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BRIEFING NOTE No. 125

# Understanding the use and trade of toxic chemicals in artisanal gold mining:

## THE CASE OF BURKINA FASO

**By Poorva Karkare**

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Millions of people in West Africa are engaged in artisanal and small-scale gold mining (ASGM). While it brings in significant benefits in terms of employment and income, its social and environmental costs are very high, in particular because hazardous chemicals such as mercury are used during the extraction process. This note shines light on the use and trade of toxic chemicals in ASGM in Burkina Faso. It argues that interventions to reduce the use of mercury in ASGM operations need to be designed keeping in mind the complexity of the sector, including the actors involved and the fluid arrangements that they strike to win gold.

In fact, mercury and gold trade are closely interlinked. Moreover, mercury has become an integral part in the pre-financing arrangements, a dominant form of funding operations in return for gold. These networks of pre-financiers are involved in the smuggling of gold to avoid paying taxes.

While national and regional bodies are increasingly adopting regulatory frameworks and voluntary mechanisms to reduce the use of mercury, their success hinges upon a degree of formalisation in the sector. This goes against the core features of how the sector is currently organised. Decades of neglect by governments in the region, which have prioritised large-scale mining, has meant that ASGM has been marginalised, largely operating in the informal sector. Traditional structures govern the activity and trust in the state among ASGM actors remains low.

ASGM does not just have an economic dimension, but is also embedded in the social fabric and structures of the local communities. This adds an additional layer of complexity to the design of any form of intervention to govern the sector.

# Introduction

**Artisanal and small-scale gold mining (ASGM) in West Africa provides livelihoods to at least 2 million, and supports millions more indirectly** (Hilson 2016). **Production is also assumed to be significant, though mostly informal**.[1] Estimates vary wildly given the clandestine nature of ASGM, and miners' incomes, though more than farming, remain precarious as they depend on what they dig and find (Bazillier and Girard 2020).[2] Nevertheless, ASGM is shown to have a poverty-reducing effect by several scholars (Zabsonré et al. 2016; Bazillier and Girard 2020) especially when compared to large-scale mining (LSM). The majority of those employed are young (68%) with a higher proportion of women engaged in the activity than men (IUCN 2019). At the same time, because of its highly informal nature its contributions are not captured in national accounts and the sector remains invisible (Geenen et al. 2020).

**ASGM, however, is also a source of environmental pollution**. Worldwide, the **widespread use of mercury** to extract gold results in an estimated 1,400 tonnes of mercury emissions into the atmosphere each year, or 37% of the global mercury pollution (Esdaile and Chalker 2018).[3] Cognisant of its health and environmental impact, the European Union (EU) banned mercury exports in 2011.[4]
Countries have tightened regulatory measures around the use of mercury. S**everal countries in West Africa are signatories of the Minamata Convention on Mercury**, and are in different stages of preparing or implementing their National Action Plans (NAP) to phase out the widespread use of mercury in ASGM (UNIDO 2018).[5] There have also been calls to develop regional frameworks whereby the sector can be better regulated through harmonisation.

**Accompanying the NAPs, projects are being implemented to introduce mercury-free processing technologies and promote compliance to international standards**. For instance, under the project 'creating an equitable gold sector and reducing mercury emissions in gold mining in West Africa' United Nations Industrial Development Organisation (UNIDO) has partnered with the Artisanal Gold Council (AGC) to introduce mercury-free technologies, and with Alliance for Responsible Mining (ARM) for capacity building as well as obtaining a Fairmined certification (Alvarez et al. 2016; UNIDO 2014).

**Certification schemes can encourage miners to engage in good practices by guaranteeing them higher incomes**. However, implementation of standards has been limited, and there has been little systematic assessment of whether they have brought about the desired changes (Eslava 2018). One reason for the limited implementation is that the context in which these initiatives are designed, and where they are implemented are very different.

**Most efforts to introduce better and more sustainable practices require formalisation of ASGM activities, yet this appears at odds with the core features of the sector**. Mercury and gold trade go hand in hand and the trade takes place informally through established smuggling routes. Moreover, it is unclear whether there is genuine traction among governments in the region to address this issue. Thus, the context in which ASGM takes place is important to appreciate before designing interventions to improve the social and environmental sustainability of artisanal mining.

**This note looks at the factors shaping the interaction between mercury and gold trade in West Africa** to inform the debate around governing the ASGM sector in terms of responsible mining and regional harmonisation around mercury by using the case of Burkina Faso as an illustration.

# Interlinked gold and mercury trade in West Africa

The use of mercury in ASGM is a more recent phenomenon in some countries like Nigeria, Liberia and Sierra Leone compared to others like Cote d'Ivoire, Ghana and Mali (UNIDO 2018). In Burkina Faso it started in the 1990s as miners progressively went beyond alluvial reserves to those at deeper

levels where the use of rudimentary tools no longer suffices for the recovery of gold particles (Nikièma et al. 2020).

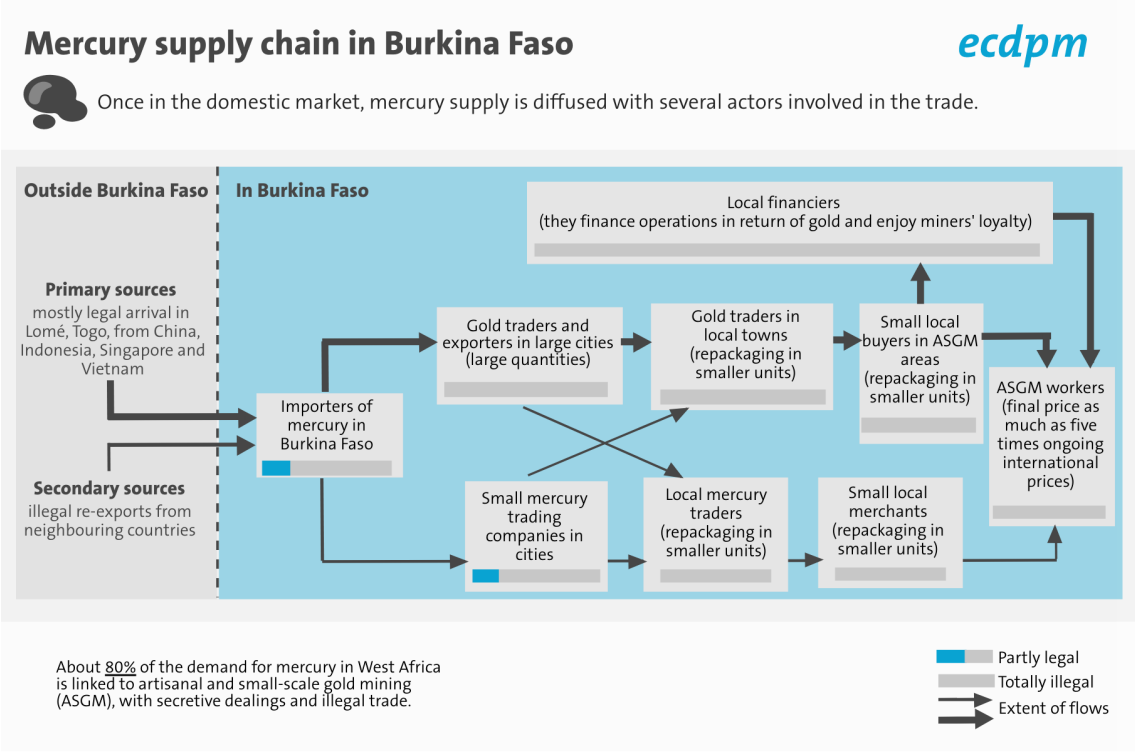
**Mercury trade in Sub-Saharan Africa is only roughly estimated at 200-400 tonnes, given its highly informal nature** (Lassen et al. 2016). About 80% of the calculated demand for mercury in West Africa is assumed to be for ASGM (Ibid.). It makes its way to the mines through clandestine channels, transported by vehicles across the border along unpaved roads to avoid customs or any other inspection (Ibid.).

**Togo is the main hub of mercury trade in the region**.[6] Legal imports of mercury arrive in Togo from various sources like China, Hong Kong, India, Indonesia, Singapore, Vietnam and Turkey before being illegally transported to other countries in the region without much oversight (Hendus 2020).[7] Burkinabe actors are known to be heavily involved in actually smuggling the mercury to other countries, making them the regional linchpin (UNIDO 2018).

The mercury supply chain is highly layered **with intermediaries at several stages repackaging mercury into smaller units and make high margins** (Hendus 2020)[8]. Dealings are highly secretive given the illegal nature of the trade, and personal introductions are typically the way to get access (Lassen et al. 2016).

**Burkina Faso has one of largest usages of mercury in the region**. But estimates vary - from 25 tonnes/year according to the Minamata Initial Evaluation (MIA) to 35 tonnes/year according to Mercury Watch, to an estimated 77,624kg/year according to the NAP (UNIDO 2018; IGF 2018; NAP 2020). Moreover, while the mercury practices in Africa are less efficient than in other regions like Asia or South America, the **techniques in Burkina Faso are especially inefficient in terms of the amount of mercury consumed vis-a-vis gold that is produced** when compared to others like Senegal and Ghana (IGF 2018).[9]

Mercury is supplied (sold or provided on credit) by local gold buyers or pit managers to the miners in exchange for gold. These actors in turn are supplied with mercury by gold trading houses (who buy the gold from them). Sometimes mercury is also sold by individual vendors as illustrated in the figure above (Lassen et al. 2016).

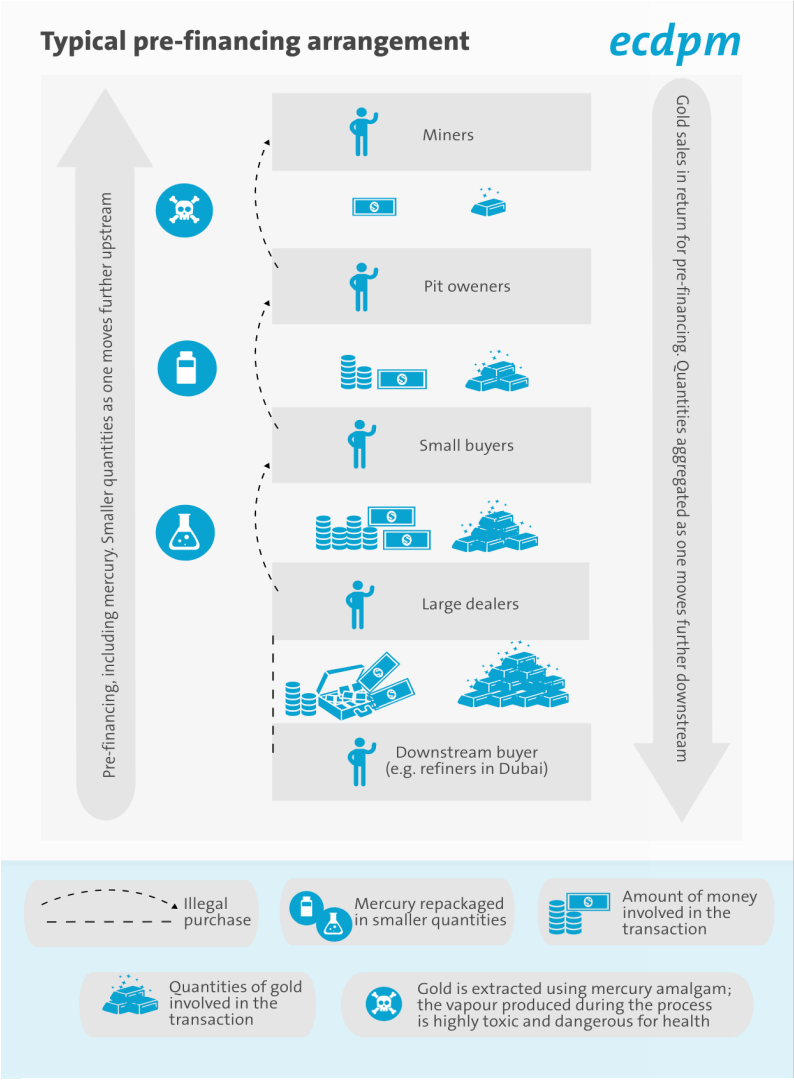



*Source: Based on Lassen, et al. (2016) and Hendus (2020)*

The context in which ASGM takes place is important. **Pre-financing arrangements are ubiquitous in the region**. Under this kind of agreement, financing is provided for mining operations in order to secure access to gold as shown in the figure below. Financing requirements in setting up a gold mine can be sizable.[10] Pit owners need sufficient capital to pay all the costs to operationalise the mine, including living expenses for miners before profits can be generated. This makes pre-financing **necessary, especially given the lack of formal financing options**.

Miners work for a pit owner, who sells gold to small buyers operating close to the mining sites. These small buyers are usually pre-financed by gold traders in the big cities, who in turn are pre-financed by buyers further downstream, including in refining centres like UAE (Martin and de Balzac 2017). Amounts involved can be huge, for instance, large dealers in Niger are reported to have entered into partnership with small buyers providing a capital outlay of US$30,000-US$50,000. This way, dealers can benefit from economies of scale and pay a relatively small mark-up on the gold they purchase (Hunter 2019). The arrangements often dictate to whom gold is sold and at what price. Greater control over the supply chain reduces costs and increases profits. Pre-financiers can range from local leaders foreign businessmen.[11]

The financier deducts his costs before paying for the gold. Buyers may social assistance to miners in the form of food, or coverage of health fees (DeJong 2019). In exchange for this support, the financier expects fidelity from the miners (Hunter and Smith




Source: Author's illustration

2017). This **established relationship may be seen as a way to mitigate risks of selling to strangers who may take advantage of the miners' lack of knowledge and provides a means for them to rely on funds during hard times** (Lassen et al. 2016). That is not to say these arrangements are not exploitative. Indeed, given that they happen informally, with different kinds of actors being involved, there are also cases where deals have been unfavourable to miners (Hunter 2020).[12] Mercury is widely used in these arrangements (Ibid.). This preponderance makes it difficult to separate mercury trade from the wider socio-economic relations in the community. Moreover, the close interlinkage between gold and mercury trade also makes it a difficult cycle to break, (Hendus 2020).

Workers that process ore through amalgamation, many of whom are women, work semi-autonomously, according to fixed arrangements, without requiring to work in groups (Ouedraogo 2014; Lanzano 2020; Eslava 2018). Mercury amalgamation however **only gives a low recovery rate of less than 60%** according to the MIA (IUCN 2019). With technological advances, miners are moving to more efficient forms of gold extraction, for instance by using cyanide.

In industrial gold extraction, the use of cyanide is widespread, as it allows to extract a greater amount of gold from ore. As gold prices kept rising in the 2000s and early 2010s, and ASGM boomed in the region with the perceived need for intensification in processing and raising productivity, the use of **cyanidation trickled down to ASGM operations as well** (Lanzano 2020). However, its use is not uniform across the region. Burkinabe prospectors learnt the technique of cyanidation from specialist companies since the 2010s (Sollazzo 2018). Regionally, they are considered the leaders in this kind of processing, diffusing the practice in other countries (Lanzano 2020).

**Cyanidation is a less rudimentary technology, and requires a degree of centralisation**. It also poses distinct environmental and health risks, as cyanide is stored and used in pits in the ground. While it does not persist in the environment, if mishandled its impact can be grave (Notman 2015).[13] Worse still, cyanide is used in combination with mercury whereby leftover ore from tailings handled with mercury is further processed with cyanide. This combination is highly toxic. In a few cases, this is slowly being replaced by using cyanide throughout the processing.

As Lanzano (2020) explains, the introduction of this technology has further **blurred the distinction between ASGM and semi-mechanised gold mining, and reshaped the organisation and division of work**. The increased use of cyanide replaces other modes of production centred around crushing, washing and mercury processing. With greater needs in terms of investments and specialised knowledge, it has resulted in a hierarchy, incentivising members with capital (particularly pit chiefs) to integrate the different

Mercury and gold trade in West-Africa


*Source: UNIDO (2018)*

production phases (excavating, washing, cyanidation) in order to minimise costs (Ibid.). Thus, mechanisation brings about greater profits, and a degree of organisation of the workforce, while also **transforming ASGM from being a livelihood activity for many to being a profitable business for a few**.

When looking at gold purchasing, prices offered to **actors in the supply chain are relatively high since no official taxes are paid on it**.[14] Nevertheless, miners who are at the bottom of the supply chain are least compensated, while other actors, especially the dealers make the largest margins.[15] So **while miners may be motivated by poverty-driven considerations when engaging in ASGM,[16] actors at the higher end of the supply chain are rather profit-driven** (Hunter 2020).

Gold is aggregated in sufficient volumes in large gold trading houses, mostly based in Ouagadougou at an estimated 99.2-99.5% of international gold price or LBMA price (see the figure above illustrating a typical pre-financing arrangement). Reports suggest that gold from other countries, especially Côte d'Ivoire, was smuggled into Burkina Faso during the civil war there (Martin and de Balzac 2017). These large dealers smuggle the gold out of Burkina Faso and sell it in Lomé, presumably at a loss since the buying price there is around 97-98% of LBMA (Alvarez et al. 2016).

This 'loss' can be justified because gold, long used as a trading currency, allows the purchase of other goods (especially in Dubai) by circumventing the official banking and currency circuits, which are considered restrictive and selling the goods at a mark-up (Ibid.; Sollazzo 2018; Hunter 2020). This amounts to illicit financial flows (IFFs). IFFs linked to ASGM in West Africa have also contributed to conflict and instability in the region as traffickers and armed groups have increasingly penetrated these smuggling networks to finance their activities including terrorism and money laundering circuits (ICG 2019; Hunter 2020). For instance, mines were seized by armed groups in Mali and Burkina Faso (ICG 2019). There is also other criminal activity.

For instance, between 2010 and 2014 in Burkina Faso there were several reports of groups of South American citizens (claiming to be Colombians) buying gold or sending collectors to mining areas, without negotiating the price (Sollazzo 2018). The smuggled gold then makes its way to refiners and jewellers based outside the region.

**Once in Togo, the smuggled gold enters the formal supply chain and is exported out of the region, including Switzerland until recently** (Martin and de Balzac 2017)**.** Switzerland is home to some of the largest refiners in the world - 5 out of 10 world's largest (Ruysschaert et al. 2015). Guéniat and White (2015) showed that up to 7 tonnes of gold smuggled out of Burkina Faso made its way Swiss refineries in 2014 via Togo. These revelations have bolstered the **increasing civil society and regulatory pressure on large enterprises to ensure that the minerals they source are produced with sound social and environmental practices**. In response to these pressures, companies have signed up to voluntary mechanisms for due diligence and promotion of responsible practices in mining areas. Further, the Swiss Better Gold Initiative (SBI) is a public-private partnership set up with the aim of promoting a more responsible gold supply chain through certification. The following section will briefly outline some of the challenges of these schemes.

As the use of mercury and cyanide show, **transformations in ASGM are not just technological but also social where established patterns of relations between miners, traders and private investors evolve** (Lanzano 2020). Governance is embedded in existing social structures that may be customary - through an established system of practices and norms rooted in traditional law and customary institutions - or informal, involving a multitude of actors that strike arrangements that vary and evolve over time (Arnaldi di Balme and Lanzano 2013; Côte and Korf 2018). These relations are key to understanding the potential impact of initiatives aiming to promote responsible mining and those seeking to control the (illegal) trade in chemicals.

## Push from responsible mining

Responsible mining is an umbrella term taking into account the social (human rights, conflict minerals, child labour, health and safety etc.), environmental (pollution and use of hazardous chemicals) and economic (transparency on financial transactions and tax payments) sustainability in mining operations (van den Brink et al. 2019).

The EU, and its member states, have adopted a mix of legislations on the one hand, e.g. **EU Conflict Minerals Regulation**[17] which looks at supply chain due diligence by importers in the EU, and several voluntary schemes on the other, e.g. the **European Partnership for Responsible Minerals (EPRM)**[18] to ensure compliance with the tenets of responsible business conduct. These measures also cover the gold supply chain.

Third-party certification and labelling programs exist, which in some cases trigger premium payment for miners upon adherence to certain standards. **Certification schemes in ASGM include the Fairtrade Gold and Fairmined Gold standard, managed by Fairtrade International and ARM respectively** (Hilson et al. 2018).[19] The Code of Risk-mitigation for ASM engaging in Formal Trade (**CRAFT**) was designed for artisanal operations to lessen the compliance burden and provide a stepping-stone to the Fairmined standard.[20] But in general, standards in ASGM are recent with little information on their impact.

**In West Africa too the principles of responsible mining in ASGM operations have been embraced.** Apart from frameworks like the NAPs, members of the LGA (Liptako-Gourma Integrated Development Authority) i.e. Burkina Faso, Mali and Niger have also put in place an eight-part action plan to promote the **OECD Guidance for responsible mineral supply chains** (Sollazzo 2018). Several projects have been introduced as accompanying measures to the NAP. Apart from the project led by UNIDO, mentioned above, ARM has several projects to not only reduce the use of mercury but also ensure a more socially and environmentally sustainable supply chain using the mechanisms under CRAFT. It has two pilot projects to introduce the Fairmined certification in Burkina Faso and Senegal (Stähr and Schütte 2016); Alvarez et al. 2016).

However, **there are several challenges to these measures eventually resulting in more sustainable practices in ASGM**. They all require a degree of **formalisation** in the sector, which currently is not the case, due to several bottlenecks like the tenure security, access to finance for miners, organisational capacity, among many others (de Haan 2019). Years of relatively neglect of ASGM and simultaneous prioritisation of LSM has discouraged formalisation, distorting incentives and fragmenting the sector. Moreover, formalisation may not be an option for many, since ASGM is a (crucial but) supplementary activity providing the urgently needed cash rather than a primary activity (Hilson 2011; Pokorny et al. 2019). Legal requirements also ignore traditional, though informal, organisational structures (Levin Source 2020). The diversity of actors, and the complex web of interconnected and fluid interests need to be appreciated for formalisation efforts to be successful.

N**ational policies do not take the realities of ASGM organisation into account with outdated legislation failing to reflect technological evolution in ASGM** (Levin Source 2020; Nikièma, et al. 2020). This could also have an impact on the ability of initiatives introducing better technologies since they may not fit within the narrow legal definition of what constitutes ASGM (Ibid.).

With regards to the NAP specifically, **"environment-led development agenda" pursued under the Minamata Convention brings its own set of challenges** (Hilson, et al. 2018b). The institutional partner to implement the NAP (i.e. Ministry of Environment) does not regulate nor license ASM activities (Ibid.). Policy actions outlines in the NAP thus seem disconnected to the challenges of the sector.[21] Moreover, there is lack of coordination between different state. For instance, the Ministry of Environment has little scope to verify mercury imports entering the national territory (which are overseen by the customs agency) even though it is in charge of reducing its use through the implementation of the NAP (UNIDO 2018). Similarly, several Ministries (e.g.

Environment, Health, Mines) and organisations (defence and security) undertake different initiatives as they sensitise miners to the risks of mercury use in an uncoordinated manner (see IUCN 2019). But the heavy restriction mercury use without reducing its demand will likely increase illegal trade (Hunter 2020).

Lack of access to formal finance is another binding constraint for miners to invest in cleaner technologies. A typical investment for a mercury-free processing plant designed by the AGC is about £80,000, equivalent to two kilo of gold at current prices in 2015 (it is also dubbed the two kilogram model or 2kgM) (Schure 2015). While the program by AGC envisages access to finance as an integral part of the formalisation process, even banks extending microloans to small and medium enterprises in West Africa are highly prejudiced against ASM and consider it too risky (Hunter and Smith 2017). This is clearly not the case with pre-financing. **In the absence of access to formal finance, it is unclear how the appeal of pre-financing from informal networks, that also promote mercury use, can be taken away**.

C**ertification schemes are also not without challenges.**[22] Without pre-financing which can provide miners the wherewithal to carry out operations, gold, even if eligible for a premium, may be pledged to a pre-financier outside the system (Fisher 2018; Levin Source 2020; Martin and de Balzac 2017). In the absence of authorised gold buying counters close to the site, miners may continue to depend on local traders present on site and avoid the risk of theft by transporting gold to greater distances (RCS Global 2016; Bahbot 2017). More importantly, these schemes also have a selection bias and do not reach a majority of ASGM workers (Fisher 2018).[23] Sippl (2020) also reports a **trade-off between the stringency around mercury use when complying to standards and the uptake of these schemes**. This may be due to reluctance to changing technologies and altering social norms or simply lack of awareness (Ibid; IUCN 2019).

While miners may currently not contribute much to state revenues, several research works have shown that **miners would be willing to pay taxes for public services, but trust in government institutions to do so is low** (Geenen 2011; Crawford and Botchwey 2016; Rahnama and Tolonen 2016; Sippl 2020). There is anecdotal evidence of informal taxes being levied and profits being reinvested to build basic infrastructure e.g. in Burkina Faso which suggest tax avoidance is not the only motive for operating in the informal market (Ouedraogo and Mundler 2019; Pokorny et al. 2019). Lack of consideration to the local social and cultural dynamics that underpin ASGM could lead to the sub-optimal design of standards (Eslava 2018).

In sum, the operating in the informal market (with relatively cheap access to mercury that does not require skilled labour and established channels) is a more attractive option than the official market (where gold price tends to be lower and formalisation does not offset costs). Existing trust-based relationships are not easily substituted by interventions of the government or NGOs.[24]

Some private companies are developing shorter and more sustainable gold supply chains by going directly to miners and working with the national authorities to transform operations. One such company is Barksanem, which deploys a license containing a portfolio of technologies (precious metals extraction, digital money, tracking). Several of these licenses are under various stages of negotiation and preparation in West Africa.[25] In addition, if investments can be secured, the company intends to establish a foundry in Burkina Faso to attract miners to sell their gold to be processed by using cyanide in a controlled setting (DeJong 2019).[26] There could be value in such initiatives whereby the **cyanide-processing facility could reduce the demand for mercury, without the miners having to assume the risk of investing in mercury-free technology themselves**. It was pointed out that the company invests time in winning the confidence of the local community by laying out its plan.[27]

## Regional dynamics in ASGM

**The use of mercury in ASGM has an inherently regional or cross-border angle**, given the reliance on imports, and the highly porous borders with labour

mobility. The **close links and overlap between mercury and gold trade** also suggest that one cannot be seen in isolation from the other. Several countries in the region are losing millions of dollars in state revenues to illegal trading and smuggling (Hunter and Smith 2017; Hunter 2020). For instance, in 2014, Burkina Faso lost as much as FCFA 3.5 billion in gold export taxes, equivalent to a quarter of the total aid from Switzerland to Burkina Faso in that year, from the smuggling circuits via Togo, most of which ended up going to Switzerland until recently (Guéniat and White 2015). This figure does not include foregone import duties on mercury.

**The cost of royalty and other export fees among ECOWAS countries varies from one country to another**, ranging from US$2,231 in Côte d'Ivoire to US$33 in Guinea, and providing an incentive to smuggle gold to places with low tax costs (UNIDO 2018).[28]

**The role played by Togo in both mercury as well as gold trade is particularly interesting** here. As mercury shipments come into Togo, much of it is not recorded since they are not (officially) imports into the country. Moreover, no taxes are levied on most mercury imports because they are in transit and the shipments are also subject to less scrutiny (Ibid.). So mercury shipment after leaving the port in Lomé disperse through illegal channels into the neighbouring countries. On the gold marketing side, while countries like Burkina Faso reduced the tax[29] on artisanal gold to about US$711/kg in an effort to promote legal trade, dealers smuggling the gold out of Burkina Faso and exporting it from Togo pay only US$81/kg in transit tax (Ibid.). Smuggled gold from other West African countries, e.g. Liberia, Ghana and Mali also finds its way to Togo before being exported out of the region through formal channels (Hunter 2020; World Bank 2019).

**Gold-trafficking networks to Lomé are well-established** which settle transactions in Lomé or even Dubai via the hawala or phone-based money or value transfer services without any physical circulation of money, circumventing controls on capital movements and can be used by armed groups or criminal gangs to finance themselves (Sollazzo 2018). Especially some of the **big companies settle the transaction immediately with 'no questions asked' about the origin and relevant paperwork of the gold being bought** (Guéniat and White 2015). Here, gold enters the formal supply chain to be exported to outside the region.

There are **calls to harmonise tax and trade policies at the regional level and greater cooperation and coordination between and among member states** to address the issue of illegal mercury (and the interlinked gold) trade (UNIDO 2018). Some of the regional frameworks include the ECOWAS Harmonisation of Guiding Principles and Policies in the Mining Sector and the WAEMU Common Mineral Policy and Community Mining Code (Ibid.).[30] The focus on chokepoints in the regional supply chain, like Togo, would ensure more effective and efficient use of limited resources.

**Implementation of regional agreements is a known challenge where strong interest groups play a role at the national level, undermining implementation** (Byiers et al. 2017). Coordination and collaboration between countries to tackle these challenges together requires a series of conditions to be in place, not least high-level alignment of interests and willingness to upset the existing modus operandi.

**The incentives for individual countries, especially those benefiting from the status quo, to cooperate is not very clear**. Despite not being a significant gold producer, exports of gold from Togo have significantly increased from 0.7% (≅ US$0.33 million) of total exports to 3.5% (≅ US$22.6 million) between 2009 and 2016 (WTO 2017). It exported some 48.7 tonnes of gold between 2014 and 2016 (Sollazzo 2018).[31] Out of 20 tons of gold exported in 2017 reported between two gold trading houses, apart from a few kg estimated to have come from Togolese artisanal mines, the rest is expected to be from neighbouring countries.[32] Exports worth about US$36 million (3% of total exports) have been reported with a contribution of about US$1.8 million towards state revenues (EITI 2019). Surprisingly, these two gold trading houses are said to have closed operations according to the EITI

report. This may be something to further research in the future and determine its implications for gold smuggling.

Gold re-exports from neighbouring countries (including Ghana, Burkina Faso and Mali) are wrongly classified as Togo's exports (World Bank 2019). Moreover, while the country is the regional mercury hub, it does not have a high use of mercury within its borders. Efforts needed to curb this smuggling may be a huge investment of resources for Togo and the benefits thereof are not immediately clear, especially if it also reduces revenues from current mercury and gold traders. UNIDO (2018) rightly points out that **negotiations may require identifying the right levers that can be used to lure Togo to the negotiating table and spend resources** to target mercury imports at seaports.

**Harmonisation of royalty and tax rates to reduce the impetus smuggling can only work if and where these can be enforced**. Weak regulatory capacity and lack of resources impede the ability of countries in this regard. For instance, despite reports of gold being smuggled along main trading routes over land, oversight by several countries is limited (Hunter 2020).

Moreover, it is **unclear if harmonising tariffs alone will resolve the issue of smuggling given other factors like pre-financing, the use of gold as a currency etc.** It would thus require a holistic regional cooperation strategy.

**Corruption is one concern**. The involvement of customs agents on both sides in facilitating the smuggling of gold at the Burkina Faso/Togo border is documented (Guéniat and White 2015).

**Capacity within the Togolese administration, especially customs, to regulate this flow is unclear**. At the export stage, despite exports of in excess of 20 tonnes (mostly coming from neighbouring countries), the value declared to the customs authority was negligible whereas a report from 2013 suggests that gold exports, which accounted for a whopping 24% of the country's mining exports, should have brought in revenues worth US$43 million.[33] These discrepancies could not be reconciled. Moreover, two major gold marketing companies apparently halted operations between July 2018 and February 2019 (EITI 2019). Consequently, total gold exports in 2018 saw almost a 50% decline in 2018 to 10 tons compared to 2017 (BCEAO 2018). But it is unclear whether this is a sustained trend or a temporary decline.

The revenue authority recently created a tracing system to intercept smuggled imports in order to maximise revenue collection, but most imports entering the Togolese ports seem formal.[34] But this system does not address the issue of mercury re-exports from Togo to other countries. A new specialised unit of customs officer was also created to intercept smuggling.[35] There do not seem to be any reports of smuggled mercury or gold being seized. It would require significant investment and technical capacity to record mercury imports and exports correctly[36], control the source of gold exports and intercept smuggling. Coordination across Ministries will be essential to discuss the issue and find viable solutions. This shows that **regional harmonisation and cooperation, while necessary, may not be easily achieved**.

# Conclusion and implications for further engagements

**ASGM is a major employment generator in West Africa but there is a vast array of actors involved in this activity**, ranging from miners looking to supplement their agricultural incomes, to large and profit-making dealers who are interconnected through a complex web of transactions. The activity also has a **strong socio-cultural aspect**. There are governance structures which may be customary or informal. Moreover, knowledge is embedded within social structures and has been evolving with the use of new technologies.

Nevertheless, the activity does not enjoy provisions like access to finance, or tenure security, thereby being **marginalised as governments prioritise LSM** - operating the shadows of the informal economy, and

engaging in smuggling. As such, **it needs to be seen from the prism of wider socio-economic development rather than a mere mining issue**.

**The closely interlinked relation between mercury and gold trade needs to be broken, and the role that pre-financing plays in this needs to be appreciated**. While miners are aware of the social and environmental costs associated with the use of hazardous chemicals, they may not be willing to undertake expensive investments of adopting mercury-free technologies unless they have a meaningful alternative to finance it.

Miners are looking for legitimacy of their work, more than its legality (Eslava 2018). At the same time, they would be willing to formalise and pay taxes if trust in the state is restored with benefits in terms of provision of public services (including geological data, safety and protective equipment and so on). In short **it is important that costs associated with formalisation are outweighed by benefits, but more often than not it is the costs that outweigh the benefits**.

The systemic issues which hinder better governance of the ASGM, may not be addressed through ad hoc initiatives. But more broadly, the following implications can be drawn from the above analysis:

### For miners to formalise and use chemical-free technologies..

1. **Use a carrot (incentives) and stick (enforcement) approach**. Formalisation includes a spectrum of activities which go beyond registration of firms. It includes access to services like formal financing to pay for operations (carrot), as well as greater scrutiny that operations are performed more responsibly (stick). But access to formal finance may not provide an incentive enough for miners who have pre-financing.[37]
2. **Explore a viable alternative to pre-financing for miners**. Pre-financing, in and of itself, is not a bad practice. In fact, it is necessary given the costs involved in setting up ASGM operations. However, the way in which these arrangements take place, perpetuates informality. Alternative ways of providing pre-financing to miners while incentivising the use of chemical-free technologies should be explored. These could include blended finance options (see e.g. PlanetGold 2020).
3. **Explore alternatives which do not involve too much risk for miners, including through the linking of ASGM operations to LSM or other private sector actors**. Under the current system, miners' equipment and daily subsistence is already pre-paid, and sale of gold is predetermined, so that miners do not have to assume much risk. It seems unclear what incentives miners would have to access formal financing and repay these costs of using these. Instead, making chemical-free technologies available to miners through the participation of private companies, including LSM operators may be more pragmatic.

### Governments need to explicitly recognise that..

4. **..the balance between revenue-generating LSM and employment/income-generating ASGM.** Studies have shown that ASGM has more poverty-reducing effects even though it may not contribute much in terms of government revenues when compared to LSM.
5. **..formalisation is an attractive option to miners only so far as the benefits outweigh costs**. Apart from reducing the costs of formalisation through simplification of processes, benefits - including not just basic infrastructure but also public services like geological data, or provision of safety equipment and so on - may provide an incentive to formalise.
6. **..local and traditional governance structures have played an important role in governing ASGM, and should be built to govern ASGM.** Trust in the state in many countries in the region is low. It should be built by working together with, rather than replacing, existing structures and arrangements where possible. This includes local buyers whose incentives need to be altered away from the use of harmful chemicals.
7. **..to regulate the use of chemicals and govern ASGM, different government organs need to work in a coordinated way.** A coordination committee at the national level that can sensitise the stakeholders to the perils of mercury trade may be useful while highlighting it close to the artisanal gold trade.

### At the regional level..

8. **Inter-governmental coordination and cooperation is essential**. National coordination committees or bodies across countries should interact with one another to resolve other issues related to mercury shipments in transit. This may call for multi-stakeholder approaches.

### External partners also have an important role..

9. **International standards need to be critically assessed to see if they actually impacted the conditions they seek to change**. While it may seem evident that compliance to standards improves conditions on the ground, this also needs to be backed by evidence. Moreover, periodic assessments of the functioning and responsiveness of standards can provide important insights into what needs to be adapted to improve conditions on the ground. There should also be an assessment of the premium consumers would be willing to pay for certified artisanal gold.

10. **Certification schemes should consider not just the economic but also the socio-cultural aspects of ASGM**. Focusing on heavy top-down measures, or worse treating miners as criminals, may only alienate them further.

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[1] Based on estimates, annual production is assumed to be at least 20 tons in Cote d'Ivoire, close to 20 tons in Mali, 4.3 tons in Senegal and 20-25 tons in Burkina Faso (Nikièma et al. 2020).
[2] For instance, in Burkina Faso, a World Bank report from 2018 estimates the number of artisanal sites at 1,500, while the national survey puts this figure at 448 in 2016 (IUCN 2019; INSD 2017). Whereas Bazillier and Girard (2020) estimate 648,000 are directly employed through ASGM in Burkina Faso in 2014, INSD estimates the number to be much lower at 140,200 (see Medinilla et al. 2020).
[3] Mercury-processing or amalgamation has several steps where the rocks or sediments containing gold are mined, followed by crushing of the ore to liberate gold particles, and concentrating the mass of the ore. Mercury is then added (typically by hand) to the ore to form an amalgam (a mixture of mercury and gold), and then is heated (often with a torch or over a stove) to evaporate the mercury and obtain a porous 'sponge' gold product. This is melted to produce the 'gold doré' before being refined in gold processing shops and sold on the global market (IGF 2018).
[4] Mercury vapour released into the atmosphere during amalgam is very harmful for the nervous, digestive and immune systems, lungs and kidneys, and may be fatal (Esdaile and Chalker 2018).
[5] Burkina Faso, Mali and Senegal have the NAP in place. See National Action Plans.
[6] According to state statistics, between January and November 2018, some 8,477kg of mercury was imported (UNIDO 2018).
[7] According to Lassen et al (2016), Switzerland was also a major exporter of mercury, recovered from chlor-alkali plants. However, as of 2018 mercury exports from the country are subject to restrictions and permit requirements (FOEN 2018). The EU, traditionally a major exporter of mercury accounting for 25% of the global supply, banned mercury exports in 2011 (EC 2013, Lassen et al. 2016).
[8] A flask of 34.5kg at its peak cost about US$3,500 in 2012-2013, before declining to US$1,000-US$1,200 by 2016. But the calculated price charged for a flask, based on the average price at which mercury is bought by miners (per gramme), was equivalent to US$17,600 (IUCN 2019).
[9] About 71% of initial mercury is released into the environment, 53% of which goes in the air while burning while 18% in the ground during amalgamation (IUCN 2019). The level of mercury concentration found in human urine in several sites is well above the WHO recommended levels, with increased risk of mercury poisoning (IGF 2018).
[10] For instance, equipment costs for starting a mining operation in a region in Sierra Leone costs around US$550 (Hunter and Smith 2017).
[11] In countries like Ghana pre-financiers could be from countries like India or China given high demand back home (Hunter 2020). In others like Liberia, Lebanese pre-financiers are also involved, while in Burkina Faso, they could sometimes even be refiners in Dubai or jewellers with connections back in India (Hunter 2019; Hunter 2020).
[12] During the COVID19 related disruptions, while the international prices of gold soared, those offered to miners were significantly lower (from 73% of world price pre-COVID19 to just 58% of the world price in April 2020). Moreover, dealers stockpiled on cheaply bought gold during the travel restrictions, to sell at a hefty profit when the restrictions were lifted. See https://www.artisanalgold.org/2020/04/burkina-faso-quarentines-and-gold-prices-down-20/
[13] With unprofessional management, chemicals are released into nearby water sources, contaminating the water supply, and posing risks to people and livestock.
[14] In Burkina Faso, prices offered by ANEEMAS (the national semi-autonomous body to supervise and regulate the ASM sector), are lower than those offered in the informal market (Medinilla et al. 2020).
[15] In Burkina Faso it is estimated that average workers earn US$60 (which is still much higher than incomes from agriculture) while pit owners earn as much as US$240 during the production phase (DeJong 2019). Dealers on the other hand, make margins ranging between US$400 and US$1,000 per kilo of gold sold (Sollazzo 2018).
[16] A majority of workers engaged in ASGM Burkina Faso are estimated to be living below the national poverty line (Thiombiano et al. 2011).
[17] Introduced in 2017, the regulation requires companies importing the 3TG minerals (tin, tungsten, tantalum, and gold), which have most often been linked to armed conflicts and related abuses of human rights, to put in place mechanisms to ensure that they import from responsible sources only starting 2021.
[18] This is an accompanying measure for the above-mentioned EU regulation and intends to assist miners in conflict-affected and high-risk areas (CAHRAs) to comply with standards under the OECD Due Diligence Guidance on Minerals. See Seters and Ashraf (2019).
[19] A joint Fairtrade and Fairmined certificate was launched in 2011 before splitting into two in 2013 (Sippl 2020). This has resulted in, among other things, an evolving definition of what constitutes 'fair' with rules around it (Hilson et al. 2018).
[20] CRAFT was recently revised. See https://www.responsiblemines.org/en/2020/10/craft_v2-0/
[21] In Burkina Faso, it is envisaged to have a single window to emit licenses for ASGM, along with the establishment of 12 cooperatives, provision of a financing mechanism to produce gold without the use of mercury, promotion of traceability and certification of mining cooperatives, and direct involvement of ANEEMAS to buy responsible gold without the use of mercury with a large component of capacity building. But how precisely the close link between illegal mercury and gold trade will be

broken, especially given the close relations between pre-financiers (buyer/pit owners) and miners on the one hand, and distrust of the government of the other is not clear. Moreover, ASGM in Africa more generally has a limited history of collective organisation.

[22] Hilson et al. (2018) also point to the diverging interests with ASM workers, mostly based in the Global South, want more wages, better working conditions and legitimacy whereas jewellers and consumers, based in the Global North, would be more interested in traceability and transparency of the supply chain (which may overshadow certain other sustainability objectives like fair trade and empowerment of small producers) and lower prices (reflected in the low demand) respectively (van den Brink et al. 2019; Eslava 2018; Ruysschaert et al. 2015).

[23] Certified groups exist in Latin America and Asia, but attempts in Africa, where the need for support is greater, have failed. These schemes cover only about 0.01% of the miner population, and these miners already earned an income that was much higher than the average wage of an artisanal miner which tends to be below the poverty line (Sippl 2020).

[24] For instance, an evaluation of the Dutch responsible business conduct agreements notes mistrust between project implementers and local communities in Uganda (KIT 2020).

[25] See https://www.barksanem.com/licensing/?lang=en

[26] This would allow for greater recovery of gold, ensuring high incomes for miners and avoiding smuggling. Recovered gold will be sold to ANEEMAS before being shipped to a Swiss refinery (DeJong 2019).

[27] Nevertheless it was also pointed out that the miners were less inclined to work in this scheme if the government was involved.

[28] Low tariffs in Guinea have been identified as a driver of smuggled gold from neighbouring countries like Sierra Leone (Hunter and Smith 2017).

[29] On gold is exported via ANEEMAS

[30] ECOWAS is currently also developing a regional model for the regulation for ASM, including gold following approval of a wider regional mining act in 2019. See https://www.ecowas.int/event/selection-of-individual-consultant-to-develop-an-ecowas-model-regulation-on-artisanal-mining-and-small-scale-mining-which-aligns-with-the-communitys-vision/) and https://allafrica.com/stories/201906050251.html

[31] Main export destinations include UAE (24 tonnes), Lebanon (15.8 tonnes) and Switzerland (8.7 tonnes).

[32] According to Sollazzo (2018) estimates some 10-12 tonnes of gold from Burkina Faso and 2-3 tonnes from Niger are smuggled into Togo each year.

[33] See https://eiti.org/news/behind-scenes-of-togos-exports

[34] See article entitled "Togo : un système automatisé de marquage, pour lutter contre la contrebande et le commerce illicite"

[35] See article entitled "Togo : la douane se dote d'une unité spéciale d'intervention pour lutter contre la contrebande"

[36] Currently there is no single mercury-specific trade code and different countries use different codes, making the tracing of this trade difficult (UNIDO 2018).

[37] Access to finance would normally happen post-formalisation, and miners need to show some form of track-record to access loans. But they need none of these with pre-financing arrangements.

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**HEAD OFFICE**
***SIÈGE***
Onze Lieve Vrouweplein 21
6211 HE Maastricht
The Netherlands *Pays Bas*
Tel +31 (0)43 350 29 00
Fax +31 (0)43 350 29 02

**BRUSSELS OFFICE**
***BUREAU DE BRUXELLES***
*Rue Archimède 5*
1000 Brussels *Bruxelles*
Belgium *Belgique*
Tel +32 (0)2 237 43 10
Fax +32 (0)2 237 43 19

**info@ecdpm.org**
**www.ecdpm.org**
**KvK 41077447**