining and the Economy

As pointed out, ASM is an important source of livelihoods, especially for rural economies. However, the difficulty of defining ASM and the informal nature of the activity as well as the seasonal nature (in some cases) makes it hard to measure the size of the sector (in Ghana and also globally) and thus measure its impact. Figures vary dramatically depending on the definition and the minerals considered. Many estimates primarily focus on precious metals and minerals, leaving aside industrial commodities such as coal, stones and sand.

Fig 1: Artisanal and Small-Scale Mining Share of Exports, Ghana



Source: GHEITI 2014

Though formal gold mining is now dominating the gold mining sector in Ghana, a significant part of gold output comes from ASM. The sector's contribution to the national gold production has increased steadily from 2.2 per cent in 1989 to about 34 per cent in 2014 (Ghana Chamber of Mines, 2014). Therefore, the contribution to the economy is significant. The artisanal and small-scale mining sectors contributed as much as 40 per cent of Ghana's total mineral exports and 10 per cent of the total exports underscoring its crucial role in Ghana's economy (see fig. 1)⁴. Given the fact that mining contributes about 6 per cent of the gross domestic product (GDP), a reasonable estimate of ASM contribution to the GDP is 2 per cent. The contribution of ASM to employment dwarfs that of the formal sector as a whole. While about 27,000 are employed in the formal sector, estimates indicate that there are over 1 million people in the ASM sector (Minerals Commission, 2015). Close to 4.4 million people in Ghana are also dependents of these people (Hilson and McQuilken (2014).

Many local stakeholders and the academic literature recognise the significant and positive contribution of ASM activities towards community development in Ghana. These include the financing of the building of schools, clinics, houses and local infrastructure; providing regular employment; and invigorating farming, associated service industries and local markets (McQuilken and Hilson 2016). Indeed, the Africa Mining Vision (AMV) points to the 'the potential of ASM to improve rural livelihoods, to stimulate entrepreneurship in a socially-responsible manner, and to promote local and integrated national development as well as regional cooperation (ECA, 2011).

⁴This equalled the total contribution of three large multinational companies. AngloGold contributed 6 per cent, Newmont had 13 per cent and Goldfields Tarkwa 15 per cent (Chamber of Mines, 2014).

Ghana's development plans recognise the important role that the ASM sector plays. The Ghana National Development Plan, the 'Ghana Shared Growth and Development Agenda', seeks to improve the technical capacity of small-scale miners to enhance the efficiency and sustainability in their operations (NDPC 2014)⁵.

III. The Challenges of ASM

While ASM is a key employer and many people depend on it for their livelihood, ASM is plagued by many challenges. There are significant externalities that emanate from ASM activities and these are borne by other people not necessarily connected with ASM. This brings to the fore the question of whether it is creating or destroying value. The sector is also changing rapidly, making the slow-changing regulatory regimes unable to shape its development. Some of the key challenges are discussed below:

a) The Changing Nature of ASM

The artisanal mining sector, characterised by small hand tools (simple mining instruments like spades, pickaxes and chisels), is shrinking as the sector is becoming more mechanised, taking on the characteristics of small-scale mining. This is because the sector attracts investors⁶ from the cities and beyond who can raise the capital due to high gold prices. The mining law of Ghana (GoG 2006) governs both the LSM and the ASM mining sectors. With regard to ASM, the law refers to small-scale mining as any miner having a concession of less than 25 acres. However, in practice the regulation has focused on the artisanal mining end of ASM. Therefore, the increasingly capitalised and networked ASM sector that has links stretching from mine sites to national capitals and even global centres presents a very different regulatory challenge than the one envisaged in the laws and regulations.

b) The Threat to Agriculture

Historically ASM has complimented agriculture, which has been the mainstay of rural livelihoods. Artisanal and small-scale mining is largely being used as a risk diversification strategy, mainly to complement agriculture (ACET, 2017). Resources from ASM were invested to improve agriculture through increased access to inputs and thus higher yields and a higher income. This has in turn enabled them to secure high quality education for their children (Hilson and Garforth 2013). However, the relationship has changed. Between 2003 and 2012 the price of an ounce of gold went up from US\$621.8 an ounce to US\$1678.82 an ounce (GHEITI, 2014). The rise in price has changed the economics of ASM vis-à-vis farming. For instance, Yeboah (2014) points out that a cocoa farmer and miner indicated that he earns US\$3,600 a year from ASM compared to roughly US\$340 that he gets from cocoa. Though the revenues from mining are not regular (depending on several factors including the price of gold on the international market and the ability to explore new mining concessions which demand sophisticated machines), ASM is way more profitable than farming and worth the higher risk. Therefore, rather than agriculture experiencing an increased output due to increased investment resulting from increased inflows from ASM, the converse has happened. Resources meant for farming are now being invested in ASM activities with expectations of higher returns. Landowners have also opted to sell their agricultural land for the purposes of ASM (ACET 2017).

The ASM sector is also very attractive to many people, especially the poor, since it promises to yield much better returns than agriculture. As a result, farmers, the youth and even children are increasingly resorting to ASM depriving farming of labour. The productivity of agriculture is also being negatively affected by mining activity through environmental degradation caused by ASM activities. Aragon and Rud (2016) find that between 1997 and 2005, farmers near mines experienced a reduction on total factor productivity of almost 40 per cent. This has huge implications for food security and poverty reduction as farmers are already poor. The study also points out that the impact goes beyond the areas surrounding the mine sites, affecting farmers within 20 kilometres of mines.

⁵The document did not offer any assessment of how the implementation of previous medium-term policy (GPRS 2) had been, especially in relation to mining.

⁶These are mainly investors from the middle class in the cities (WATs 2013) and also from outside, including China. The activities being invested in are not necessarily legal and indeed much of this investment is not recorded by investment promotion authorities.

c) The Challenge of Environmental Degradation

Artisanal and small-scale mining activities have been associated with serious environmental damage. The main environmental problems associated with the ASM industry in Ghana include land devastation, soil degradation, water and air quality deterioration, noise, solid waste, land subsidence problems, and visual intrusion. (Minerals Commission, 2015). The alluvial gold mining techniques require that waterlogged areas thus rivers get dammed and also diverted denying water to downstream users. Digging deep pits also has the impact of destroying land and causing frequent landslides in areas of steep gradient⁷. This has particularly impacted vegetable farming in the Western region that depends on water bodies for cultivation (ACET, 2017)⁸. This additional cost imposed by ASM activities is making farming unattractive.

d) Artisanal and Small-Scale Mining Health Hazards

Related to environmental contamination are the significant health risks that come with ASM activities.

Mercury Poisoning: Perhaps the biggest challenge in artisanal mining is mercury poisoning and contamination. Mercury is a key chemical used to recover gold as it attracts gold (which is usually collected as mud with gold specks) and bonds to it. Gold can be easily recovered once mercury is heated as it vaporises easily. Nearly 95 per cent of the mercury used by these miners ends up in the atmosphere or in the soil that the miners discard during the process (WATs 2013). This is a serious health hazard of mercury and is known to cause many health problems. This toxin attacks the central nervous system and can also damage the lungs, kidneys, gastrointestinal tract and immune system. For children, who are often involved in all stages of artisanal mining, mercury can lead to severe developmental problems. Women and girls can suffer damage to their reproductive health, and mercury can harm the foetus. Yet at ASM sites children and breast-feeding mothers handle mercury without any form of protection. Mensah et. al. (2016) assessed the occupational exposure of 343 small-scale gold miners to mercury in Prestea, a gold mining town in Ghana. It was found that 46.65 per cent of the small-scale gold miners had mercury in their urine above the recommended exposure limit (<5.0ug/L). Mercury poisoning due to ASM has affected the soil and the quality of drinking water in communities close to river bodies like the Birim, Enu, Pra, Bonsa and Ankobra, which have been badly polluted (Darkwa, 2017).

Safety Issues: Accidents are also a common occurrence as ASM operators observe few safety procedures and use little safety equipment. In a study of 120 miners in Ghana's Upper East Region, 70 per cent of participants responded that they never used protection, 5.8 per cent reported positive to using protection, while the remaining miners reported that they sometimes used protection (Paruchuri et. al. 2010). To get an idea of the occupational health risk of artisanal miners, Kyeremateng-Amoah and Clarke examined the admission records of a district hospital's emergency department in the Eastern Region of Ghana from 2006 to 2013. The causes, types, and outcomes of the reported injuries of 72 cases that involved ASM workers were analysed. They found that various injuries were sustained among the miners during the study period. Fractures and contusions constituted the most frequently occurring types of injury accounting for about a third of reported injuries respectively. The rest were spinal cord injuries, lacerations, and neurogenic shock. Over half of the injured were treated in the emergency room and discharged. About a quarter of the patients were referred to seek further care and management at tertiary level facilities and 10 per cent of the injured were admitted to hospital. Almost 3 per cent of the injuries resulted in death.

Malaria Hazard: Stagnant ponds that develop in the numerous excavations' pits left behind by ASM operators become breeding places for diseases, particularly mosquito-borne diseases like malaria. Indeed, malaria is a major health hazard for miners themselves. Interestingly, malaria from Ghanaian mining sites has been transmitted to countries where illegal ASM miners come from. During May–August in 2013, a malaria outbreak comprising 874 persons in Shanglin County, China, was detected among 4,052 persons returning from overseas. Ghana was the predominant destination country, and 92.3 per cent of malarial infections occurred among gold miners (Li et al 2015).

⁷See: <http://www.reportingoilandgas.org/river-ankobra-pollution/>

⁸Refer to: <http://www.todaygh.com/mining-activities-pollute-water-bodies-in-western-ashanti-regions/>

e) Land Contestation

Artisanal and small-scale mining activities are accompanied by increased conflicts that have a detrimental impact on development. This emanates from contestation around various land issues.

Formal versus Traditional Authorities

In Ghana, and many other countries in Africa, traditional authorities (e.g. chiefs) still assert authority and control over rural land. However, customary land tenure practices frequently conflict with formal land rights and licensing procedures (Nyame & Blocher, 2010). In Ghana, the government grants the formal license and concession for ASM. However, one also needs a social licence to operate, as the chief is the owner of the land involved in the conflict. The promulgation of Act 703 entrusts the President of Ghana with control over land and all its minerals on behalf of the people of Ghana. However, as Osei-Kojo and Andrews (2016) point out, the reality is that rural land in Ghana is still mainly controlled by the chiefs and traditional leaders. Under such conditions, miners that claim ownership of or the legal 'right' to use the land for mining purposes (because they have obtained a license from the government) often encounter significant opposition from traditional authorities. They further point out that this contradiction reflects why 'illegal' artisanal miners do not consider their operations to be necessarily illegal. For the majority, there is a natural entitlement that remains even when the constitution of the country pronounces otherwise. This is especially the case when the parcels of land either belonged to their ancestors and/or have been acquired from the appropriate local leader(s).

Farmers versus Miners

As pointed out mining and agriculture have ceased to be complementary activities of the traditional farmer-miner. They have diverged and are now competing for land, a situation made worse by the influx of a significant number of people from elsewhere in search of gold riches. Schueler et al (2011) found a substantial loss of farmland (45 per cent) within mining concessions and widespread spillover effects as relocated farmers expand farmland into forests. The structure of land ownership is partly driving this conflict. This is mainly because land tenure does not give full ownership to the farmer. A farmer only has user rights that can be withdrawn by the real 'owner', usually the traditional authority⁹. The attraction to ASM has brought non-farmers and non-residents to agricultural areas in search of mining concessions. They have managed to bribe traditional authorities to get access to land at the expense of existing farmers. In Ghana, there are multiple cases where cocoa farms have been destroyed without the free, prior and informed consent¹⁰ of farmers concerned (Yeboah 2014, ACET 2017).

Artisanal and small-scale miners tend to seek the consent of traditional authorities and disregard farmers who have the right to use the land (Yeboah 2014). Though there is a mechanism for the compensation of farmers, this is woefully inadequate. The Minerals and Mining Act, 2006 (Act 703) governs compensation payments and requires mining companies or an individual miner to pay the occupiers of the land who are affected by this. The crude calculation used values one cocoa tree at about 15–25 Ghanaian cedis (US\$10–US\$15). Compensation is paid once by miners (who are not farmers) to a farmer and is calculated based on the maturity of crops and what a farmer could produce from his farm within a year. But cocoa trees can survive for more than 70 years,¹¹ underscoring the injustice of compensation schemes¹².

A bigger and more contentious challenge is the illegal invasions of land. Artisanal and small-scale miners who are not farmers and are exclusively engaged in mining, capitalise on the informal land-ownership structure. They invade and seize lands, often with little or no compensation to farmers. The common response has been to use the military and police; however, this enforcement of law is very spasmodic. Hirons (2014) points

⁹This can be at the whim of the traditional chief. Though the chiefs are the custodians of the land, they are expected to take care of their subjects and exercise good judgement with their vast powers. However, many chiefs have become corrupted and serve their own interests. There has been an allegation of them being bribed or otherwise influenced in order to allocate land to those with means at the expense of poor farmers.

¹⁰Free, prior and informed consent (FPIC) represents the highest possible standard for the involvement of indigenous people in decision-making processes about projects. FPIC means that people must be informed about mining, logging, dams, palm oil and other projects in a timely manner. They must be given the opportunity to approve (or reject) projects prior to the commencement of the operations. This includes participation in setting the terms and conditions that address the economic, social and environmental impacts of all phases of the project. <https://www.oxfam.org.au/what-we-do/mining/free-prior-and-informed-consent/>

¹¹As pointed out by an agricultural officer in the district office of the Ministry of Food and Agriculture (MOFA),

¹²For instance Yeboah (2014) points out that a farmer, John K Annoh, with a 20-acre cocoa farm, reported that 'only US\$750 was paid for [a] five[-]acre farm that was taken over by an artisanal and small-scale miner'.

out that there is little transparency in decision-making regarding security interventions in the ASM sector. Most political figures hold ambiguous positions on ASM on the one hand, aligning themselves with the national discourse requires upholding the sector as a ‘menace’ and on the other, ASM represents the primary economic activity of their constituents and, in some cases, a means to fund political campaigns.

Artisanal and Small-Scale Mining versus Large-Scale Mining

Conflict between ASM and large-scale mining (LSM) is an area of increasing concern and attention. At times ASM occurs on large-scale mining leases; in fact, the presence of ASM frequently provides a geological indicator or ‘target selection criteria’ for large-scale exploration activities (Aubynn, 2009). Large-scale mining has been seen to follow and supplant ASM in some areas (Patel et al 2016). At other times the presence of the large-scale company instigates an influx of miners, either to work on the outskirts of the concession or in the tailings of large-scale mines (Okoh, 2014). Indeed Patel et.al. (2016) find that there is a large amount of resource competition between the two parties in Southern Ghana. They find that more than half (52 per cent) of the identified small-scale mining activity occurs within the boundaries of large-scale concessions.

Military-type tactics of are frequently employed in confrontations between LSM and ASM. For instance, in 2013, armed illegal gold miners attacked a security team of AngloGold Ashanti (AGA) on the company’s concession in Obuasi (Arku 2013). This is while in 2014, illegal miners were shot and killed by AngloGold Security (Okoh, 2014). Currently, the government of Ghana has deployed Ghana’s military forces to protect LSM property from ASM invasions of LSM concessions.

f) Disrupting Societies

The growth of ASM and the resulting influx of ASM workers/prospectors have also impacted and disrupted societies in a number of ways:

- **Raising living costs:** Artisanal mining is also increasing the cost of accommodation, for example in a place like Dunkwa-On-Offin in Ghana’s central region where the presence of the Chinese illegal miners has raised rent prices for guest houses and hostels in the mining towns. Access to such accommodation is becoming difficult for locals (Mantey 2012).
- **Distorting perspectives leading to short-term thinking:** The lure of quick fortunes to be made in artisanal gold mining is distorting perspectives with regard to livelihoods. While many are claiming to be pushed to this field by poverty, there are lots whose motivation is to gain quick wealth. This is to the extent that they are abandoning other professions for artisanal gold mining. People’s perceptions are thus being distorted and this has adverse implications for long-term development goals aimed at developing skills and livelihoods. When gold prices fall, or mines are no longer productive, many will find themselves with no profession and many who are also illiterate will be ill-equipped to adapt to new professions.

g) Rising Criminality and a Security Challenge

Though ASM is regulated in Ghana and thus one can get a formal licence¹³, MacQuilken and Hilson (2016) estimate that 70–80 per cent¹⁴ of artisanal and small-scale miners operating in Ghana, operate informally or illegally in part due to barriers associated with obtaining land and a licence. They point out that this stems largely from a shortage of untitled land for ASM activities and accompanying geological records, without which it is difficult to obtain formal finance. Illegal ASM is becoming attractive to criminal networks. This is exacerbating the challenges posed by ASM activities. Some disconcerting trends include:

New Networks, New Webs: The ASM ranks are also being joined by local interests and foreign investors who are mostly offering financing. Clearing forests and digging up grounds require heavy machinery which the traditional artisans cannot afford. As the price of gold rose sharply between 2001 and 2011, attracting many

¹³The Minerals Commission (MC), is the main agency for issuing mining leases and permits. The Minerals Commission charges a Processing Fee of GH¢250 and a Consideration (License) Fee of GH¢550. The Environmental protection Agency (EPA) also issues a complimentary environmental permit that costs GH¢ 8,400. The Precious Mineral Marketing Company Ltd. (PMMC), which all must register with, has a license fee of GH¢ 1,500. There are also other fees paid to local government including: Stool Lands Administration Fees, Land Valuation Fees, Metropolitan/District Assembly Fees. All the fees are subject to changes at any time. However in total the licensing of a small-scale miner will cost a minimum of GH¢10,700 or about US\$2,500.

¹⁴McQuilken and Hilson (2016) point out that it is generally accepted that there are an estimated one million artisanal and small-scale miners in Ghana and approximately 1,000 registered and licensed small-scale miners. If each licensee employs between 200 and 300 people, it can then be extrapolated that there are an estimated 200,000 to 300,000 people working under the security of a licence. Thus, the remainder (700,000 to 800,000) are operating informally and illegally.

to the sector¹⁵, from around 2008 there was a huge influx of foreigners, especially Chinese. They have brought in heavy machinery and also new mining technologies to increase the recovery of gold thus expanding the coverage of ASM (Aidoo, 2016, Crawford et. al. 2015). As the Chinese were usually working in partnership with local miners they brought know-how, technology and also finances that dramatically increased the production of gold. They transformed the ASM sector, however the influx also increased conflict as locals competed with them for access to land. It also created mistrust between local people and their leaders whom the people argued had been bribed and were in collusion with the Chinese (Crawford et. al.2015). Foreigners engaged in ASM have been estimated to be over 50,000 (OBG 2016, Hirons 2014) and all these are illegal miners as by law, those engaged in ASM must be Ghanaian citizens¹⁶. To get protection, law enforcement and traditional authorities collude in illegal ASM activities (ACET 2017). As articulated well by an official of Ghana's Minerals Commission (the regulator for the sector), 'Behind every illegal Chinese operator, we are looking at an opinion leader, a chief, a farmer, a landowner or somebody who then sublets it to the Chinese for these illegal activities' (Mantey, 2012). Even elements of the military have been accused of protecting illegal miners (Citifm, 2017).

Human Trafficking and Illegal Immigration: As pointed out above, there are close to 50,000 immigrants engaged in ASM. Foreign miners came from nearby countries in the West African region, as well as faraway places like Armenia and Russia, but the largest concentration was from China (Crawford et. al. 2015). Some of the Chinese illegal miners have also been trafficking Chinese sex workers to Ghana (Aido 2016).

The itinerant nature of the ASM, the influx of migrants, human trafficking, illegal mining, land invasions combined with an influx of resources from the middle class and the politically connected people (thus enjoy state protection) are creating a toxic mix. This is posing new security challenges that are threatening the state itself. Eliminating illegal mining is now a priority of the incoming government. In July 2017, the military launched 'Operation Vanguard' to flush out illegal miners. The government also announced long-term military protection for large-scale legal mining concessions under a signed memorandum with the Chamber of Mines and the Ghana Armed Forces (Citifm, 2017).



<https://www.land-links.org/issue/artisanal-and-small-scale-mining/>

¹⁵The Oxford Business Group points out that during the commodities boom of the 2000s the number of miners is estimated to have tripled to as high as 600,000 between 2001 and 2011. (<https://oxfordbusinessgroup.com/analysis/small-fortune-government-focusing-reforming-small-scale-mining>)

¹⁶The middle class in big cities like Accra is also financing the heavy machinery needed in the increased scale of activities. A common method is for a group of people to pool funds and acquire the equipment. Much of the activities being funded in this way also tend to be illegal (WATs 2013).

IV. The Ghana ASM Landscape – Emerging Developments

As pointed out the ASM landscape has about 1 million miners scattered largely in western, central and northern parts of Ghana (McQuilken and Hilson, 2016). The real size of the sector is very hard to estimate due to the fact that it has a significant unregistered or informal and illegal component and many ASM miners do not declare their output to avoid taxation. In summary, governments can also not tell the exact number of sites, the number of people involved and the output. Furthermore, since artisanal and small-scale mining (ASM) employs many, government attempts to clean up and consolidate traditional mining areas have often been met with strong local opposition by local chiefs and also even legislators.

The current legal framework for regulating small-scale mining activities is provided in sections 81 to 99 of the Minerals and Mining Act, 2006 (Act 703) and its accompanying regulations. As pointed out, the Minerals Commission is the body charged with regulating the sector. From the discussion above the regulatory regime is currently buffeted by many new challenges, calling into question the ability of the regulatory regime to guide the development of this sector in achieving sustainable development. There is a clear need to revisit the framework and develop an institutional framework that can help ASM to deliver sustainable development.

New ASM Mining Policy

In its desire to improve outcomes from ASM, the government of Ghana has recently promulgated the Ghana's ASM policy framework (Minerals Commission, 2015) to guide the development of the ASM sector. It has six main objectives:

1. Regulate and assist ASMs to improve the efficiency of their operations.
2. Ensure the use of appropriate, safe and affordable techniques in small-scale mining.
3. Ensure that relevant stakeholders enforce the law reserving small-scale mining for Ghanaians.
4. Ensure the sustainable use of resources (water, land, minerals) by promoting the integrated use of land through planning and taking cognisance of ASMs.
5. Develop a more efficient taxation system for artisanal and small-scale mining.
6. Discourage any form of gender bias.

The government has also launched some initiatives to support the sustainable development of ASM. These include:

Supporting ASM

The Minerals Commission has undertaken some initiatives to support the ASM upgrade. One such initiative is the establishment of a revolving credit with a seed capital of US\$700,000 to support the activities of ASM operators (ACET 2017). However, recovery has been a major problem and the Minerals Commission has since discontinued the arrangement. Another important step taken by the Minerals Commission as part of the support to ASM operators was the registration of foreign companies as 'mine-support service providers' to small-scale concession holders, as outlined in Minerals and Mining Act 2006 (Act 703). This enabled private companies, including foreign ones, to provide mining support services to registered small-scale miners. This is inclusive of technical and logistical assistance and includes the hiring or leasing of mining equipment and in some cases the offering of credit facilities. Though this law was changed in June 2012, so that foreign companies could no longer provide services, the law change did not apply retrospectively. Therefore, two providers that were registered still continue to serve the sector (Crawford et. al. 2015).

Re-Energised Enforcement and Sanctioning

The government also established an Inter-Ministerial Task Force (comprising of five relevant ministries) in May 2013. The main objective of the task force was to promote sanity and responsible mining in Ghana's artisanal mining sector. The taskforce went out to halt all unregulated ASM activities and seize all equipment being

used in those activities. Foreigners who were found to be working illegally on these mines were also arrested (ACET 2017, Crawford et al. 2015).

The government made some amendments to the Minerals and Mining Act (Act 703) providing stiffer punishments for those who engage in illegal ASM activities. During the last quarter of 2015, Parliament approved an amendment to the Minerals and Mining Act (Act 703), which provides for the confiscation of equipment used in illegal small-scale mining activities. The amendment also criminalised the engagement of foreigners in small-scale mining activities and made it an offence for a Ghanaian to engage foreigners in small-scale mining activities. Stiffer punishments, including jail terms, were provided in the law (Vinorko, 2015). The impact of the law was a significant reduction of foreign illegal miners, especially the Chinese, who became less visible. Some also became suppliers of equipment and support services to ASM, which is a legal enterprise for foreigners (Crawford et. al. 2015).

Recognising the crucial role of ASM and also the many challenges that come with ASM activities, the government and development partners have undertaken a number of initiatives to upgrade ASM:

Artisanal and Small-Scale Mining Upgrading/Support Initiatives

The Government of Ghana

The Government of Ghana has promulgated an ASM policy that has a number of measures to upgrade the ASM sector (Minerals Commission 2015). These include:

- a. the establishment of District Offices to give technical assistance to small-scale miners;
- b. the geological investigation and demarcation of areas suitable for small-scale mining;
- c. education, training and the provision of logistics to enhance the corporate governance, efficiency, and the safety of their operations;
- d. assistance to obtain fair market prices for their minerals through the control of illicit dealings and the trading of minerals through appropriate licensing and providing the necessary market information and training;
- e. supporting a range of measures to facilitate access to finance, including co-operative savings, pooled equipment leasing arrangements and concessional lending schemes;,,
- f. assistance in business skills training.

Development Partners

Government actions are also being supplemented by development partners. Some of their notable initiatives include:

- The Artisanal Gold Council (AGC) has been active in supporting governments in the region to address the ASM challenges. Some of the interventions they have instituted are noteworthy:
 - In 2017, they conducted baseline mercury inventory work for the Ghana National Action Plan (NAP) as required by Minamata convention.
 - From 2010–2011, the Artisanal Gold Council (AGC) has worked with Ghana’s University of Mines and Technology (UMaT), to develop and introduce direct smelting technology to groups of miners who use mercury to recover gold. This work has demonstrated that purifying gold without the use of mercury (using what is popularly called the ‘borax method’ in which borax is used to melt and purify gold) is possible in this context. The kit consists of an efficient furnace, a few common compounds, and some other tools which enable gold concentrates to be directly smelted, thereby avoiding the mercury-amalgamation step. However, the dissemination of the technology has been hindered by a lack of subsidisation to provide educational outreach (Abbey, Nartey, Al-Hassan, & Amankwah, 2014).

V. Artisanal and Small-Scale Mining and Sustainable Development – The Search for Potential Pathways

a) Agriculture vs ASM – The Search for Symbiosis

The traditional relationship between agriculture and mining has broken down, meaning that it is not complementing agriculture and it is in fact destroying agriculture. As much as ASM is highly profitable compared to agriculture, ASM activities come with significant externalities. The high gold prices have changed the economics of ASM but not the sustainability of the activity as a source of livelihood. Gold prices are cyclical and as those of any other commodity, after a boom a bust does come. In addition, gold gets depleted leaving ghost towns in its wake. Therefore, the question of sustainability is crucial. While the itinerant gold digger can move on to the next site, the local people are left to deal with the impact of the bust and the externalities of ASM.

The issue of sustainability of ASM requires careful thought. Some avenues include:

- On the one hand, gold wealth can be redirected to create a new industry in rural areas and thus be a driver of rural transformation. This will require rethinking how activities are financed and how the proceeds are invested. The question is then what policy framework steers the ASM industry in this direction.
- The other path is to discourage ASM and severely limit these and focus on upgrading agriculture so that it can provide better returns and indeed be a driver of rural transformation through investment in agro-industries. This path has a much bigger promise of sustainability, but it is harder to implement. Artisanal and small-scale mining has a significant constituency that will resist any attempt to curtail it. Furthermore an agriculture-led rural transformation will take much longer and significant investment is needed that will have to be sourced from elsewhere.
- A middle-of-the-road strategy that can strike a balance between ASM and agriculture is needed. This requires a mechanism to couple the two sectors together again, so that one complements the other in enabling rural transformation. The short-term benefits from mining will need to be invested into the longer-term benefits of improved agriculture. This has to be a more deliberate coupling as the two sectors have largely separated.

b) Local Value Addition – Can ASM Lay the Foundation?

Ghana largely exports its mineral resources as ore. Thus, Ghana misses many value-addition opportunities that gold, its key export, can bring¹⁷. More value addition has been an objective of the government. However, local value-addition efforts are likely to face significant challenges including:

Value addition like all aspects of mineral value chains is very capital intensive and requires firms with the necessary skills and resources. It is unlikely that local entrepreneurs have the necessary resources. This is also a very consolidated sector with well-established centres. Van Gelder and Smit (2015) point out that two key nodes of the gold value chain, trading hubs and refining hubs, are located between the producing and consuming countries. These hubs include for example Switzerland, Dubai (United Arab Emirates), Singapore, Shanghai and Miami (United States). Switzerland has the largest refining capacity by far. It formed an estimated 70 per cent of the world's gold refining capacity in 2012¹⁸. Dubai is also making a significant investment in gold refining with an intention to compete with Switzerland for dominance. Thus:

- Local value addition may mean significant incentives to attract the necessary investments. These incentives

¹⁷The key applications of gold include: the production of jewellery (48 per cent); an investment demand for gold bullion (36 per cent); central bank purchases where gold bullion is kept as a reserve asset (8 per cent); another 8 per cent of global gold consumption is accounted for by industrial applications (mainly electronics and telecommunication equipment); dental and medical applications took a 1 per cent share of global gold consumption in 2013 (Van Gelder and Smit, 2015).

¹⁸The supremacy of Switzerland is being challenged by Dubai, which has been adding significant capacity in recent years including the world largest gold refinery (van Gelder and Smit, 2015).

can erode any benefits that come with increased local value addition as has been the case with generous incentives given to cocoa processing, which have delivered few benefits¹⁹.

- Local value addition has the same key pre-requisites as the development of other industries namely mainly good infrastructure, access to reliable and affordable power, and cheap credit. Ghana lacks these.
- All the same, there have been attempts in the past to do more refining of gold, the key mineral and also make jewellery locally, but this has had challenges. The government-owned Precious Minerals Marketing Company (PMMC) makes jewellery (see box), while Asap Vasa Co. Ltd., and Sahara Royal Gold Refinery Limited are the only institutions that refines gold in Ghana, and they primarily buy from ASM operators in Ghana (ACET, 2017).

Box 1: Precious Minerals Marketing Company Limited (PMMC)

The Precious Minerals Marketing Company Limited (PMMC) is a Ghanaian government-owned enterprise (SOE) that is charged with buying and marketing gold, silver and diamonds. It mainly buys and markets artisanal-produced gold. The Precious Minerals Marketing Company Limited has been keen on increasing the local value addition of the gold that it purchases. Initially, PMMC had an arrangement where it provided its raw gold purchased to selected local jewellery manufacturers to be processed, sold and the cost of raw gold covered once the gold was sold. Over time the arrangement had to be truncated because the manufacturers defaulted in paying back. The Precious Minerals Marketing Company Limited now does the value addition itself. The company has procured modern tools for jewellery production which enables the firm to produce a variety of designs. Currently, PMMC processes 20 per cent of all the gold purchased into jewellery. It is largely sold largely in Ghana, while the remaining 80 per cent is exported in raw format (ACET 2016).

In 2011, the PMMC purchased a plant and equipment worth GH¢156,000 for their diamond-cutting and -polishing plant, which has not been operated since. This is because most of the diamonds produced in Ghana are of the industrial type and therefore it is difficult to process with the newly purchased plant and equipment²⁰. The Precious Minerals Marketing Company Limited faces an uphill struggle to become a viable company that can advance the value-addition proposition. The Precious Minerals Marketing Company Limited is one of the five 18 state-owned enterprises that showed losses in 2016. Its revenue has been on steady decline by 83 per cent from GH¢136 million to GH¢23 million in 2016²¹.

c) Exploiting Niche Markets

While a lot needs to be done to build refineries that can compete with the best in the world, a lot of work is also needed before competencies in jewellery design and branding can be developed so that local value addition can become globally competitive.

Ghana can leverage the ASM sector to exploit niche markets opening up with the growth of creative industries in the region. The rapidly developing local fashion industry is a regional trend setter and can support a new jewellery value chain that is more amenable to local value addition efforts. The vibrant film and music industries provide yet another opportunity. This niche market can help to build the competencies needed and with time produce world-class designers. At the moment there is no mention in the ASM policy of how to leverage other creative industries to develop local jewellery value chains. One way is to work with fashion creators and movie directors to do product placement of Ghanaian-made jewellery in their shows. The government can also sponsor fashion shows and films with themes around jewellery made in Ghana.

¹⁹Ghana has used generous incentives to entice global cocoa processors to do more processing locally. The processors get cocoa at discounted price of 80 per cent of the world market price (the export value). They are also located in free zones which have many incentives including generous tax holidays, import duty exemptions, fast track services with customs, good infrastructure and easy access to ports. Although the local processing of cocoa has increased dramatically as a result, this has been mainly low in value and with low employment grinding operations. Many have complained that the cost of the incentives is not worth the benefits (ACET 2015).

²⁰Industrial diamonds are processed differently from jewellery diamonds and the equipment differs.

²¹<http://citifmonline.com/2017/09/27/bog-pmmc-unable-to-trace-companies-in-2-3bn-gold-export/>

VI. Upgrading and Re-Orienting the ASM Sector

The two strategies proposed above are not mutually exclusive and should indeed be executed together. Greater coupling of ASM with a rural transformation initiative will support local development, while the pursuit of value addition through the development of the regional jewellery market will support broader national development goals. However, the ASM landscape needs to be changed. Some proposed actions towards this end are discussed below:

a) Rethink ASM Governance

Central government regulation of the ASM sector has been reactive to emerging issues e.g. a concern for invasion by foreign illegal miners or the pollution of water bodies, further disparate actions taken without much coordination, especially with local authorities who tend to be caught unawares when military operations are launched to flush out illegal miners (Crawford et al. 2015). At the time the focus seems to be on sanctioning e.g. deporting foreigners engaged in ASM, at other times the focus is on supporting e.g. providing geological data. Interventions seem to be in response to issues raised by civil society organisations and interest groups²².

A more proactive approach is to involve chiefs and opinion leaders in the monitoring process since they are the custodians of the land and have first-hand ground information on what goes on in their communities. Indeed, traditional authorities played an important role in regulating mining activities, protecting communal water sources and settling disputes between miners (Wilson et. al. 2015). However, ASM is governed much like formal mining with the Minerals Commission responsible for much of the oversight in coordination with other centralised government agencies like the Environmental Protection Agency (EPA), the Forestry Commission, etc. Yet the structure of this sector is fairly different. It competes directly with agriculture for land and for labour. Agriculture bears much of the brunt of the environmental challenges wrought by ASM. agriculture is largely regulated by the traditional authorities who are the custodians of the land and thus allocate land. Artisanal mining and agriculture should be seen as an alternative source of livelihood for people who live on the land and the traditional authorities should be left to weigh the costs and benefits of adopting a livelihood approach and guide the development of both sectors. Formal government agencies' role should be confined to backstopping traditional authorities.

Box 2: Agriculture vs Mining: A Historical perspective

Given that gold mining is not a recent activity and similarly agriculture is a not recent activity, there must have been a way that both crafts have coexisted without the apparent conflict that is quite evident today. Therefore, some insight on how these activities were regulated traditionally may help in thinking forward.

Traditionally gold was mined at Wassa. Wassa was described as a scantily populated, thickly forested region, a state whose soil was not particularly fertile and where agriculture did not flourish. Olefert Dapper, the Dutch chronicler, reported in the 1660s that 'the inhabitants spend all their time mining and sow no grain, they are supplied' [with food by their neighbours...] There were few towns or large villages. Even in the richer mining areas, most of the people lived in small hamlets of three or four cottages (Ofosu-Mensah and Ababio, 2011).

It is clear that there was traditionally an element of specialisation, with some people specialising in mining and others in farming. The story also points out that mining was done in areas that were not particularly good for agriculture.

²²See: <<http://pulse.com.gh/business/ghana-policy-on-mining-policy-to-guide-extractive-sector-launched-id4724309.html>>

b) Build Data Collection and Local Regulatory Capacity

Lack of capacity plagues regulatory agencies. For instance, the capacity of the Minerals Commission in terms of human resources and logistics represent a major challenge in the execution of its mandate. Besides, the District Mining Committees, required by the mining law to be established in order to support the development of ASM, are mostly dormant. In many areas these committees have not been constituted as the relevant ministries who appoint members. They have been slow to act and appoint the members (ACET 2017).

Related to the lack of capacity is a lack of reliable data about the scale and scope of ASM production. This is a key challenge for government authorities and other key stakeholders looking to develop effective policies and management programmes. There are a range of obstacles with regard to collecting data on ASM. This includes the fact that few miners are willing to be honest about the figures of their production levels/earnings/investments to researchers or government officials. Even fewer keep adequate records (Marin, Seccatore, De Tomi, & Veiga, 2016). In addition, ASM populations are often mobile and transient and may be linked to illegal activities, problematising access for researchers (Heemskerk, 2005). Better data collection will come from empowering decentralised district mining regulatory agencies and also the traditional authorities. Indeed, traditional authorities need to be strengthened to carry their full mandates as the custodian of lands. This goes beyond allocating. It also includes monitoring the land used and being involved more closely with regard to the planning of land used (thereby leading the process rather than leaving it to formal authorities to lead the process).

Data collection should include the generation and dissemination of data to ASM to help in streamlining the activities. One of the causes of the destruction of the lands in mineral-rich communities by ASM operators is the uncertainty of, and the extent of minerals in a given concession. Unlike large-scale mining companies that spend a lot of resources on prospecting and researching specific areas that contain the minerals, ASM operators are guided by a combination of experiences, hunches and guesswork. The result is that ASM exploration activity can result in digging in an arbitrary manner with significant damage to environment. Better support in generating geological data can reduce the level of guesswork and make the exploration less destructive. The Government of Ghana's support in terms of taking up the cost of prospecting will reduce this. More importantly, proper geological data can help in planning with regard to land so that there is a clear demarcation of land for ASM, thus reducing competition for land especially with regard to agriculture.

c) Rethinking ASM as the Driver of Rural Transformation

For ASM to be a driver of rural transformation, the sector will need to be reoriented so that its practices are sustainable and so that it also has a future where short-term ASM gains are used to transform the rural economies. This is so that in the longer-term incomes will be derived from a diversified and vibrant rural economy. This will require government to rethink ASM and how it treats the sector from a taxation viewpoint. The sector must also view itself differently and have a longer-term outlook beyond mining so that short-term inflows from mining can be converted to human, social and other capitals. A pathway is proposed below.

Governments are generally not supportive of ASM due to the fact that it is harder to collect taxes from them as opposed to LSM. However, the reason for government to collect taxes is to create opportunities for citizens and drive transformation (both of which are important to poverty reduction). Artisanal and small-scale mining has already helped in one way through jobs and can also drive rural transformation if properly directed. The Government of Ghana could re-examine its role where ASM is concerned and focus more on creating an environment for rural transformation through increased consumption that can come from inflows from ASM. Rather than trying to capture direct taxes from ASM (which is difficult), it can focus on capturing taxes from consumption generated by inflows from ASM. This is feasible if more goods services are provided in areas where ASM occurs and the minerals also are purchased on those localities. This means that there must be mineral-buying centres that are trusted by ASM communities and which incentivise businesses to locate there by providing a conducive business environment.

This will require a shift from a centralised regulation to a more decentralised regulation where the local chiefs regulate ASM. It also requires a shift from an enforcement approach to a more incentive-based approach. Both can foster self-regulation which frontier mining towns²³ have been able to accomplish (Brycesson nd).

d) Strengthened ASM Associations and Cooperatives

Self-regulation will be further enhanced when miners are better organised. Strong ASM associations and cooperatives ‘lend themselves to self-regulation’ as evidenced in Tanzania where regional miners’ associations have managed to exert influence over small-scale miners to operate responsibly (Mutemeri et al., 2016). Self-regulation is a first step. It is these strong associations that can be incentivised to build a diversified portfolio of investments that can start the process of rural transformation. Working in partnership with government and especially the traditional authorities, these association can be supported to identify investment projects that can diversify incomes. An area that can be particularly pertinent is agro-processing. Opportunities for partnerships with local authorities and development partners can also be explored. The recently promulgated Ghana ASM Mining Policy seeks to help ASM to advance in basic business skills as one of its objectives (Mining Commission 2015). This can include helping them to invest the proceeds from ASM activities by diversifying into other activities.

e) The Adoption of Sustainability Standards

Sustainability standards can be one way of upgrading ASM by adopting sustainable practices. Compliance also opens up new markets, especially fairtrade markets, where they can earn a premium for demonstrating sustainable practices and markets that demand conflict-free minerals. In addition, being certified can attract more support from development partners. Hilson et al. (2016) describes 14 ethical mineral schemes and standards²⁴. In Ghana, Solidaridad, an international NGO, is piloting a project to help ASM operators to fulfil the criteria for Fairmined Certification. To date they have conducted a series of courses on diverse topics including first-aid, safety, mercury, and environment that will help them to get Fairtrade Certification. Other activities have included distributing free personal protective gear, the appointment of Fairtrade officers, support for school-going children of miners, and support for women’s groups. Two mines in the pilot project, Dakete Small-Scale Mining Company in Tarkwa and Golden Star Resources in Wassa Akropong, have already applied for Fairmined Certification while awaiting the completion of their auditing (GNA 2016).

McQuilken (2016) has, however, found that that certification schemes face enforcement challenges and are reliant on inputs from ‘Western’ organisations. They also tend to be top-down initiatives that do not encourage the agency of miners but rather dependence on Western consumers. Furthermore, Hilson et al. (2013) argues that they tend to work with already established and well-networked miners, because they are the ones capable of meeting the stringent requirements required to supply minerals that can be tracked along the supply chain. There is a need for locally developed sustainability standards that emphasise rural transformation as the end result.

f) Strengthening the Collaboration Between ASM and LSM

Sustainable practices can also be further enhanced by strengthening collaboration between ASM and LSM. There is potential for large-scale mining companies to provide capacity building or mentorship to artisanal and small-scale operators, particularly in the areas of environment, health and safety. However, the predominant ‘illegality’ (informality) of the sector, and the risk of encouraging an influx of miners’ present risk factors (Verbrugge, 2017). This collaboration will require careful thought with regard to the model for collaboration. One model employed by the artisanal miners of diamonds is a pointer. The miners work on the concession of the only large-scale licensed diamond producer in Ghana, the Great Consolidated Diamond Ghana Limited (GCDL). The small-scale miners are mandated to sell their produce to the company at a discounted price for resale by the company in the international market. Their system enables better monitoring of artisanal mining

²³Many big cities like San Francisco sprang out of gold mining settlements as a business set-up to provide services to the mining communities. As the money from mining was spent, the business grew and became good at providing services which could also be sold elsewhere. The famous brand of Denim pants was invented by Levi Strauss for gold miners to cope with tough conditions.

²⁴Some that target ASM directly include – the Better Gold Initiative (BGI), Fairtrade Gold, Fairmined Gold, International Tin Research Institute (ITRI) Tin Supply Chain Initiative (ITSCI), and Diamond Development Standards (DDS).

activities and the company is also able to offer on-site technical training for the miners while developing the livelihoods of the community at large. In developing this collaboration, building trust will be crucial. The government's involvement is also a key factor. Large-scale companies must plan their relationship with artisanal and small-scale miners early in project development and establish agreements that are adhered to throughout the lifespan of the mine. Consultation with ASM leaders is crucial (Buxton et. al., 2015, Teschner 2013).

g) More Realistic Legislation that Conforms to the Reality on the Ground

Crawford et al (2014) argues for more realistic legislation that recognises the reality on the ground. They point to a current a situation where many local ASM operators, both registered and unregistered, are working with foreign partners irrespective of the law stating that small-scale mining is reserved for Ghanaian citizens only. Partnerships with the Chinese have been particularly strong²⁵. They point out that this appears to be the de facto situation and one that is unlikely to change any time soon. And there is a simple logic to it, local operators benefit from the capital investment, machinery and expertise that foreign miners bring. Indeed, this arrangement is bringing the capital and expertise that the government's new ASM mining policy seeks to bring to the ASM sector (Minerals Commission, 2015).

The government may therefore consider changes in legislation with regard to the ASM sector. It may do so to come to terms with what is happening on the ground and to take advantage of this to accomplish its mission of upgrading the sector. It may be necessary to amend the small-scale mining legislation to formally allow foreign miners to work with registered Ghanaian concession holders. This will then create the space to set clear guidelines on the nature of partnerships, financing regulations, service provision, subcontracting rules as well as ensuring effective reporting and tracking of the gold, etc. produced and the revenues that accrue (Crawford et al. 2015).

h) The Formalisation of ASM

The formalisation of ASM has been seen as a way forward in upgrading the ASM sector. An approach to formalisation that has proved to be successful is to encourage individual miners to form mining associations and then jointly apply for mining certificates. This reduces the individual burden of applying for a license which can be daunting for individuals. However, for formalisation efforts to show results, formalisation must also demonstrate benefits for miners. In other words there should be an incentive for miners to want to formalise because many times the aim of formalisation is to facilitate the collection of taxes by governments. To make formalisation attractive to ASM some of the incentives that can be provided include: linking technical support and capacity building; linking formalisation with access to credit; linking miners to formal markets that pay a higher price than the informal markets that they usually use; the demarcation of areas for ASM; and the provision of geological data (Collins and Lawsons 2014). Ghana seems to be on the right path. To entice formalisation and in the process facilitate the collection of taxes, the strategy of the Ghana Minerals Commission is to geologically explore areas for small-scale miners, organise them into associations and license the areas for them. By doing so, it will be easier to tax them appropriately (Minerals Commission 2015).

²⁵Some locals simply acquire lands directly from community landowners or chiefs, and sell these to the Chinese to undertake the mining. Others go through the legal concession acquisition process and then form a partnership with the Chinese, taking between 10–15 per cent of the gold produced, while the Chinese who finance the entire mining operations take 85–90 per cent (Crawford et. al. 2015).

VII. Conclusion

Artisanal and small-scale mining is an important source of livelihood for many people and it has been for some time. However, ASM has many externalities that come with it. Traditionally ASM was a way to diversify livelihood, as farming was the mainstay. In this complementary role the externalities of ASM could be controlled. This is because the farmer-miner could weigh the benefits and payoff and choose an optimal level of ASM activity that provides resources to invest in agriculture without destroying the basis of this other important livelihood. However, as gold prices have risen, ASM has attracted new players not connected to the land and indeed itinerant and thus the checks and balances have gone with the new dynamic. Now the beneficiary of ASM and the one who bears the externalities are different. Artisanal and small-scale mining activities are now threatening the very basis of sustainability through wanton environmental destruction.

The rise in gold prices has also seen an influx of many illegal miners and an emergence of new networks to finance the activities, changing the face of ASM. The axe is being replaced by the bulldozer and operations are now coordinated in the cities and even in global capital. The itinerant nature of ASM and huge inflows of migrant workers also stresses the social fabric of rural communities as this influx is also accompanied by a breakdown of social order. More significantly, ASM also has a large illegal element that is increasingly becoming part of national and even global criminal networks that are well connected and increasingly heavily armed. This poses a national security threat. Without serious rethinking of how to steer this sector the externalities are likely to dominate the benefits that can be derived from ASM.

Yet ASM does still hold the promise of driving rural transformation and economic transformation in general. Significant inflows are generated from ASM activities and if they are redirected to rural areas, they can help to boost consumption and also provide investment resources to support transformation. Also, by developing regional niche markets ASM can support the growth of industries for local value addition. For this to happen there is a need to rethink the governance of the ASM sector and how it is organised and incentivised. Artisanal and small-scale mining should be seen as separate from LSM. Its governance must be fully decentralised and indeed transferred to traditional authorities who managed it traditionally. They are in the best position to manage and balance the benefits and externalities of ASM. Support of the sector should be focused on driving it towards sustainable practices and this should guide the supportive efforts by development partners and others.

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