

ASGM: The Production of Social and Environmental Suffering Gold, mercury and the next Minamata tragedy

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Ma Onah, 60, a housewife with 3 daughters, left by her husband 5 years ago when she started showed weird movement: whole body tremors and screaming in pain every night. She became the burden of her younger daughter, Seni, 16, student, and lives on other people's donation. The local doctor diagnosed her with stroke and having nervous system disorder, gave her generic pain killer and strong drug for her nerve. In the last 3 months she stopped taking drugs because she could not afford to buy the medicines and very often the drug is not available in the nearby pharmacies in Pelabuhan Ratu, 3 hours drive from her village.

Onah never produce gold that earned by her neighbors nor touch the quicksilver - the local term for mercury, the necessary evil to get the gold out from the ores. Sadly, she is not alone. In her village, there are at least 20 other villagers that have been suffered similar symptoms or died due to stroke. High blood pressures, upper pulmonary disease, heart disease and strokes, nervous system disorder, skin diseases and digestive disorder are 5 top diseases. In Palu, Lombok, Bombana, Palangkaraya, Sekotong and other hotspots, the list are similar.

Introduction

UNEP (2011) that stated Across the globe, Europe and Asia experienced the greatest increase of supplies in gold between 2006 and 2009. A 29 percent increase in gold prices from 2009-2010 is driving new exploration activities in the formal gold sector, chasing other regions as smaller deposits buried in remote corners of the globe and leading to shallow mining activities. Large scale mining operations are shifting to regions with lax of regulatory mining climate, low environment and social costs and artisanal small-scale mining activities are most prevalent.

As mines age, extracting gold gets harder and costlier. Ores produce less metal and the average grades have fallen 30% since 1999 while ore must be extracted from a greater depth. Consequently, operational costs, labor and equipment are higher. A decade ago the average cost of extracting an ounce of gold from the ground was a little over \$200 and in 2010 it hit \$857 as stated by Gold Fields Mineral Services (2011).

Gold trading is a legal business worldwide. The sector is pressured by depleted resources but increased its awareness of fair trade and human right issues in mining introduced by the Kimberley Process and OECD. In the last ten years, the market started to develop a common understanding over the acceptance of supply chains of minerals, especially for rare earth and precious materials including gold, from conflict-affected and high-risk areas.

Global policy framework on mercury

Global support for a binding agreement on mercury emissions began building in 2003 when the Arctic council reported the elevated mercury level in the northern hemisphere's ecosystem. On 20 February 2009, the 25th Governing Council of UNEP adopted a decision "to initiate international action to manage mercury in an efficient, effective and

coherent manner." An Intergovernmental Negotiating Committee (INC) was established, chaired by Fernando Lugris of Uruguay and supported by the Chemicals Branch of UNEP's Division of Technology, Industry and Economics. The INC held five sessions to discuss and negotiate a global agreement on mercury. On 19 January 2013, after negotiating late into the night, the negotiations concluded with 147 governments agreeing to the draft convention text.

The Convention was adopted and opened for signature on 10 October 2013, at a Conference of Plenipotentiaries (Diplomatic Conference) in Kumamoto, Japan, preceded by a Preparatory Meeting from 7-8 October 2013. As of February 2014, 96 countries signed the Convention and one country, USA, ratified it in November 2013. The Convention will enter into force 90 days after it has been ratified by 50 nations.

The convention was named the Minamata Convention on Mercury to remind the global community not to repeat the same tragedy occur in Minamata, Japan, 60 years ago. The tragedy was triggered by the pollution from the Chisso Corporation that discharged the mercury-contaminated wastewater into the bay. The mercury pollutant accumulated in the fish and poisoned more than 20,000 people in the 1960s. Until October 2013, about 80,000 people claimed that they were affected by the Minamata tragedy including the third generation of the 1960s victims.

Mercury is a chemical element, heavy metal, commonly known as quicksilver. Mercury occurs in deposits throughout the world mostly as cinnabar. Cinnabar is highly toxic by ingestion or inhalation of the dust. Mercury poisoning can also result from exposure to water-soluble forms of mercury (such as mercuric chloride or methylmercury), inhalation of mercury vapor, or eating seafood contaminated with mercury. Chronic exposure by inhalation, even at low concentrations, has been shown to cause effects such as tremors, impaired cognitive skills, and sleep disturbance in workers.

Mercury is widely used in products and processes such as thermometers, barometers, manometers, sphygmomanometers, mercury switches, mercury relays, fluorescent lamps and other devices. In some industrial processes, mercury used as catalyst of the process. Under the mercury treaty, the global community agreed to phase out the use of mercury in several products and processes by 2020. However, the target does not apply to ASGM sector.

Artisanal and Small-scale Gold Mining: local problems, global challenge

In the last 5 years, the global gold price was rising but the cost of gold exploration and production were increasing. Brooks (2009) revealed that the remaining deposits of gold lies under the protected areas or national park and mostly within the territory of indigenous peoples. Gold and other minerals could only be reach by small mining operations or by group of small-scale miners.

Globally, UNEP (2013) identified artisanal and Small-scale Gold Mining (ASGM) practiced in more than 70 countries, involving more than 10-15 million miners including 4-5 million women and children. This sector produces about 12-15% of the world's gold and released about 1400 tonnes of mercury per year to the environment, exposed harmful and irreversible effect to human health and the ecosystem. The latest finding made the ASGM sector as the largest single source of mercury emission from intentional use.

Bryant (1997) stated that in the last decades, the link between poverty and environmental degradation is becoming more widely recognized as poverty's profile has become increasingly environmental. Artisanal and small-scale mining very often is also poverty

driven and a form of a modern economic slavery that passing on debt to the next generation of the miners.

Conflict over land, particularly over environmental degradation and over the concession areas of the large scale mining companies, as well as local political and development priority issues are common points of contention between miners and local indigenous populations. Furthermore, the illegal status of ASGM practices and the associated mercury contaminations become significant obstacles to sustainable development. However, for regions where economic alternatives are extremely limited, ASGM provides a temporary source of income for miners and attract several short-term economic activities.

As the gold price raising, in the last 10 years, ASGM or *Pertambangan Emas Skala Kecil* (PESK previously known as PETI/*Pertambangan Emas Tanpa Ijin*) in Indonesia has been doubled and spread out in 22 provinces encroaching national parks, protected areas, grand forest and even in small islands. Like in other countries, most of the ASGM operation are illegal and backed up by corrupt officials, police, military, politicians and invisible financiers. Figure 1 shows the distribution of ASGM hotspots in Indonesia between 2006 until 2010.

Indonesia ASGM Hotspots 2006-2010

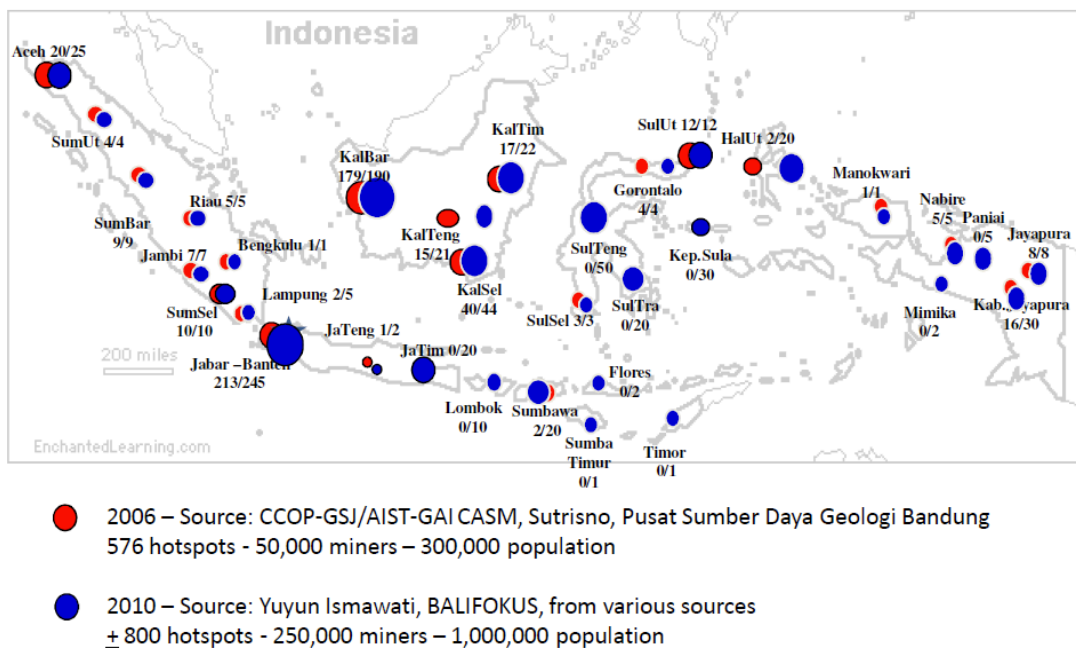


Figure 1. Indonesia ASGM Hotspots 2006-2010. Source: Ismawati, 2011.

In the case of illegal mining, the practices have widely increased since economic crises in 1998 and more rampant when the decentralization system is implemented. These activities become dilemmatic problems since unclear and inconsistent regulation or policy from the governments, as well as ambiguity position of stakeholders. Environmental NGOs have accused the government of exercising a double standard, of only wanting to curb illegal operations within large scale mining concession areas. People's mining is certainly prohibited from operating in large-scale mining companies' concession areas while the large scale mining are not prohibited from operating on indigenous lands.

Mining activities have been the source of various conflicts caused by policy and regulatory uncertainties over land use and property rights, illegal artisanal mining, pollution and environmental impacts, and uncertainty surrounding the livelihoods of local residents after mining closure. Resosudharmo (2004) noted that these conflicts are being exposed and have become more profound under the current structure of decentralization of authority to local governments, and a substantially freer social and political environment.

In 2009 Indonesia ranked the seventh as gold producers with 140 ton of gold production and a government agency stated that if we produce 90 tonnes of gold per year, Indonesian gold can be extracted until the next 100 years. My best estimation of gold production from small-scale mining activities in more than 800 hotspots in 2012 was between 65 to 130 ton a year and, of course, no official record for this.

How a small-scale mining born and abandoned

From several literature review and observation, due to its informality, the ASGM activities follow a certain pattern. Within the ASGM activity framework, every stage within the cycle, beside job opportunity and temporary economic improvement, also produce social and environmental problems. Figure 2. shows a simplified empirical cycle of ASGM practices in three stages: early stage, later stage (supply push) and declining stage (supply pull).

At the Early Stage or “Conventional Exploration” Stage, public response to the dissemination of survey results on gold potential in particular regions attracts gold prospectors and experienced miners to explore, starting an auxiliary subsistence economic activity. Several social and environmental problems started to sparked due to lack of control from local authorities and lack of local community’s anticipation and preparedness (social, physical, infrastructures, knowledge, capital, etc.). During this period, about 1,000-5,000 migrant miners per year will be coming to the new hotspot area and try their luck for 1-2 years.

During the Later Stage or “Supply Push” or the Exploitation Stage, both the production rate and the illicit economy practices start to increase significantly with mechanical and technology interventions. Mining activities expanded through financing by family resources, individual private financiers, formal and/or informal loans, applying simple technology, ‘learning by doing’ stage where risk takers’ entrepreneurial skills are challenged. Moreover, the pre-existing socio-economic dynamics, i.e. poverty alleviation, availability of the quick cash alternative livelihoods, influence the expansion of ASGM practices.

Some areas developed into a semi-industrial mining area, a pop-up gold-rush town and various profit sharing scheme become more common. At this stage, more severe social and environmental problems increased along with the gold production and number of miners. During this stage, about 5000 up to 40,000 migrant miners and workers from outside of the area will be flocking and try their luck for 1-3 years, sometimes miners bring their families to live at the site. A gold rush town will be pop-up and various entrepreneurs will also betting to gain profits in short time. This supply stage is really critical as it create more tensions and conflict between all actors and create irreversible impact to people’s health and the environment. Mercury used intensively during this stage.

At the declining Stage of “Supply Pull” or Scavenging Stage, the production rate starts to decline due to several factors, possibly the technical limitation in the mining sites such as getting deeper or wider, new regulations enacted by government to control i.e luxury

goods tax, increased land rent retribution, too many people in one area, the arrival of new investors, increasing horizontal and vertical conflict. The social problems and environmental destruction seems to be slowing down but the impact remains for a long time especially the impact of mercury. At this stage, the number of miners and migrant workers or visitors will be decreasing, created ghost towns and devastated environment. Figure 2 shows the empirical cycle of ASGM practices in most ASGM sites locally. The time frame of every stage varied from one site to another site and the rate of gold production (in metric tonnes per year) also varied.

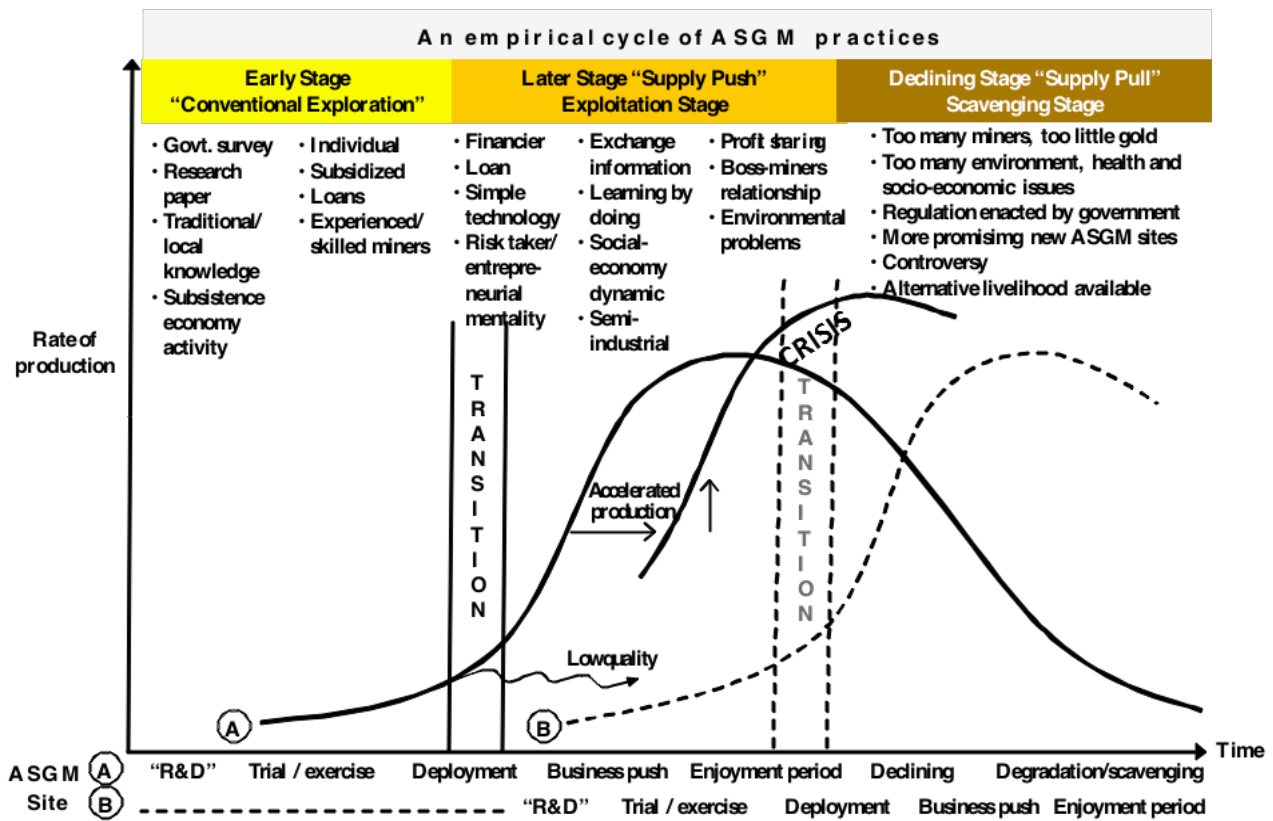


Figure 2. Empirical cycle of ASGM practices (Ismawati, 2011).

Life cycle assessment of ASGM activities

To assess the problem and challenges in ASGM, we can assess the life-cycle of the ASGM activities. Observation from several sites lead me to come up with the diagram of the life-cycle assessment of ASGM and mercury use in all streams.

Up-stream level activities are mainly related to the primary mining in the underground shaft, crushing and post-mining rehabilitation. As happening also in most ASGM sites globally, these up-stream level activities are mostly illegal, no legal permits, and most of the times conducted in remote areas to avoid government or authorities' intervention. This stage is a crucial stage to trigger an off-spring of ASGM hotspot. Corrupt forest officials, local leaders, police, military and local thugs group in a region are the key players. Sugiri (2006) stated that mining, forest and agriculture as the primary sector are vulnerable to bribery and corruption at all level.

Middle-stream level activities deal mostly with ore and gold processing from transportation, crushing, chemical mixing, water/wastewater management, tailing handling, power

generation and amalgam burning. The ball-mills and cyanide plant are at the centre stage and receive government attention. The local government agencies, environmental and trade, required the plants' owners to apply for registration and permit to operate their facility including preparing the necessary environmental statement. Although the process took about three to six months and was not properly conducted, some ball-mills and cyanide plant owners followed the requirement and regulation but most of them have no proper paper works.

The middle-stream stage is the centre of ASGM life-cycle. At this stage, besides the employment opportunities for the locals and short-term economic benefits as the ripple effect of the gold extracting activities, the hidden rip-off effects are obvious but always undermined: physical and emotional abuses, tricked and betrayed, crimes, drugs, new or strange diseases, alcohol, slavery, thugs, vertical and horizontal conflicts, inflation economic and cultural shocks. It is true that the salary of miners and workers at this stage are higher (USD 5-10 per day) than the regular jobs according to Indonesian standard (USD 1-2 per day) but most of it earned after 2-4 working days and or more than 8 hours a day under the harsh working conditions. Occupational health risks are high but ignored largely by the workers and misinterpreted by the local health workers.

Down-stream level activities deal with pure metallic gold processing, market mechanism and the end-sale of gold at the local level. Activities involved in this stage are gold purity testing, amalgam burning, chemical mixing, gold and silver ingot/nugget production, and business transaction of the gold bullion or local people call it as LM, meaning *Logam Mulia* (100% gold).

At the down-stream level beside the gold, the ASGM actors also leave their legacies: abandoned mine shaft or pond, mercury contaminated environment and food chain, sick people, dead body under the mining shafts, and the ruins of ghost towns or wrecked barrages in the middle of the river. No body responsible for what ever they leave behind and nobody even care about it. In Central Kalimantan, there is an area of devastated land used to be one of the largest ASGM hotspots in the 1980s, can be seen from google earth and known among the global ASGM experts as "the moon face craters". Figure 3 shows the ASGM activities at all level.

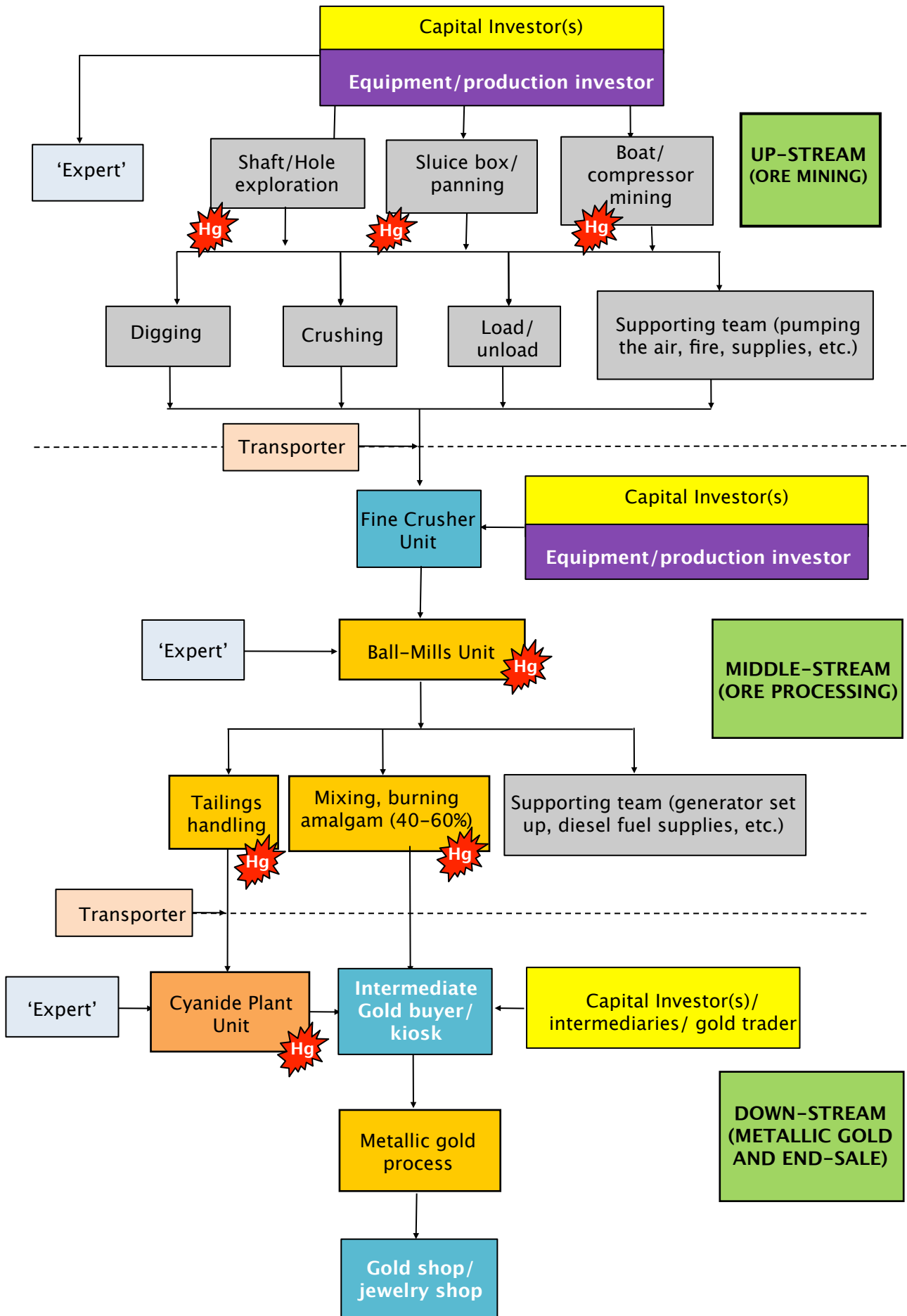


Figure 3. ASGM activities at all level, mercury use and pollution within the system.

Why ASGM activities mushrooming and mercury is so easy to find?

First, involve in an ASGM business is very easy whether you have money or not. People with money, can play their role as financiers, boss *kongsi*, owner of the shafts, or involve in any supporting businesses such as food stall, gold buyer, mercury sellers, transport providers, etc. People without money, can easily step in and join any activities that don't require any skill such as the rock carrier, air pumper, helper, stone crushers, any labors, etc.

Second, mercury as the main working tool to extract gold can easily find in the market as well as virtually, on the internet. We can easily buy mercury from any shops in ASGM villages, in the gold or jewelry shops in the nearby big towns. No permit nor cautions about the harmful effect of mercury worries the miners or villagers. They handle and treat mercury like an ordinary but precious stuff.

Even more, people can contact any mercury traders from the internet, locally and globally without any awareness or worries they will be busted or confiscated by the police or the officials. No clear boundaries and understanding about what kind of act or business activities will be consider illegal and which one is legal.

In one hotspot area near Palu, Central Sulawesi, the confiscated mercury and cyanide stored at the provincial storage house for dangerous goods coordinated under the Ministry of Justice, were confiscated by the police team from a navy division. When I asked why, the storage officer explained that the 'legal' mercury and cyanide were the one that supplied by the police group. Inside the storage room, they placed the mercury and cyanide next to a couple of home-made bomb confiscated from a conflict area.

Figure 4 shows the global mercury trade in 2011 released at the third mercury negotiation meeting in Kenya, Nairobi. The map was derived from UNCOMTRADE database that compiled export and import notifications from countries including Indonesia. The interesting information from the graph is the blue band from Singapore to Indonesia. UNCOMTRADE database stated that in 2010, Singapore exported 256 metric Tonnes of mercury (HS280540) to Indonesia. However, Indonesia's mercury import notification was only 2 metric Tonnes. This discrepancy continues when comparing the Indonesian statistic with the Global Trade Information Services Inc.(GTIS) data and export data from the US Department of Commerce, Bureau Census. Noting that EU and the USA have issued the ban exportation of mercury effectively by 2013, the figure is expected to be decreasing in the near future.

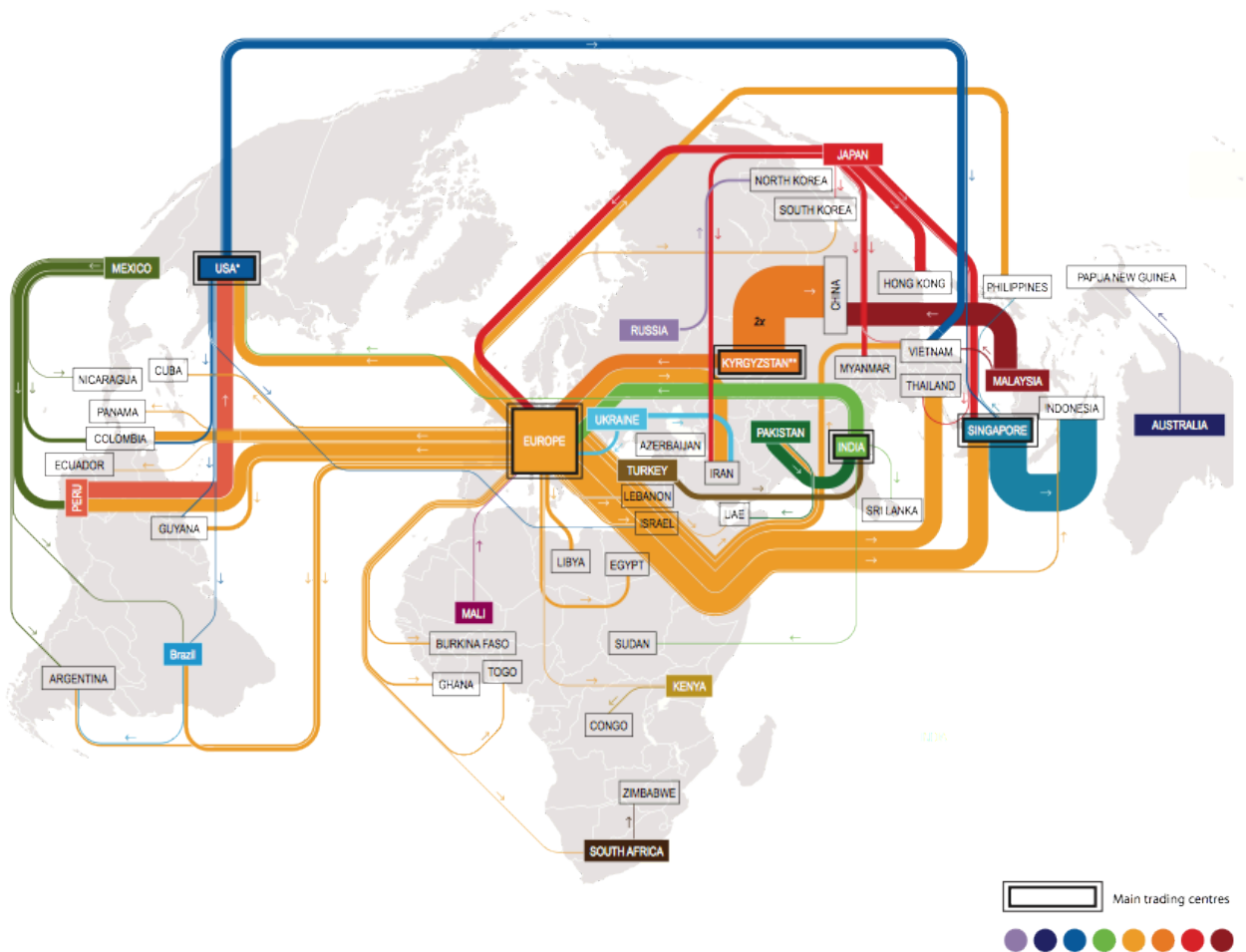


Figure 4. Global mercury trade in 2011 (Source: [Zoinet, 2011](#))

Indonesia has been a mercury importer since 1980s but the earliest data available on the UNCOMTRADE database was from 1989 until to date. Figure 4 shows the amount of mercury exported to Indonesia based on export notifications of several countries from 1998 to 2012 following the price of gold price. Based on this database, the total values of mercury exported to Indonesia in 2012 was about USD 32 million.

Moreover, in 2013, the Ministry of Trade reviewed the discrepancy between the data provided in the *Badan Pusat Statistik* (BPS) and compare it with data provide by GTIS. In 2012, BPS recorded the imported mercury was only 0.99 metric Ton while the GTIS data recorded the mercury exported from the world to Indonesia was 366 metric Ton.

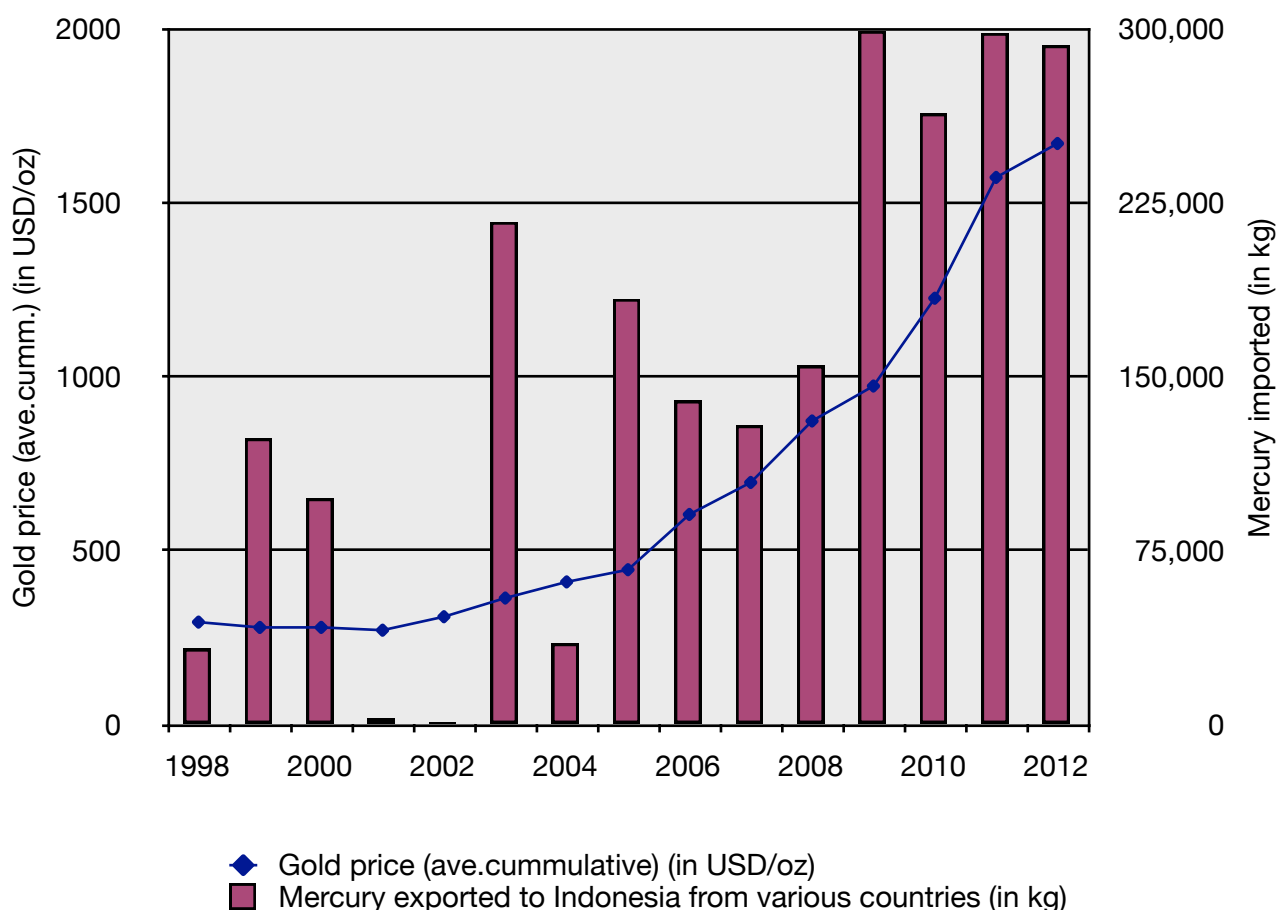


Figure 5. The amount of mercury exported to Indonesia from 1998 to 2012 following the price of gold price (Source: analysis [UNCOMTRADE](#) database and [Kitco](#)).

Further, the Ministry of Trade also reviewed recent regulations that was released in 2009 regarding the importation of hazardous substances. The implication of the enforcement of the new government regulation regarding procurement, distribution and supervision of hazardous substances (Bahan Berbahaya or B2) - including mercury - in *Peraturan Menteri Perdagangan (Permendag) No. 44/M-DAG//2009*, since 15 November 2009, reduced drastically the legal importation of mercury. The new regulation control the importation of hazardous substances by the licensed importers can only be done through 4 sea ports and international airport (Belawan, Tanjung Priok, Tanjung Emas, Tanjung Perak, and Soekarno-Hatta) through Verification of Technical Assessment of Importation (*Verifikasi atau Penelusuran Teknis Impor* or VPTI) by certified Surveyors.

From an interview with one of Indonesia's largest mercury trader and distributor, it was confirmed that mercury came to Indonesia under the table. The trader claimed that he was helped by his brokers abroad and backed by powerful officials. In 2012 alone, the values of mercury imported to Indonesia illegally was about USD 32 million. At the local level, in one of the ASGM hotspots in West Nusa Tenggara, at least about 30 metric tonnes of mercury distributed per week to serve about 20,000 ball-mills at the price of IDR 1,5 million per kg.

The ripple effect and rip-off effect of ASGM

ASGM for sure provides ripple effects to the local economic: jobs, supporting businesses like transportations, mechanical workshop, and communications, and food stalls. However, the rip-off effects of the sector could be outweigh the ripple effects: casualties, environmental damage, environmental pollutions, untreatable health impact, drugs and crimes, prostitutions, modern slavery, wealth disparity, human rights violation, and inflation.

Most of ASGM hotspots will be busy and flocked with migrants miners and workers from other islands or the neighboring cities for 2-5 years. This economic spike boosted local economic and bring out wealth for some villagers. New modern houses, brand new vehicles, new life styles and *nouveau riche* are mushrooming in the gold rush villages and its neighborhood. More villagers afford to go for the hajj pilgrimage and gained more respects and seen as having higher social status in their neighborhoods. GIZ (2012) predicted that the economic value of ASGM activities in Lombok Island alone worth about USD 22 million.

The health, social, cultural, economic and environmental problems occur in various shapes at all ASGM stream all day long, all year round. The sound of cricket and water flow have been replaced by the sound of the generator and noises from the ball-mills. Some people who used to be able to work in their farm until old age, now must endure the tremors, headache and dizzy, high blood pressure, strokes, numbness and digestive problems with misinterpretation of the symptoms, no proper medication and become the burden of their family members. The soil, the air, the crops and fish are no longer safe to breath, drink and eat as they are tainted with mercury for more than 5 years. In many ASGM hotspots all over Indonesia, in the last 10 years, many studies already revealed elevated mercury concentration in the environment and food chain; some of them are 100-700 times higher than the safe level set by the WHO. In some 'old ASGM sites', we can find more than 20 villagers already suffered with similar Minamata disease symptoms for more than 5 years.

Once the ASGM activities declining in the area, the legacy remains to be solved are the contaminated soils in former gold shops or ball-mills units or other gold processing sites, and the mercury poisoned people. So far, there is no medical treatment to cure mercury poisoning safely available in the market. Most treatment could expose new threat and risks to the victims.

In Minamata, government of Japan and the Chisso Corporation shut down the factory operations 14 years after the contamination occurred and built the Minamata Eco-Park for 14 years that costs them USD 500 millions. Until to date, many victims, about 80,000 people, are still struggling to get certified and acknowledged by the government and get compensation. Developing countries and ASGM definitely will not be able to follow the Japan's way of dealing with mercury pollution.

What's next?

Develop National Action Plan and Local Action Plan

The Ministry of Energy and Mineral Resources in coordination with the Ministry of Environment are preparing a National Implementation Plan to Eliminate Mercury in ASGM as part of the National Implementation Plan as mandated in the Minamata Convention on Mercury. At the moment, Indonesia has not ratify the treaty yet, but some preparatory activities have already conducted by the national stakeholders to anticipate the implications of the mercury treaty.

As the initial step and mandated by the treaty, Indonesia should send a letter to UNEP and the Mercury Secretariat stating that the ASGM activities in our country already shown “more than insignificant” impacts. Build on that statement, Indonesia develops the National Action Plan and National Implementation Plan to eliminate mercury in Indonesia.

Following the national statement, local governments that has recognized ASGM activities in their region, should send an official letter to the Ministry of Environment and the Ministry of Energy and Mineral Resources. The letter should state that the ASGM activities in their areas have been significantly affected their people’s health and damaging the environment. In Figure 1 we can see the ASGM spread out all over Indonesia and can be found in 22 provinces.

Furthermore, it is necessary for the local government and local stakeholders to develop a Local Action Plan (LAP) to regulate and control ASGM including the use of mercury and other chemicals and the formalization process. The issues below need to be incorporated into the LAP.

Conduct mercury inventory at the national level and local level

UNEP have developed guidance for countries and stakeholders to conduct mercury inventory in 2 levels; Level-1 is for national and general inventory of mercury emissions and releases, and Level-2 is for specific sectors. The toolkits are available online and can be downloaded for free. However, the inventory does not include the review of mercury import or export to and from a country. This section need to be integrate into the mercury inventory report so necessary interventions can be established.

Prohibit the importation of mercury for ASGM

The only way to stop this environmental, health and social production of suffering is to end the use of mercury in ASGM and ban the importation of mercury to be use in ASGM and or mining sector. Some people worried that banning will lead the transaction further under the ground. In contrary, up to now, most of the mercury import and trade already conducted illegally and under the table.

Waiting for the mercury treaty to be enforced might take about 5 or probably even 10 years. Moreover, within the Article 7 of the treaty, there is no agreed date to eliminate or phase out the use of mercury in ASGM. In other sectors, mercury use in several agreed products and processes, will be phase out by 2020. If we let the situation as it is now, the cost of inaction will be very high for Indonesia and other developing countries.

Local governments should also control the trade and distribution of mercury in their region. A local regulations should be issued to prohibit the operation of ball-mills and other gold extraction methods of gold processing taking place in every house hold and in residential areas. Gold processing plant should be centralized and managed by organization or company with local government permit and tight monitoring and supervision.

Other chemicals use in gold processing, such as cyanide, borax, thiourhea, etc., also need to be regulated and tightly controlled to prevent another chemicals disaster in the ASGM sites.

Formalize and restrict the ASGM practices in a designated area

Many government seen ASGM activities with two interpretations: support local economic but at the same time the devil in the area. As happening also in other countries, the nature of ASGM practice generally are illegal, from the upstream stage until the downstream level (see Figure 3). The umbrella policy for community mining is the *Undang-undang Mineral dan Batubara No.4/2008* that still need to be elaborated in a government regulation. The discussion about this subject at the parliament level has been taking place for years and up to now there is still no clear policy.

In response to the crisis in several ASGM sites within their respective territory, some local governments decided to make their interventions to formalize the ASGM activities in their regions albeit no clear national guidance on this sector. At the upstream level, a dedicated area for community or small-scale miners need to be allocated and a centralized processing plant need to be provided either in cooperation with the third party of organize by the miners' cooperatives/association. Miners and gold processors have to organize themselves into cooperatives and register to the assigned agencies (i.e. *Dinas Koperasi, Dinas Pertambangan dan Energi, Badan Lingkungan Hidup*, etc.). By formalizing the sector for a period of time or with limited production capacity, interventions can be done by relevant agencies and or institutions including health interventions.

Eliminate four worst practices

As mandated by the treaty, Indonesia and other ASGM countries, have to set actions to eliminate four worst practices in ASGM:

- Whole ore amalgamation;
- Open burning of amalgam or processed amalgam;
- Burning of amalgam in residential areas; and
- Cyanide leaching in sediment, ore or tailings to which mercury has been added without first removing the mercury.

In many ASGM sites, villagers seen gold as a lucrative business without really know how to operate and risks entails in the business. Some of them went bankrupt shortly due to lack of awareness and proper knowledge how to run the business. However, even after they shut down the ball-mills and gold shops operations, the pollutions and the legacy remains unsolved: mercury poisoning and contaminated environment. Government should pay attention and include the remediation plan in their action plan(s).

Develop health measures

Health aspect is most important component that need to be integrated into the National Action Plan as well as the Local Action Plan(s). Mercury poisoning give an irreversible health effect. Some early poisoning might be able to be treated but later stage of poisoning will be risky and too expensive to be applied in developing countries and poor communities. The best way is to prevent mercury exposure by prohibit the use of mercury in gold processing and other processes, and increase the capacity of local and national health workers to understand the source of exposure, risks and preventive measures.

Alternatives livelihoods

Alternatives livelihoods need to be introduce in ASGM hotspots areas. Local government should encourage alternatives economic activities to push the communities to switch from

ASGM and mercury into another livelihood that are safer and sustainable. These alternatives should be included in the Local Action Plan(s).

Closing

Strong political will to stop the mercury use, trade and importation, review and enforce the regulations, include all stakeholders in the process, introduce alternative livelihoods that are more sustainable, and remediate the devastated environment immediately before it's too late. We do not want to create the future Minamata tragedy in 80 countries.

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