

Rapid Assessment of the Socio-Economic Impact and Human Rights Aspect of Mercury Use in Artisanal and Small-Scale Gold Mining Hotspots in Indonesia

Conducted by

BALIFOKUS

As part of the International SAICM Implementation Project (ISIP)



a toxics-free future

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”A mine is a hole in the ground with a liar at the top....”
Mark Twain

A study conducted by BALIFOKUS as part of the International SAICM Implementation Project coordinated by IPEN with the support from Swedish Society for Nature Conservancy (SSNC)

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Abbreviation

ASM	Artisanal and Small-scale Mining
ASGM	Artisanal and Small-scale Gold Mining
BAPPEDA	Badan Perencanaan Pembangunan Daerah (Local development and Planning Agency)
BLH	Badan Lingkungan Hidup (Environmental Agency at the local level)
BLHD	Badan Lingkungan Hidup Daerah (Environmental Agency at the provincial level)
CPM	Citra Palu Mineral
ESDM	Energi dan Sumber Daya Mineral (Energy and Natural Resources)
ILO	International Labor Organization
IPEC	International Partnership on the Elimination of Child Labour
JATAM	Jaringan Tambang (Mining network)
KLH	Kementrian Lingkungan Hidup (Ministry of Environment)
Komnas HAM	Komite Nasional Hak Asasi Manusia (Human Right Commission)
LSM	Large Scale Mining
Minerba	Mineral dan Batubara (Mineral and Coal)
UU	Undang-undang (Act/Law)
UNEP	United Nation Environmental Program
UnTad	Universitas Tadulako
WALHI	Wahana Lingkungan Hidup Indonesia

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Rapid Assessment of the Socio-Economic Impact and Human Rights Aspect of Mercury Use in Artisanal and Small-Scale Gold Mining Hotspots in Indonesia

1. Introduction

1.1. Background

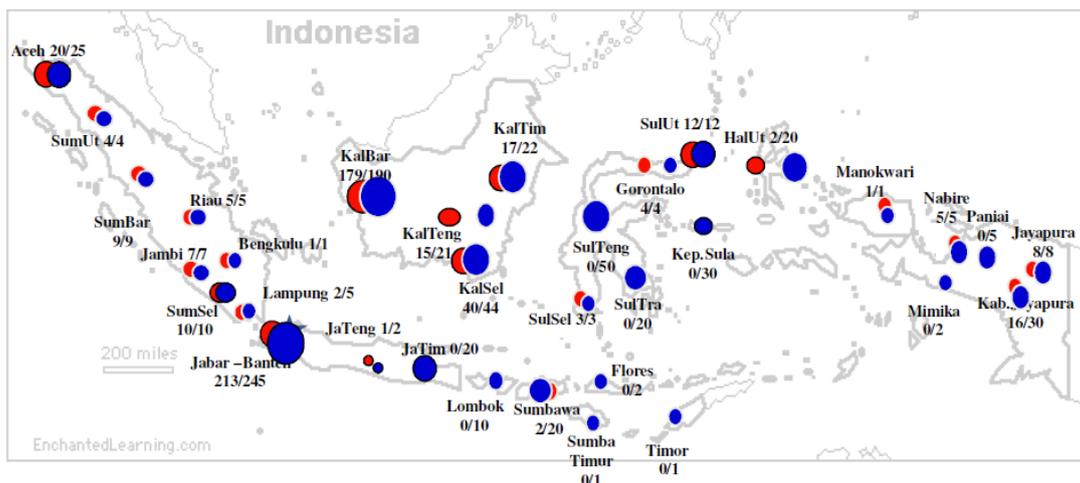
Gold, as one of the most valuable minerals, has been used as a global monetary unit and for luxury goods. More than half of world's gold reserve has been extracted in the last 50 years, leaving the world's last deposits in remote, fragile environments or potential reserves near the city as the last resorts for gold mining (Avila, 2003; Brook, 2009).

Indonesia was the 7th largest world's gold producer and produced about 127 tonnes of gold in 2010 from several large-scale gold mining companies (Widajatno, et al., 2011). In 2006, there were about 576 hotspots of ASGM identified in Indonesia involving about 50,000 miners (Geology Resource Center, 2006). The number of hotspots was almost doubled in 2010 and involved about 250,000 miners with more than 1,000,000 populations affected and risking their lives from the ASGM activities (Ismawati, 2011).

Various studies estimated that every ASGM miner could produce at least 10 grams of gold per day with mercury consumption at more than 150 tonnes a year (UNEP, 2006; Telmer, 2007). Based on the number of hotspots and minimum estimates from each site, the gold production from ASGM sector in Indonesia could be half or equal to the gold production of the large-scale gold companies (Ismawati, 2010).

Figure 1 below shows the distribution of ASGM Hotspots in Indonesia from 2006 until 2010.

Indonesia ASGM Hotspots 2006-2010



- 2006 – Source: CCOP-GSJ/AIST-GAI CASM, Sutrisno, Pusat Sumber Daya Geologi Bandung
576 hotspots - 50,000 miners – 300,000 population
- 2010 – Source: Yuyun Ismawati, BALIFOKUS, from various sources
± 800 hotspots - 250,000 miners – 1,000,000 population

Figure 1. Indonesia ASGM Hotspots 2006-2010

Source: Ismawati, Y. (2010). BALIFOKUS. Policy Brief: ASGM in Indonesia.

Most miners come from rural areas, other gold mining areas or previously worked as farmers. As daily income from gold mining and processing activities was considered a hard cash economy and significantly higher than from agriculture and other sectors, farmers, market coolie, drivers, gold shop owners, housewives, school leavers and workers from other professions shifted to become team members of a small group of artisanal miners, employees or owner of a small gold processing company, mostly informally and illegally.¹ Regardless of the risk, daily wage as a miner is more attractive than that of any other job; offers are ranging from USD 2 up to USD 15 with profit sharing from ore and gold yield. Most agriculture and farm- land has been left abandoned for mining (Hentschel, 2002; Ismawati, 2011).

The auxiliary socio-economic impact can be seen immediately in the form of small economic activities such as food stalls, sweat shops, transportation sector, communication business, equipment maintenance and repair services, as well as prostitution and drugs. Miners and communities were exposed to mercury intoxication, HIV/AIDs, malaria and other diseases unrecorded officially, which rapidly increased as the mining activities began booming. Casualties due to landslides and occupational accidents are not recorded but covered by media and became public knowledge.² However, limited health data are available due to poor health care services and discreet operation.

Most of ASGM practices use mercury to extract gold because it is cheap and easy to use compared to cyanide and other methods. Due to its wide use, the sector is recognized as a major source of global mercury demand and pollution (UNEP, 2006). In many developing countries, mercury used by ASGM sector is illegally imported and traded (Veiga, 1997). In Indonesia, annually, more than 250 tonnes of mercury is illegally imported, used mainly for the ASGM sector (interview with a mercury importer, 2011).

About 1 to 3 grams of mercury is lost to the environment for every gram of gold produced from a concentrated amalgamation. However, the most familiar practice is Whole Ore Amalgamation (WOA), which releases much more mercury, up to 20-50 grams of mercury per gram of gold (Telmer, 2007). Globally, small-scale gold mining annually released an estimated 650-1000 tonnes of mercury per-annum or one-third of all global anthropogenic mercury releases, making ASGM the single largest intentional-use source of mercury pollution in the world (GMP, 2006; Pirrone, et al., 2010; Weinberg, 2010).

Mercury use in ASGM practices is contaminating water, air, soil and fish, risking community's health, the environment and the public in general (Limbong, et al., 2002; Syafrul, 2003; Said, 2008; Subanri, 2008; Serikawa, et al., 2011; Ismawati, et al., 2011). 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 (Veiga, 1997; Harada, 2004; Weinberg, 2010).

¹ Ismawati, Y. (2010). *Interview with various miners, workers, ball-mills plant operators, gold buyers, and gold shop owners in Palu, Central Sulawesi and Bombana, Southeast Sulawesi.*

² Ismawati, Y. (2010). *Interview with communities, journalists and environmental activists in Palu, Central Sulawesi.*

1.2 Objectives

The objectives of the project are as follows:

- To assess the socio-economic impact of mercury use in Artisanal and Small-scale Gold Mining Hotspots in Indonesia.
- To assess the human rights-related impact of mercury use in Artisanal and Small-scale Gold Mining Hotspots in Indonesia.
- To provide a snapshot of the socio-economic impact and highlights of human rights-related issues of mercury use in ASGM.
- To develop policy recommendations for interventions to minimize the impact.

1.3 Location of the Study

Initially, the study was proposed to be conducted in four ASGM hotspots in Indonesia: Pongkor in West Java, Poboya in Central Palu, Sintang in East Kalimantan, and Sekotong in West Nusa Tenggara.

However, due to political, social, geography and communication reasons, BaliFokus conducted the study only in three ASGM sites: Lebak in West Java, Poboya in Central Palu, and Sekotong in West Nusa Tenggara.

1.4 Project Implementation and Cost

Project implementation is 3 months, from May until July 2012.

Total project costs: IDR 61,750,000.- or approximately USD 6,861.00.

Amount requested from ISIP: SEK 34,000 or approx. USD 5,069.00.

Additional secured funding are provided by BALIFOKUS in-kind contribution and Mercury Storage Project supported by the US Department of States.

1.5 Methodology and approach

The study conducted using qualitative approach and combination between interview, field observation, FGD and literature study.

The study is looking at the whole stream of ASGM activities in general, from up-stream, middle-stream and the down stream level, and various human rights aspects in every stream of ASGM practices as well as human rights impacts of mercury use in ASGM.

2. Artisanal and Small-scale Gold Mining in Indonesia

2.1. General ASGM practices

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. 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 (Resosudharmo, 2004).

In 2009 Indonesia ranked the seventh as gold producers with 140 ton of gold production and the Indonesia was the 7th in 2010 and produced about 127 ton of gold from several large-scale gold mining companies (Widajatno, et al., 2011). A government agency stated that if we produce 90 tonnes of gold per year, Indonesian gold can be extracted until the next 100 years.

In regards with the ASGM, in 2006, there were about 576 hotspots of ASGM identified in Indonesia involving about 50,000 miners (Geology Resource Center, 2006). As the gold price hiked, coupled by the economic crises and poor law enforcement, the number of hotspots were almost doubled in 2010 and involving about 250,000 miners with more than 1,000,000 populations affected and risking their lives from the ASGM activities (Ismawati, 2010).

Various studies estimated that every ASGM miner could produce at least 10 grams of gold per day with mercury consumption more than 150 ton a year (UNEP, 2006; Telmer, 2007). Based on the number of hotspots and the number of miners, 250,000 miners, and conservative estimations of gold production of 1 gram per miner per day, the gold produced by the ASGM sector in Indonesia could reach 90 ton per year or almost equal to the country's gold production of the large-scale companies.

The gold presented in primary as porphyry copper reserve found in massive rocks or *reefs* and epithermal vein while secondary as alluvial reserve. There are two principal types of deposits where gold is concentrated enough to make commercial mining viable: primary or lode and disseminated deposits, and secondary or placer deposits. Primary deposits are found in hard-rock. Lode deposits (which provide most of the gold produced today) are where gold has been concentrated in cracks in rocks, in the form of high grade veins. Gold that is widely distributed throughout a large volume of rock is in a disseminated deposit. However, in 2011 Indonesia's rank was dropped to the 9th as the output of the production was decreased from 128 ton in 2010 to 97 ton.³

Most large scale gold mining companies obtained permit from local authorities to explore and exploit the minerals. After the period of concessions terminated they can extend the permit for another cycle or close it down, depends on the government's regulations and plan. In many countries, ASGM practices very often found inside the large scale gold mining concession areas and create horizontal as well as vertical conflicts with indigenous peoples, local communities, the company and local authorities (JATAM, 2010; Resosudharmo, 2004; WALHI, 2007).

In the case of illegal small-scale mining, the practices have widely increased since economic crises in 1998 and more rampant when the decentralization system is implemented (Gunawan, 2009;

³ <http://www.bloomberg.com/news/2012-04-05/top-10-gold-producing-countries-in-2011-table-.html>

JATAM, 2010). These activities become dilemmatic problems due to unclear and inconsistent regulation or policy of the governments. Environmental NGOs have accused the government of exercising a double standard, of only wanting to curb illegal operations within Large Scale Mining's (LSM) concession areas (JATAM, 2010; Gunawan, 2009; Resosudharmo, 2004). In the past, people's mining is certainly prohibited from operating in large-scale mining companies' concession areas. On the other side, LSM are not prohibited from operating on indigenous lands (JATAM, 2010, Resosudharmo, 2004).

In response to the growing environmental problems from ASGM practices, the Ministry of Environment in 2008 issued a government regulation on technical guidance to prevent the pollution and environmental damage from artisanal and small-scale gold mining activities.⁴

2.2. ASGM cycle

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 as well as impacts to human rights. The interaction between each aspects could determined the cycle or booming period of the site.

Figure 2. shows a simplified empirical cycle of ASGM practices in three stages. The first stage, or early stage is recognise as the "conventional exploration" stage. During this stage, geology survey conducted by experts or experienced miners, exploration activities conducted, subsidized research and development activities, etc. The first stage usually take about 2-4 years.

On the second stage, which known as the "exploitation stage" or supply push stage. At this stage, golds prospectors and financiers started to spread their activities and recruit a group of people to explore the field using simple technology. Financiers or investors come from various background and groups, most of the times involving back ups from the military, police and/or government officials. Furthermore, we will find experienced miners or actors as well as new local entrepreneurs who recognize the opportunities from the ASGM new activities in their area. Some of them learning their new skill by working as cheap labors in one of the successful or promising gold processing plants without going through proper training. The production of gold increase over time and last for 3-5 years and attract more miners and communities from other areas to get involve and try their luck. As the ASGM practices run illegally, environmental and social problems are increasing and become more visible. At the end of the second stage, usually some crisis will be occure, either it is environment, health or social crisis. The crisis will reduce the speed of production and the pace of the ASGM practices. The number of miners and migrants also will be decreased.

The third stage or identified as the declining stage or "supply pull" stage, is a case where the potential ores are declining, the competition is too high (too many miners concentrated in one or few areas), the local regulations enforced, or the owners of the property or concession area took over or reclaimed their sites, etc. Some local communities will continue their activities but only tapping the gold from the tailings.

⁴ Peraturan Menteri Negara Lingkungan Hidup No. 23 Tahun 2008 tentang Pedoman Teknis Pencegahan Pencemaran dan/atau Kerusakan Lingkungan Hidup Akibat Pertambangan Emas Rakyat

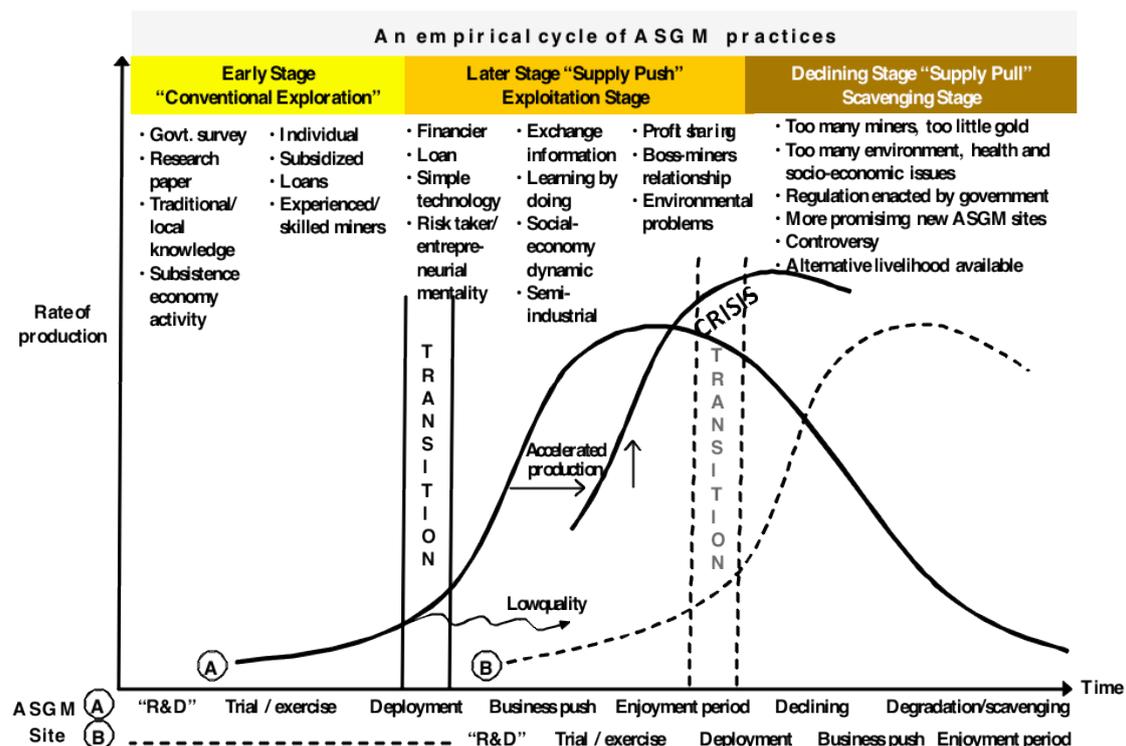


Figure 2. Empirical cycle of ASGM practices

(Source: Ismawati, Y., 2011)

2.3. ASGM work-stream

Typically the ASGM activity can be identified in three streams: up-stream, middle-stream and down-stream with detailed activities shown in Figure 3 and its embedded externalities. Up-stream level activities are mainly related to the primary mining in the underground shaft, crushing and post-mining rehabilitation plan. In many ASGM sites, globally, these up-stream level activities are mostly illegal, have no legal permits, and are sometimes done in remote areas to avoid government official's intervention. However, the rehabilitation plan and activity never applied to ASGM practices in Indonesia and elsewhere.

2.3.1. Up-stream Level

ASGM actors involved at the up-stream level include miners who work as diggers, crushers, helpers of the shaft, coolies, child labors women labors, 'experts', boss *kongsi*/financiers, *kongsi* coordinators, food stall owners, fuel suppliers, transporters, community leaders, sex workers, journalists, thugs, police officers, army officers, park rangers and government officials.

The identified human rights related aspects at the up-stream level are the rights to decent jobs, the right to have a safe and sustainable livelihood, and child labor issue which involving also miners, panners, farmers, fisherfolks and community nearby the ASGM hotspots.

2.3.2. Middle-stream 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 plants are at the centre stage and receive government attention. The local government agencies, environmental and trade agencies, required the plants' owners to apply for registration and permit to operate their facility including preparing the necessary environmental statement. However, in many places this requirement never enforced.

The middle-stream level activities considered as the most devastating stage of ASGM practices and create the worst impact to all socio-economic aspects and human rights issue.

Actors involved at the middle-stream level include the ball-mills/cyanide plant worker, crusher, helper, boss/financier of ball-mills/cyanide plant, ball-mills/cyanide manager/operator, tailing worker, transporter, 'expert', steel workshop owners, chemical/fuel/water suppliers, gold shop owners, community leaders, communities, fisher folks, farmers, sex workers, journalists, thugs, police officers, navy officers, environmental agency and other government officials. Although they are considered one of the main sources of mercury contamination, no gold shops/kiosks or gold buyers were registered in any local government agencies.

The identified human rights related aspects at the middle-stream level are the right to live in a world free from toxic pollution and environmental degradation, the highest attainable standard of health care, the right to have a healthy environment, the right to access sustainable environmental services and the child's right not to be subjected to economic exploitation or performing any work that is likely to be hazardous. The affected stakeholders are gold extraction workers, panners, other livelihood nearby in the ASGM areas, especially children and women.

2.3.3. Down-stream Level

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. Actors involved at the down-stream level include the ball-mills/cyanide plant workers, boss/financier of ball-mills/cyanide plants, ball-mills/cyanide manager/operators, tailing workers, transporters, gold shops, chemical suppliers, thugs, fisher folks, farmers, communities, police officers, and government officials.

The identified human rights related aspects at the down-stream level are the right to access sustainable environmental services and the right to live in a world free from toxic pollution which involve workers and community.

2.4 Externalities from ASGM activities

The conventional resource curse concept supports the assumption that where the extraction costs for a mineral commodity are less than its market price, mining generates economic rents. For this reason, most economists and policy makers presume that mining creates wealth and in the process contributes to economic development both in rich and poor countries (Davis, 2005). Shockingly, mining economies are found to grow slowly and have higher levels of poverty and corruption after contributing for GDP per capita due to the exclusion of externalities (Stevens, 2003; Davis, 2005).

Mining provides opportunities for public in general and in some countries that can manage them wisely for the people's welfare, the resources are considered a blessing. For their potential to be realised and provide the wealth to the people, mineral deposits have to be found and extracted (Davis, 2005). However, if these opportunities are not properly acted on, the resource blessing can become a resource curse.

The environment refers to the use of physical resources, such as soil, water, or air. Most environmental market failures in the mining sector occur when producers misuse a physical resource because they do not have to pay the full costs of that resource. There are two types of environmental market failures – environmental externalities and environmental degradation.

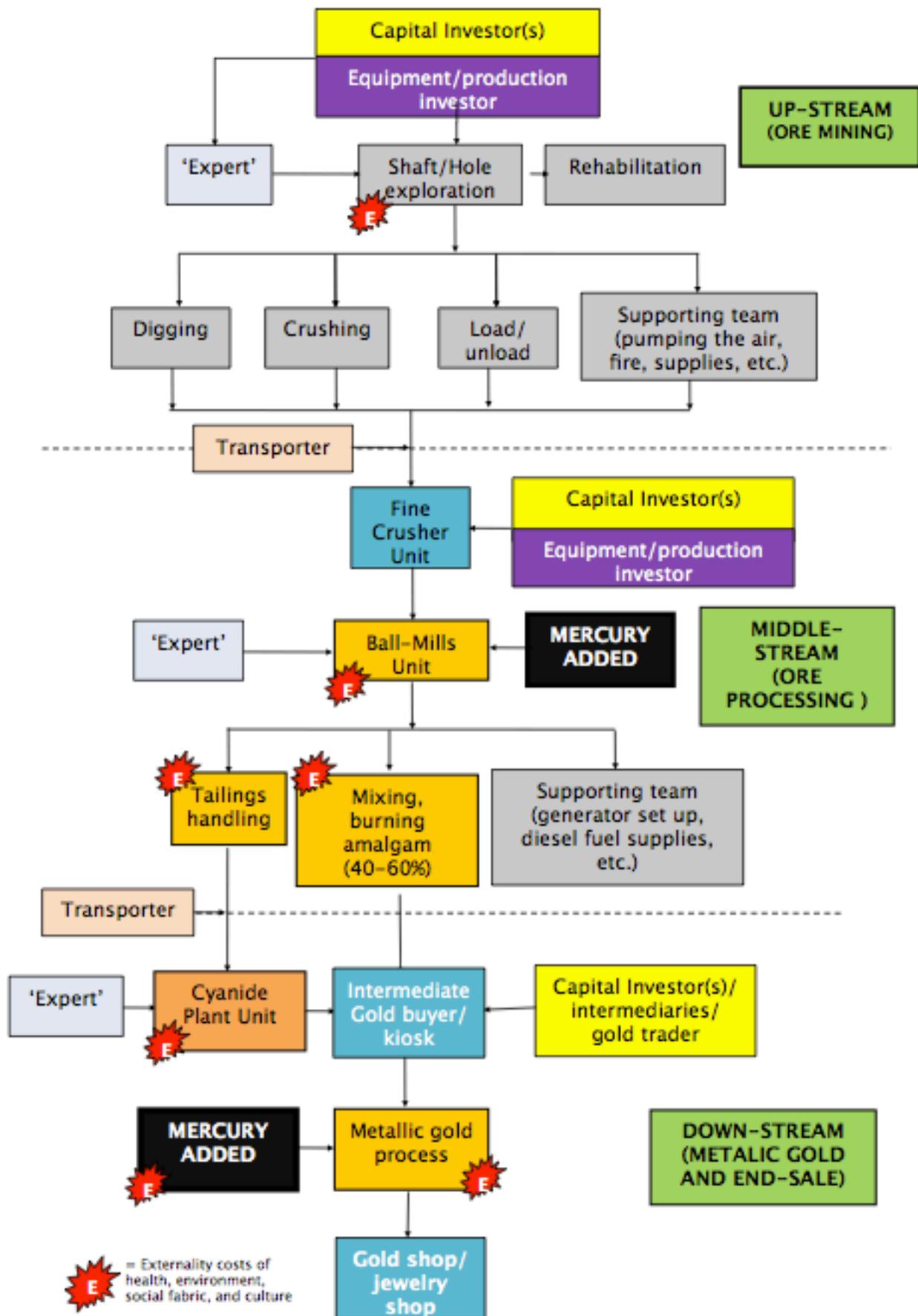


Figure 3. Typical ASGM work flow and embedded externalities in primary mining
(Source: Ismawati, Y., 2011)

Externalities are market failures. In general, negative externalities arise when a producer or consumer imposes costs on others for which the imposer cannot be charged. On the other side, positive externalities occur when a producer or consumer creates benefits for others for which the provider cannot receive compensation (Pearson, 2002). Environmental externalities fit into this general pattern of external market failures and distinguished by involving the use of physical resources, particularly soil and water in ASGM activities.

The use of mercury in the gold extraction process is a negative externality. The mercury released to the air and to the water, contaminating the water, soil and food chain. People who live at the downstream of the polluted water suffer from mercury residues. But these recipients of negative external effects have no way of charging the upstream ASGM miners for polluting the water. The market fails to include the negative external costs of mercury in the gold production costs. The price of gold do not reflect the negative externals costs. Consequently, there is a role for government intervention to correct the negative externality (Pearson, 2002).

3. Environment and Human Rights

Over the years, the international community has increased its awareness on the relationship between environmental degradation and human rights abuses. It is clear that, poverty situations and human rights abuses are worsened by environmental degradation. Environmental conditions contribute to a large extent, to the spread of infectious as well as non-infectious diseases (Darsini et al, 2010).

Environmental protection has means of fulfilling human rights standards. UNEP and OHCHR (2009) stated three main dimensions of the interrelationship between human rights and environmental protection:

- The environment as a pre-requisite for the enjoyment of human rights (implying that human rights obligations of States should include the duty to ensure the level of environmental protection necessary to allow the full exercise of protected rights);
- Certain human rights, especially access to information, participation in decision-making, and access to justice in environmental matters, as essential to good environmental decision-making (implying that human rights must be implemented in order to ensure environmental protection); and
- The right to a safe, healthy and ecologically-balanced environment as a human right in itself.

Since the Stockholm Conference in 1972, international environmental law has developed to the extent that even the domestic environment of states has been internationalized. Experts at the joint meeting of UNEP and OHCHR (2009) agreed that the time was ripe to deepen understanding of the direct and indirect links between the protection of the environment and the enjoyment of human rights.

An exploration of emerging rights' concepts related to the environment, for example intergenerational equity, environmental governance, right to a certain quality of environment, and alternative ways for conceptualizing the environment, including the model of ecosystem services.

On working related issue, Article 25 of the Universal Declaration of Human Rights affirms that "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family." Article 22 guarantees the right to social security. Article 23 affirms the right to work, as well as to "equal pay for equal work" and "just and favorable remuneration."

The Indonesian Children Protection National Committee stated that in Indonesia there are about 6.5 million child labour age between 6-18. About 26% of them, or about 1.7 million, work in hazardous working environment, spread out in various sector mainly mining, agriculture, fisheries, domestic/household, and service industry.⁵

In regards with the labour wage to achieve a proper and decent life, Indonesians refer to the Act No. 13 year 2003 regarding employment which elaborated further by all provincial governments and several local government to define the regional minimum wage or local minimum wage. The minimum wage was first introduced in the 70s as the result of international trade and market pressures under the General Scheme Preferences for export goods (Pratomo and Saputra, 2011). Minimum wage defined by the Ministry of Labor and Transmigration and applied nation wide based on minimum physical needs (*Kebutuhan Fisik minimum/KFM*) consisted of costs of minimum consumption including foods, accommodation, clothes, recreation, and other expenses for a month.

After the decentralization era (2002), the minimum wage defined by provincial governments considering the minimum needs for living, consumer index, job market, inflation rate, economic growth and income per capita. The government also using Decent Living Needs component to determine the minimum wage since 2005. The average ratio of the minimum wage towards the decent living needs standard is only by 84%, or in other words are still below the decent living standard, although some areas have been set their standard above the decent living benchmark (Manning, 2003a; Pratomo and Saputra, 2011).

4. ASGM Hotspots Profiles and Rapid Assessment

Several considerations and criteria were used to select the sites for this study. The criteria and considerations were as follow:

1. The scale of ASGM activities based on the predicted numbers of miners and the length of ASGM operations;
2. Proximity to densely populated areas (urban areas, concentrated areas, etc.) or sensitive areas (national park, conservation areas, etc.);
3. The impact of the pollutions especially from the use of mercury and other chemicals;
4. The existence of conflicts - vertical and/or horizontal conflicts related to the ASGM activities; and
5. The impacts to all human rights aspects.

The study conducted in three ASGM hotspots areas:

- a. Kecamatan Lebak Gedong, Lebak Regency in West Java Province,
- b. Poboaya, Palu City in Central Palu Province, and
- c. Sekotong, West Lombok Regency in West Nusa Tenggara Province.

Below are the brief profiles and characteristics of each site.

⁵ <http://www.tempco.co/read/news/2012/06/04/173408068/17-Juta-Anak-Bekerja-di-Lingkungan-Berbahaya> accessed in June 27, 2012

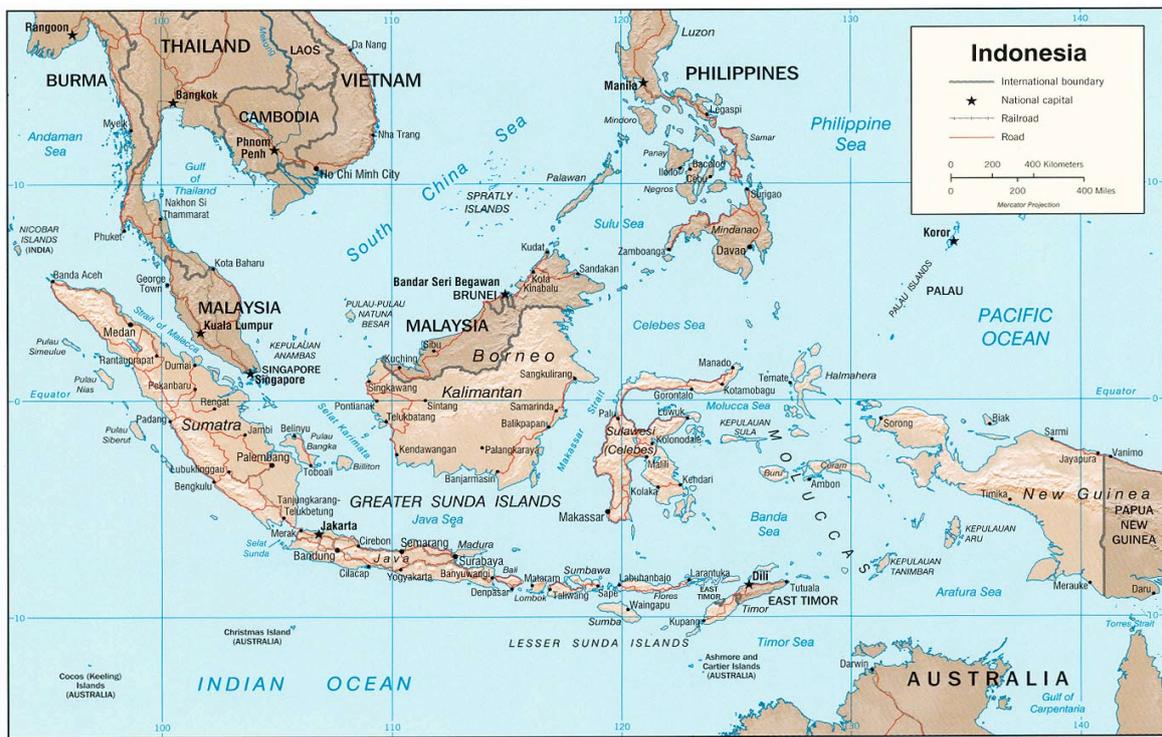


Figure 4. Map of Indonesia and the hotspots study area in circles.

Source: http://1.bp.blogspot.com/-YW_EwBtkFj4/T1mBcd5MZQI/AAAAAAAAAtU/ohq7AY7skWQ/s1600/peta+indonesia_rel_2002.jpg

4.1. Gunung Julang Village, Lebakgedong Sub-District, Lebak District, West Java Province

4.1.1 Site Profile

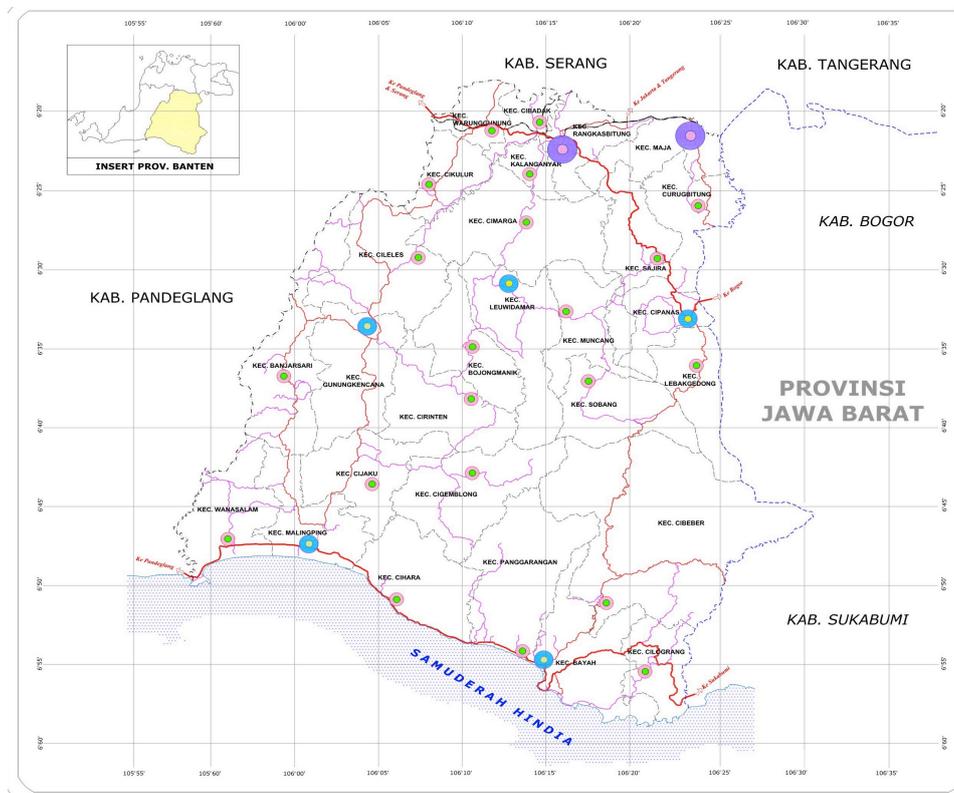


Figure 5. Map of Lebak Gedong Sub-district, Lebak Regency, Banten Province.

Lebak Regency is located in Banten Province. It has an area of 2,859.96 km² of 19 districts and 320 villages with an official 2010 Census population of 1,203,680.⁶ Rangkasbitung is the capital of the regency and share borders with Pandeglang Regency on the west, Serang Regency in the north, Tangerang Regency to the north-east, and Bogor and Sukabumi Regencies to the east. The regency is subdivided into 28 sub-districts and one of it is the Lebak Gedong Sub-district, the study area.

Geographically the Lebak Regency is located at 6° 7'12"S, 106°9'1"E. The northern part of the area was formed by lowlands, while the southern part is mountainous, with a peak at the southeastern tip of the Halimun Mountain and its National Park. Ciujung River flows to the north, is the longest river in Lebak Regency, utilise by the locals for domestic and agriculture purposes.

Lebak Gedong sub-district is home for 22,200 populations with high poverty rate with 50% illiteracy rate. The local monthly minimum wage in 2012 is IDR 1,047,000.⁷ The sub-district also lack of adequate infrastructures and poor utilities despite the abundant natural resources. The land use of Lebak Regency is mainly categorised as plantations (23.65%), forest area (23.60%), dry rice field (21.11%), wet rice field (15.08%), community forest (8.78%) and settlement (7.73%).⁸

Some part of the Lebak Regency areas are part of Gunung Halimun-Salak National Park (GHSNP). The national park was first established as Gunung Halimun National Park in 1992 for its rich biodiversity. The tropical rain forest which remains in GHSNP is the largest on the island of West Java. The National Park total area is 40,000 hectare about 10 ha located inside the Cisoka Resort within Lebak Gedong Sub-district.

GHSNP preserves the natural habitat of endangered species such as the Javan leopard, Javan hawk eagle, and Javan gibbon as well as a source of water for cities and agriculture in West Java. For these reasons, active efforts are underway to promote wildlife habitat conservation, management, research, and education as well as ecotourism. However, it still faces several problems such as illegal land use, illegal logging, poaching, and illegal artisanal and small-scale gold mining (ASGM) activities.

4.1.2. Characteristic of ASGM Activities

4.1.2.1. The upstream level

The ASGM activities have been exist in Lebak Gedong Sub-district since the 1990s with the booming era between 1989 until 1993. The mining sites are located inside the national park, in a hill and forest covered areas which can be reach by foot. The ASGM activities are quite complex due to several factors:

- high poverty rate and high illiteracy rate;
- it is consider as an inter-generational and family business activities;
- lack of skilled workers in gold mining sector from the area invite migrants from other areas;
- alternative livelihoods not available or not strongly introduced;
- quick cash/short term economic orientation.

⁶ <http://banten.bps.go.id/lebak.htm>

⁷ http://www.hrcentro.com/umr/banten/kabupaten_lebak/non_sektor/2012

⁸ *Rencana Strategis Kabupaten Lebak 2004-2009*

Currently there are about 33 active gold mining pits, diameter 1-2 meters, 30-150 meter depth, located inside the National Park⁹ and lack of law enforcement due to the limited numbers of forest police. Last year the National Park established an integrated team involving hundreds of police and army officers, local authorities, and PT. Aneka Tambang, closed down 252 mining pits in Cikidang Block. PT. Aneka Tambang is a state-own company who hold the concession permit to exploit the mineral especially gold in the area. As the 20 years contract have been terminated and the efficiency of the extraction decreasing, the company required to rehabilitate the mining sites. However, the illegal miners or “gurandil” still considered the pit valuable. With the support from the buyers and some strong local officials, the *gurandil* re-exploite the sites and messed up the rehabilitation works. In 2010, a local villager sentenced to jail for 5 years for renting out 400 mining pits at former concession area of PT. Aneka Tambang inside the National Park to miners and gold prospectors.¹⁰

To go to the mining pits, miners or villagers should walk for 12 hours. In the 1980s until the 1990s people went to the mining pits for a couple of days and done after taking care of their crops. Miners, called by locals as “gurandil” work in the underground mining pit with depth ranging from 20 meter until 150 meter. The pits conditions are severe, without safety measures and proper oxygen supply. Many villagers suffocated and suffered from a well-known phenomenon among the villagers called “*sakit muda*” or “dying young”. It means they were still young but could not sustain any works for more than 1-2 hours. Their muscles were stiff, numb and aching, although they were still young.¹¹ Most of the *gurandil* were young workers, under 40 year old. Very rare we would meet the old *gurandil* as most of them would ‘dissappear’ or died due to infectious diseases, diseases related to alcoholic consumption, drugs, accidents or crimes. Local Public Health Clinic data shows records with digestive problems, skin and respiratory irritation as well as rigid rheumatism and gout.¹²



Figure 6. Eight miners died, four of them were from Lebak Regency, and eight others injured due to the landslide in ASGM site inside the Gunung Halimun-Salak National Park within the Bogor Regency.

Source: <http://us.nasional.news.viva.co.id/news/read/317181-8-orang-meninggal-tertimbun-longsor-di-bogor>

⁹ Interview with Bapak Lucky dan Danang, Tim Polisi Hutan Wilayah 1 Lebak, Taman Nasional Gunung Halimun Salak

¹⁰ <http://www.kejaksaan.go.id/berita.php?idu=0&id=1737&hal=1>

¹¹ Interview with Bapak Suhaedi, Teacher, SDN 2 Lebak Situ

¹² Interview with Bapak Kurnia, Head of Puskesmas Kecamatan Lebak Gedong

Several landslides and casualties occurred almost every month. The most recent one, occurred last May 2012; 8 miners were injured and 8 died. Every year about 50-100 miners died but no official data available. Many villagers were reluctant to step into the mining sites as the areas were controlled and managed by local thugs or “jawara” with a complicated rules and arrangement. During the evacuation of the 8 miners in May 2012, the “jawaras” strictly controlled the area and did not allow the media cover the event thoroughly.

Currently most of the miners are migrants from other villages or from outside of Lebak Regency or even people from other island. Most of the locals now working as coolie to carry the ore from the mining pits to the crushing and processing facility at the village, or other small businesses related to the mining activities (transporters, food stalls, or cigarettes sellers).

The miners and communities working on ASGM and ASGM related businesses usually stay in the mining sites for a month and leave their children in the village with their neighbors or relatives. Some of them occasionally bring their children to the mining sites to herd the sheep while the parents do their businesses. This situation made the children leave schools for months and could not keep up with their study any longer. Eventually some of them dropped out from schools at the age of 10-12 years old and some of them work in the mining site to help their parents or as coolie.¹³



Figure 7. “Gurandil”/ASGM miners mining pits in Lebak Regency

Source: <http://www.berita8.com/newspic.php?id=688&page=120>

The health agency stated that the community who work and live at the ASGM sites were prone to tuberculosis disease and lead to death. There were about 34 miners from the ASGM sites and some were the former employees of PT. Aneka Tambang Emas, the state-own gold company who used to have a gold mining concession in Lebak Regency.¹⁴

¹³ Interview with Pak Suhaedi, Teacher, SDN 2 Lebak Situ

¹⁴ <http://www.pelita.or.id/baca.php?id=28096>

4.1.2.2. The middle-stream level

From the 1980s until 2000 miners used potassium and carbide to get the ore. Mercury was introduced recently in 2010-2011 by the Chinese and Korean gold buyers/bosses while cyanide introduced in the early 2012 by a Germany buyer. The ball-mills and crushing units mostly owned by outsiders. Local villagers, mostly women and children, are working there as the crushers or operator of the ball-mills and paid weekly based on the number of sacks from 7am until 4pm.

A typical crushing and ball-mill units located about 7-8 hours walk from the mining sites and usually situated within a settlement, on the river bank or near the rice field. The facility usually employed 30-50 local workers. Ore crushers get paid depends on the number of sacks they delivered, amounted Rp. 20,000 per sack (approximately US\$ 2) while ball-mills workers received Rp. 50,000.00 per day. Most women whose working as crushers could produce 1-3 sacks per day and will get paid when they deliver 10 sacks. The ball-mills owner could produce 1 kg of gold per month and sell it to the nearby market for Rp. 470,000.00 per gram.¹⁵

Like in the upstream level, most of the works in the middle-stream level are physically demanding, take place in unhealthy environment and high noise level. Some workers in Lebak Gedong Village were employed by Haji Anis, the most respected village leader. Ibu Salamah, 36 years old with 4 children, worked as the crusher (manual), turning the large size ore into smaller chunks. She was working next to the leaching pond which hold the water discharged from the ball-mills unit where 500 gram mercury added in each ball-mill unit every 4-hour. The tailing sludge will be processed in the cyanide plant while the remaining water will be discharged to the rice fields. Ibu Salamah crushes 3 sacks (approx. 150 kg) of ores in a day, 3 days a week. Regularly she feels dizzy and headache while she was working and afterwards. She has been working at Pak Haji Anis for 11 months now together with several women and other housewives from her village.¹⁶ While working there, most of their children, age between 5-12, would also playing around the pond.



Figure 8. A small squeeze of amalgam from one ball-mill drum of Haji Anis plant in Lebak Gedong, Lebak Regency. Photo credit: Armyn Gita, BALIFOKUS.



Figure 9. This facility in Lebak Gedong operates about 50 ball-mills drums and use 500 gram of mercury in each drum, sometimes 3 times a day, 15-20 days in a month. Photo credit: Armyn Gita, BALIFOKUS.

¹⁵ Interview with Bapak Haji Anis, Head of the Banjarsari Village, Kecamatan Lebak Gedong, a ball-mills owner

¹⁶ Interview with Ibu Salamah



Figure 10. Women crushers working next to the tailing pond in one of the ball-mills plants in Lebak Regency. Photo credit: Armyn Gita, BALIFOKUS.

Like other women workers, Ibu Salamah earns IDR 20,000 (approx. USD 2) per sack. Every month, maximum she could handle 15 sacks. They use the money to provide daily meals for their family and nothing left for the family savings. Another woman worker, Ibu Onah, 45 with 5 children, who just worked for 4 days at Haji Anis, stated that she will opt for other job if available. Ibu Onah felt that her current work is too hard and too harsh for her.

The first stage of ASGM activities in Lebak Regency started in 1990s, reach the peak of the second stage between 1995-2000, and between 2003-2005 after the decentralization implemented. From 2005 until now the activities are slowing down and most of the experienced villagers/miners are now migrating and exploring gold in several small islands of Maluku which has just started their first stage of ASGM cycle.¹⁷

The number of children finishing their elementary school decreased from 24% (2010) to 19% (2011), junior high school also decreased from 16% in 2010 to 14% in 2011. Meanwhile, the high school attendants remained the same, 11%.¹⁸ Several factors causing the number of children going and finishing their elementary schools declining. Some of it are the quick cash from ASGM, consumerism life style, and poor infrastructures. Some students have to walk miles to go to schools and crossing poor bridges as covered by the international media last January 2012.¹⁹

¹⁷ Bapak Arsad, teacher, SDN I Lebaksitu

¹⁸ <http://lebakkab.bps.go.id/pendidikan.php>

¹⁹ <http://www.dailymail.co.uk/news/article-2088998/Think-school-run-bad-Children-face-Indiana-Jones-style-river-crossing-EVERY-day-floods-cut-community.html>



Figure 11. Perilous crossing: Students, some as young as five, hold on to the side steel bars of a collapsed bridge as they cross a river to get to school at Sanghiang Tanjung village in Lebak Regency.
Source <http://www.dailymail.co.uk/news/article-2088998/Think-school-run-bad-Children-face-Indiana-Jones-style-river-crossing-EVERY-day-floods-cut-community.html>

4.1.2.3. The down-stream level

At the downstream level, a group of students and teachers from a moslem boarding school started to have concern about the quality of the river, Ciberang River, where most of the wastewater from the cyanide leaching plants being discharged. Several times they found some fish dead in the river. In 2009, Banten Provincial Environmental Agency found that all the 110 rivers in Banten Province were heavily polluted and contaminated as the results of several industrial and mining activities, included 29 rivers in Lebak Regency.²⁰

The Lebak Gedong, Cipanas and Sajira communities, who lived along the Ciberang river banks noticed the water quality has worsen since the ASGM activities taking place in Gunungjulung area, Kecamatan Lebak Gedong, Some people suffered from itchy skin rushes using the water.²¹ The situation became worst in the dry seasons as they do not have other alternatives of water resources. Interestingly, the same river, is well-known as one of the best place for white water rafting and nature trek and promoted by the local tourism agency but very little community involvement.²²

²⁰ <http://regional.kompas.com/read/2009/10/21/0642174/Sungai.Tercemar>

²¹ <http://mediabanten.com/content/sungai-ciberang-tercemar-warga-terjangkit-gatal-gatal>

²² <http://bantendiscovery.wordpress.com/2011/03/14/ciberang-banten-rafting/>



Figure 12. White water rafting in Ciberang River, Lebak Regency.

Source <http://bantendiscovery.wordpress.com/2011/03/14/ciberang-banten-rafting/>

In the past cloves plantations have been the main important livelihood for the community but due to the dynamic of the tobacco market price, the cloves market also fluctuated. Some alternatives livelihood such as lime quarry to make pottery had been introduced but did not last long after the reformation era in 2002. When the gold mining exploration activities started again in 2004-2005, many villagers and farmers turned away to take part in the ASGM activities.²³ Last year the clove price peaking up again. Local farmers and villagers are hoping that this trend will be last long so they can stop working in the ASGM sites and back to their previous livelihood.

Most of the cloves plantations are located in the Lebak Regency covering 8,500 hectare of lands and hills and produce thousands of ton cloves per year. In the past, when the price of a gram of clove equal with a gram of gold, many clove farmers went to Macca for pilgrimage and sent their children to schools and higher education.²⁴

4.2. Poboya, Palu City, Central Sulawesi Province

4.2.1 Site Profile

Palu City, with a total area of 395.06 square kilometers, is the capital of Central Sulawesi Province, located at the estuary of Palu River, at the tip of a long and narrow Palu Bay. Figure 3 shows the location of Central Sulawesi Province and Palu City on the map. Administratively, Palu City is divided into four districts and 43 villages. Palu is situated between the hills, has a dry climate, and is home for 342,754 inhabitants (BPS Kota Palu, 2011).²⁵

²³ Interview with Ustadz Irman, La Tansa Moslem Boarding school advisor

²⁴ <http://kabar-banten.com/news/detail/1915> 18 August 2011

²⁵ <http://palukota.bps.go.id/>



Figure 13. Palu City and Central Sulawesi map.

Palu, Poso and Tentena are well-known for the unsettled political situation. Sectarian violence triggered by religious conflict and land dispute broke out in Central Sulawesi in 1998 and claimed almost 600 lives between 1998 and 2001. A peace deal signed in December 2001 dramatically reduced sectarian conflict in the region temporarily. In 2003 until 2006 violence erupted again in the form of bombings and assassinations, predominantly in the towns of Poso and Palu. Since 2007, the situation has been much calmer but sporadic incidents continue.

The ASGM sites are spread out in four sub-districts: Poboya, Kawatuna, Tanamodindi and Lasoani as part of Banawa-Marawola Region. These sites are situated above the city at 190-300 meters above sea level and located between the valley and Palu Bay. The hamlet of Poboya, sited within the Palu municipality only seven kilometers from the city center, covers 14,035 hectares of a valley surrounded by rugged hills.

The area has some tree cover, including endemic species of sandalwood, ebony and rattan. Extensive scrub, grassland and high flora and fauna biodiversity and some protected species can be found in the Poboya forest and along the rivers. Local communities catch fish, eels and shrimps in these rivers. In addition to its rich biodiversity, Poboya has an important hydrological role as a water catchment area which supplies water to nearby communities and to the city of Palu (WALHI, 2007, Armitage, 2004).

Located about 12.5 km, northeast part of Palu, the capital city of Central Sulawesi Province, or about half an hour drive from the city center, situated at 190-300 meter above the sea level. The mining and processing areas spread out in four villages: Poboya, Kawatuna, Tanamodindi dan Lasoani. A high concentration of gold processing located in Poboya Village. Generally, the ASGM hotspots area known as Poboya gold mining site. The total area of mining and gold processing is approximately 7,000 hectare, involving about 35,000 miners, where some part of the mining sites

located inside the grand forest park Poboya Paneki where the large gold mining company, PT. Citra Palu Mineral hold the concession granted by the Ministry of Energy and Mineral Resources.

4.2.2. Characteristic of ASGM Activities

Poboya ASGM site had been characterised by local academia and stakeholders as the Texas of Celebes due to high influx of modern ‘cowboys’, increased rate of crimes and conflicts, horizontal and vertical.²⁶ On the other side, local villagers refer their area as “the Golden City”.²⁷ Local government of Palu City in the Planning and Development Agency (Badan Perencanaan dan Pembangunan Kota Palu, 2009) and NGOs (WALHI, 2002; JATAM, 2004; WALHI, 2009; JATAM, 2009; BALIFOKUS, 2011) as a problematic and environmental conflict area especially in regards with the land use zoning and planning (BF and IPEN, 2012).

4.2.2.1. The upstream level

The plan for the gold mining and extraction in Poboya started in 1997 when the approval of the Contract of Work (CoW) signed by Indonesian President Soeharto. The total area of mining and gold processing areas is approximately 7,000 hectare spread out in four villages. in the last couple of years, the exploitation of the ore took place mainly in Poboya area, exploring about 200 hectare of land known as Blok A Poboya. At its exploitation/supply push stage in 2008-2010, about 35,000-40,000 miners and migrants workers flocked in Poboya. About 80% of the miners, workers, gold shop owners and chemicals suppliers related to the ASGM in Poboya came from North Sulawesi, Gorontalo, South Sulawesi, Kalimantan, Java and other part of Indonesia while local community from Poboya, Lasoani and Kawatuna only about 20% (Bappeda Kota Palu, 2009). Most of the locals involved as landlord, water and power suppliers, food stall owners, small shops, etc. (Bappeda Kota Palu, 2009).

Tabel 1. Gold mining and processing related facilities in Poboya, Lasoani and Kawatuna in 2011

Data	Mining shafts (unit)	Crushing plants (unit)	Ball-mills plants (unit)	Cyanide plants (unit)	Gold shops (unit)
Poboya and Tanamodindi*	---	729	25,275	229	---
Lasoani*	---	78	2,358	26	---
Kawatuna*	---	114	3,084	52	---
Environmental Agency Palu City (as of June 2011)**	270	912	19,617	367	200

* As of December 2010. Source: Public Works, Energy and Mineral Resources Agency of Palu City from Yayasan Tambuhak Sinta (2010).

**As of June 2011 from Ismawati (2011). Source: interview with Palu City Environmental Agency.

In June 2011, the Energy and Mineral Resources Agency of Palu (ESDM) recorded 270 shafts (interview, 2011). While some other source predicted more than 500 shafts exist in the four Poboya gold mining sites (interview, 2011). They are working in groups of miners, known as *kongsi*, consisted of 10-20 people. They set up the work shifts to work down under the mine shaft of 25 meter until 100 meter depth with very limited equipments and safety measures. During the rainy seasons, several landslides, collapsed shafts or washed out by floods very often occur and killed some miners. This casualties are not officially recorded but become general knowledge among the miners and local communities.

²⁶ Mercury Storage Central Sulawesi Regional consultation meeting, 30 June 2011

²⁷ Radar SulTeng. Senin, 1 Maret 2010. Mirip Kota Kecil, Dijuluki The Golden City



Figure 14. Poboya Block A mining site taken in November 2010.

Photo credit: Yayasan Tambuhak Sinta.



Figure 15. Poboya Block A mining site taken in June 2011. After 7 months of exploitation works, some old trees were gone.

Photo credit: Yuyun Ismawati, BALIFOKUS.

Most workers, child labors and women, at the upstream level of ASGM are vulnerable of physical and sexual abuses from adult co-workers or employers. Most of them have no power to avoid or escape from their work and the harassment as it come as an unwritten contract when they agreed to join the *kongsi* or accept the job offer. Most miners or workers would received a small loan in advance for their family when they leave them to join the *kongsi*. The *kongsi* boss would cover the all their expenses, accommodations and foods during the production. When they finally wrap up the works after 1-2 weeks, they would divide the ore based on the agreed contract - most of the financiers or the *kongsi* boss will retain 30 to 40% of the total amount of sacks. The rest would be divided among the workers; earning 2 gram of gold/week is sufficient for them (interview, 2012).



Figure 16. A child laborer in Poboya Block A, age between 12-17, work as *kijang* taking the ore down to the river banks or near the road. Photo credit: Yayasan Tambuhak Sinta.



Figure 17. Dropped the schools out, preferred to work as miners, get some cash to spend in town after 2 weeks full-time work. Photo credit: Yuyun Ismawati, BALIFOKUS.



Figure 18. Big tree and water supply pipes behind the tree were affected by the upstream activities of ASGM and threaten the sustainability of environmental services for the city and community who live in the downstream areas. Photo credit: Yuyun Ismawati, BALIFOKUS



Figure 19. Back pain, sunburn, heat strokes and sexual harassment were the common pain and bad treatment they continuously having. Photo credit: Yuyun Ismawati, BALIFOKUS

4.2.2.2. The middle-stream level

Like in other ASGM hotspots, ASGM activities in Poboya also went through the non-mercury method back in 1998 and considered as a subsistence economy. Local communities, men, women, and sometimes children, were panning the gold along the river especially after the rain. Mercury was introduced in 2004 by gold trader who visited the community mining along the river every Monday and Thursday to collect the gold nuggets and exchange it with fresh mercury supplies. In 2008, the ball-mills' process introduced by miners from North Sulawesi to process the ore in bigger volume which runs for four hours, 3-4 times within 24 hours. Mercury added to each unit about 300-500 gram per 4 hours (observation and interview with miners and community leaders, 2012).

In December 2010, a study conducted by Yayasan Tambuhak Sinta predicted that about 10 kg of gold produced daily involving 400 kg elemental mercury. Every ball-mill or *tromol* unit uses 0.5 kg of mercury per batch of 4 hours extraction process. Every day the ball-mills at least operated two times. But conservatively, if all of the 20,000 ball-mills in Poboya operated at least once a day with 0.5 kg of mercury added during the process, it means about 10,000 kg or 10 ton of mercury per day are being used in Poboya. From 10 ton of mercury used, at minimum, about 4% released to the

environment. Hence, at least, 400 kg of mercury released to the environment every day. Table 2 shows mercury concentration in several ball-mills plants.

Table 2. Mercury concentration in waste water and tailings from several ball-mills plants.

Type of samples	Mercury concentration				
	A	B	C	D	E
	In operations for the last 4 months	In operations for the last 3 months	In operations for a month	In operations for the last 2 months	In operations for the last 2 months
Wastewater (ppm)	0,018	0,008	0,005	0,040	0,030
Tailing/sludge (ppm)	84,1	88,2	82,1	81,1	80,8

Source: Ruslan and Khairuddin, 2009.

A mercury emission monitoring conducted in June 2011 revealed the highest concentration of mercury near the ball-mill unit as high as 45,000 nanogram/cubicmeter, much higher than the safe level set up by US EPA and WHO, 1000 nanogram/cubicmeter (BALIFOKUS, 2011). At the city centre and the low lying areas downstream, the mercury concentration in the air is between 500-2000 nanogram/cubicmeter. Indonesian Human Rights (Komnas HAM) Commissioner, Ridha Saleh, warned Palu authority and all stakeholders about this pollution and its potential risk to people's health and the environment.²⁸ Komnas HAM strongly reminded all stakeholders about the rights to a healthy living environment as only 10% of the population benefits from the Poboya ASGM activities. The rest of Palu population only receive the impacts mostly negative impacts.



Figure 19. Ball-mills unit or *tromol* unit runs for 4-5 hours per batch, 3-4 times a day. At the end of the process, 500 gr of mercury added into each drum. Photo credit: Yuyun Ismawati, BALIFOKUS



Figure 20. Squeezing the gold from amalgam in bare hand after 4-5 hours crushing in the ball-mills unit, ready to burn to get 1-2 gram of gold. Photo credit: Yuyun Ismawati, BALIFOKUS

Some people who are really benefiting from the ASGM activities are the foodstall owners, transportation, utilities such as selling water and electricity from diesel generator, consumer goods, mining related stuffs and tools, machine or pump reparation, SIM card and mobile phone top up, and sex workers. However, most of them agreed that cheating is the name of the game in ASGM sector, regardless your status of level of profession. From the upstream to the downstream level, every body is trying to take advantage of others (interview, 2012).

²⁸ <http://www.jpnn.com/read/2011/07/15/98160/Pemkot-Palu-Dituding-Ikut-Cemari-Lingkungan->

He assumed that only a few people actually profited from the business. He pointed out the *kijangs*, the transporters and the shareholders or financiers of the gold business and mining as those who earn more profit with little risk. When the *kongsi* leader is not around, the miners might try to save some sacks of *rep* (reefs) and report less *rep* yield to the leader, while the *kongsi* leader might report less *rep* sharing to the boss of *kongsi*. At the middle-stream level, the ball-mills workers might lie to their boss about the income from the rental unit. Even the mercury seller would cheat customers about the quality of mercury they sell, indicating their product is from Spain when in fact it was from China.

The cheating practices continued further when the amalgam was brought to the gold shop and tested for its purity. The gold shop owner would lie about the real purity especially if the seller has no knowledge about the gold purity test. It is an endless cheating business.

In addition to cheating, bribery and regular 'retribution' to several local officials and the thugs has become public knowledge. Most miners prefer to work in ASGM due to the freedom, informality, flexibility, loose commitment, simple rules and work safety standard to follow. Most ball-mills workers already aware about the toxics risk of mercury and cyanide but they said they only thinking short-term and have no better long term options.

4.2.2.3. The down-stream level

Before the gold rush, Poboya area was well-known as the agriculture area, rice and onion and forest-based product especially rattan. But due the decline of water resources, the agriculture production were also declining as well as the rattan production.

WALHI or Wahana Lingkungan Hidup Indonesia is the largest and oldest environmental advocacy NGO in Indonesia. WALHI unites more than 450 NGO's throughout Indonesia and works on a wide range of issues, including conflict over access to natural resources, indigenous rights, marginalization of communities, pollution, deforestation, climate change, and biodiversity conservation. As the earth defender, WALHI Central Sulawesi is actively involved in the gold mining controversy in Poboya and has been critical towards the government's ambiguous policy on Poboya since 2000.

Lita, former executive director of WALHI Sul-Teng, sees the new policy on coal and minerals will create more environmental disaster and social unrest. With many bad records on gold mining practices in other part of Indonesia, Lita sees the Poboya issue as a red alert. Since 2003, when the community started panning the gold along the river, they have already asked for guidance from the authorities who never responded (interview, 2012). As there is no clear regulation, the mining activity became uncontrolled and susceptible to horizontal and vertical conflicts as well as unrelenting environmental degradation.

Allowing mining activity, both small-scale and large scale, to take place in Poboya will create an unbalanced environmental capacity, invite disaster and further environmental degradation. Buffer areas such as forest and river provide environmental services and support for agriculture and domestic purposes.

WALHI endorses the principle that the natural resources utilization should be prioritized for the community and to support local sustainable development. For that purposes, WALHI and JATAM, a

mining watchdog NGO, were calling for a moratorium to revisit the future plans for Poboya's ASGM before the environmental degradation worsens and the LSM comes into the picture.

4.3. Sekotong, West Lombok Regency, West Nusa Tenggara Province

4.3.1. Site Profile



Figure 21. Map of Lombok and Sekotong.

Source: http://1.bp.blogspot.com/-7L4CzPdTIMM/TrO2pxB64XI/AAAAAAAAAKI/a0TAB81hFkM/s1600/peta_lombok.jpg

Sekotong hotspot is located about 28.7 km, southwest part of Mataram City, the capital of West Nusa Tenggara Province, located about 50-200 meter above the sea level. The mining and gold processing areas spread out in three villages within the Sekotong Sub-District area: Buwun Mas, Kerato, Pelangan Village, with approximately 20 hotspots which involving about 5,000 miners. Generally, the ASGM hotspots area known as Sekotong gold mining site. The total mining and gold processing areas is approximately 1,200 hectare and some part of it located inside the protected forest areas, while another parts located inside community forest areas and private properties. Figure 3 shows the location of Hotspot B, Sekotong, in West Lombok Regency area, West Nusa Tenggara Province.

In Sekotong Village, home of 56,230 populations with 21.6% poverty rate and about 15,800 households, gold processing becomes the main business of the villagers. Anecdotal information from the field was that in Sekotong village, households without ball-mills are easier to count than those who operates the ball-mills. The Chief of Sekotong Village, took a neutral position as he personally oppose the home industry activities which generates more social and environmental problems in the village compare to the positive impacts.

Furthermore, the activities lead to cultural degradation due to high influx of migrant workers and miners from other part of Indonesia and lead to various conflicts and increased crimes cases. According to the Chief of Sekotong Sub-District, since the ASGM activities rocketed, the rate of school attendance also decreasing. Stealing and robbing cases are increasing over the years. Lombok is one of strong moslem regions in Indonesia. Cultural and religious activities are well-blended into community's social live. Since the rise of ASGM activities, many villagers ignore the religious rituals such as the Friday prayer, less people go to the mosques and funeral ceremony, people become less tolerance, more temperamental and selfish (interview with Chief of Sekotong Sub-District, 2012).

In a wider context, the presence of small-scale mining activities in Sekotong reflects the mismanagement of spatial planning in West Lombok regency. Sekotong sub-district as part of West Lombok Regency, has been designated as tourism, especially for diving area and not as mining zone. Consultations between the provincial government and the national Ministry of Energy and Mineral Resources are in flux. Meanwhile, the government over-turned Lombok's tourism zoning in 2010 to allow 1500 ha of traditional small-scale mining.

The local government of West Lombok regency has already issued a regional by-law concerning small-scale mining. However, the by-law does not specifically arrange the location in which small-scale gold mining may legally operate. Furthermore, problem arising from the absence of clear regulation is the uncontrollable usage of mercury for recovery of gold.

4.3.2. Characteristic of ASGM Activities

4.3.2.1. The upstream level

Since 2008, gold miner became a popular profession in Sekotong. The ASGM activities in Sekotong areas are less intense compared to the Poboya ASGM site. This site currently attract 5,000 miners and about 100 small ball-mills unit operates by the local villagers at the backyard of their houses. The mercury intoxication and contamination to the local communities are quite direct.



Figure 22. A miner crushing the rocks in Sekotong with Lombok Straits at the background.
Photo credit: Kemal Jufri for the New York Times.
Source: <http://www.nytimes.com/2011/07/08/world/asia/08indo.html>

Various sources stated different number of miners in Sekotong. One source stated that it was about 3,800 people consisted of 27% local residents.²⁹ Other sources stated that during the early stage of ASGM cycle in 2009, the number of miners was about 2,295 people involving about 88.6% local workers, about 3.53% from outside of Lombok, and about 9.63% from outside of West Nusa Tenggara Province (Somantri, 2011). The majority of miners came from Sulawesi, Tasikmalaya - West Java, East Java and Kalimantan. The arrival of migrant miners and gold prospectors from other regions, marked the start of the second stage of ASGM cycle in Sekotong and lucrative ball-mills operations with rocketed mercury usage around the area. Most miners worked without

²⁹ *Vivanews.com. December 16, 2009. Tambang Emas di Sekotong Ditutup.*

adequate health and safety equipments. Regardless some incidents of landslides, casualties, and increased crime rate, they continued the illegal activities for economic reasons.

Mining Agency of West Lombok Regency stated that gold, silver and copper deposits are quite wide spread in several areas including around Bukit Mesanggih and Pelangan. Gold concentration could reach up to 23 carats, with the potential reserve about 1,700,000 ton or approximately 2.7 gram of gold per ton ore. Further exploration survey need to be done to find the concentrated areas of gold. At the early stage of ASGM cycle, experienced miners sometimes act like an expert and provide inputs and suggestions to the local communities or new comers to conduct a conventional survey in several spots. There is no professional guidance or local zoning plan to identify the gold reserve areas.



Figure 23. A miner crushing the rocks in Sekotong with Lombok Straits at the background.

Source: <http://catperku.info/wp-content/uploads/DSC09156.jpg>



Figure 24. A miner crushing the rocks in Sekotong with Lombok Straits at the background.

Source: http://4.bp.blogspot.com/_m_kbUsxfr-OA/TQ3NVU3irpI/AAAAAAAAABQ/YbVat0K6_6E/s320/foto-catatan-kaki.gif

In the last couple of years, eager to find good concentration of gold ore, some miners started to dig the asphalt of the main road towards a famous white sandy beach area called Mekaki Beach. Many tour guides complaints about these irresponsible actions as the miners leave the non-prospective holes open with diameter between 2-4 meter.

Some tourism actors also worried about the pollution, negative impacts and bad image from the illegal gold mining activities. One of the accommodation owners said in the last couple of years the number of guests were decreased due to bad stories spread out in the areas. She decided to rent it out to a surfer operator to keep her business running. In contrary, some tour operators offer a tour package to pan the gold at the mining site (interview, 2012).

4.3.2.2. The middle-stream level

As usual, the ASGM prospectors also come along in the area, using mercury in the process and cyanide leaching. In West Lombok regency, ball-mills processing facilities hing plants with mercury and cyanide leacare spread out not only in rural and mining areas, but also in residential area and side by side with the rice field risking people's health and the environment (interview, 2012). The ball-mills introduced to the Sekotong village in late 2008 by a group of financiers from North Sulawesi.

The regency's Bureau of Statistics estimated a gold deposit of 1,686,462 m³ in the West Lombok regency, but zero record on gold production despite the observed gold production activities.³⁰ This can mean either a mistake during statistics compilation, or pointing to the illegal status of mining activities in the area. Around 1596 tons are estimated located in the Sekotong sub-district. In 2010, the number of ball-mills reached 1497 units, with 570 units dumping mercury-contaminated tailings direct into the rivers (Anderson, 2011). No permit or EIA documents needed or recorded.

An independent study predicted about 18 hotspots within an area of 12.20 hectare were identified in 2011 in West Lombok Regency.³¹ The identified areas are known as the limited production forest area about 10.41 hectare, protected areas about 0.79 hectare and recreational park about 1 hectare. The study also identified about 2300 miners were flocking in the mining and gold processing areas.

Data from local agency stated that in West Lombok there are about 308 ball-mills processing facilities with about 1268 *tromol* and mercury use about 200 kg per month or about 6.7 kg per day. The local agencies also revealed that they have identified 9 unit of cyanide leaching plants and carbon but no further details available. The processing plants are not only extract gold from the ores supplied from West Lombok mining areas but also tailings sludge from ball-mills plants in Sumbawa Regency and other areas (interview, 2012). By the time the study conducted, about 90% of Sekotong village residents involve in gold mining or gold extraction activities. They don't want to back to their old professions as fishermen or farmers due to economic reasons.



In Sekotong Village, home of 56,230 populations with 21.6% poverty rate and about 15,800 households, gold processing becomes the main business of the villagers. Anecdotal information from the field was that in Sekotong village, households without ball-mills are easier to count than those who operates the ball-mills. The Chief of Sekotong Village, took a neutral position as he personally oppose the home industry activities which generates more social and environmental problems in the village compare to the positive impacts.

³⁰ West Lombok Regency Bureau of Statistics. *Lombok Barat Dalam Angka (Lombok Barat in Figures) 2011*. Mataram, 2011. <http://lombokbaratkab.go.id/basis-data.html>.

³¹ Nurudin Diding Somantri, 2011. *Pertambangan Emas Tanpa izin (PETI) di Provinsi Nusa Tenggara Barat*. <http://didingsomantri.blogspot.com/>

The use of mercury in gold recovery operations in Sekotong harmed not only the health and safety of miners and their families but also threaten the economic development in Sekotong. The area has been described in the West Nusa Tenggara Province's land use and planning zone as tourism designated areas. However, the local government of West Lombok Regency, requested the Provincial government to revise its allocation and to include community mining designated areas within the tourism and productive forest areas.

By the time the study conducted, a large scale gold mining company, PT. Southern Arc (a foreign investment company, subsidiary of the Canadian's Arc corporation and PT. Indotan) has already hold a permit to explore and exploit gold in West Lombok Regency, overlap and side by side with the tourism zone. The contradictory policy between the local and provincial governments, create tension between the local villagers and miners.

Beside mercury, cyanide leaching method also quite popular in Sekotong. Some were built near the houses, some were near the rice field or mangrove areas. The tailing which hold in a simple pond, occasionally discharged to the water body nearby and polluting the ground water. According to some miners, to build a gold processing plant, they need approximately IDR 40,000,000 (approx. US\$ 4,166.7)³² for a complete 6 ball-mills unit including the generator and all the machineries, or IDR 125,000,000 (approx. US\$ 13,000) for a complete cyanide leaching plant (*tong*). From that investment they could earn IDR 50,000-60,000 (approx. US\$ 6-7) per gram of low quality raw gold or IDR 400,000-450,000 (approx. US\$ 45-50) per gram of high quality gold from the mining site nearby.



Figure 26. A new cyanide leaching plant built near the rice field. Photo credit: BALIFOKUS



Figure 27. Tailing pond from a cyanide leaching plant near the mangrove belt area. Photo credit: BALIFOKUS

In the last couple of years, the Sekotong area produces 1.5 kg of gold per day (interview, 2012). This situation definitely increased the family incomes and improved their life style. Many of them switched their professions from fishing and agriculture to become miners, gold extractors workers, transporters, crushers, or equipment and chemical suppliers. Many villagers in Sekotong now have an improved houses and or own motorcycles (interview, 2012). However, the rising of income also affect the price of basic commodities in Sekotong up to 30%. For example, since the ASGM activities rocketed, the price of the rice per kilogram was rising from IDR 4,500- 6,000 (US\$ 0.5-0.7) to IDR 6,000-8,000 (US\$ 0.7-0.9).

³² <http://www.xe.com/ucc/convert/?Amount=40000000&From=IDR&To=USD>

The gold extraction activities also decrease the quality of deep well/underground water. Sekotong residents cannot use the ground water for cooking and drinking anymore, and they have to buy water to fulfill the cooking and drinking water needs (interview, 2012).

Furthermore, the activities lead to cultural degradation due to high influx of migrant workers and miners from other part of Indonesia and lead to various conflicts and increased crimes cases. According to the Chief of Sekotong Sub-District, since the ASGM activities rocketed, the rate of school attendance also decreasing. Stealing and robbing cases are increasing over the years. Lombok is well-known as one of the strong moslem regions in Indonesia. Cultural and religious activities are well-blended into community's social live.

Since the rise of ASGM activities, many villagers ignore the religious rituals such as the Friday prayer, less people go to the mosques and funeral ceremony, people become less tolerance, more temperamental and selfish, and the rate of school attendance also decreasing. The number of child labor increased while most of the junior high school graduates or drop-outs are working as part-time miners (interview with Chief of Sekotong Sub-District, 2012).

4.3.2.3. The down-stream level

The Sekotong ASGM mining and gold processing sites are situated nearby several riversheds which some of them flowing to the Southern Lombok (to Selong Blanak Coast and to Blongas Bay and Indonesian Ocean) and some rivers flowing to the West Coast of Sekotong area (to the Lembong Bay and off to Lombok Straits).

Recent study (Universitas Gajah Mada, 2011) revealed that the water quality at the downstream part of the mining sites have shown high mercury concentration in the sediment of several rivers: Pelangan River, Selodong River, Blongas River and Sekotong River. The result of the study from Universitas Gajah Mada is shown in Table 3.

Table 3. Mercury in water and sediment near gold mining sites in West Lombok Regency

Sampling sites	Up-stream water (ppm)	Middle-stream water (ppm)	Down-stream sediment (ppm)	Mercury in fish (ppm)
Batu Montor	0.00013	---	---	---
Tembowong River	0.00013	---	---	0.7445
Blongas River	0.00016	0.00694	0.91	2.07085
Pelangan Selindungan River	0.00047	0.00325	3.48	0.0566
Selodong River	0.00016	0.00213	1.09	0.00358
Sekotong River	---	---	0.61	0.00952

Source: Laporan Pemantauan Lingkungan di Kabupaten Lombok Barat. Universitas Gajah Mada, 2011.

Indonesia has no standard for mercury in sediment. Therefore, the standard for mercury in sediment in open water is use referring to US EPA or WHO standard (0.001 ppm). The study revealed that all of the results of mercury in sediment downstream are significantly higher than the safe level, about 600 until 3500 times higher than the WHO standard.

Mercury in children's hairs (13 children hair samples) were ranging between 0,31- 22,17 ppm. High above the safe level of 0,5–1 ppm. The highest mercury in hair found in the samples of 15-30 years old respondents who have already working in the trommel/ball-mills operation for more than 6

months. Further, the hair samples from children age 0-4 years old have shown high mercury concentration up to 20,07 ppm (Gajah Mada University, 2011). The Minamata victims' mercury in hair were up to 50 ppm.

The impact of mining and gold extraction processes also complained by some groups of fishermen from the neighboring village as the river flow to the estuary of Gili Gede Island. In the last two years, the catch were decreasing due to the sedimentation. This situation made the fisher folks have to go further away from the shore. As the consequences, they have to spend more money to buy more fuel (interview, 2012).



Figure 28. Fishermen village affected by the ASGM activities inland.
Photo credit: BALIFOKUS

5.Results and Discussions

5.1.Social-economic impacts

Gold extraction and its hidden costs

The average price of extracting gold in 2010 was about USD 857 per ounce with an average recorded gold price about USD 1,425.³³ Several studies about the impact of ASGM in several areas and the mercury contaminations had been conducted and published but rarely cover the hidden cost and the human rights impact of the activities.

Hidden costs are expenses which are not included or reflected in the purchase price of a product in the market. Several costs associated with gold production include environmental management costs, environmental services costs, land rehabilitation, mercury and cyanide contamination clean up, health costs, social and cultural costs, etc.

³³ www.gfms.co.uk, www.mineweb.net

On health issue, confirmed by many studies, the associated hidden costs includes health recovery costs for the injured miners, HIV/AIDS treatment, sexually transmitted disease treatment, skin diseases, respiratory-related diseases, nerve-related treatment, health recovery costs of community surrounding the mining sites, compensations for the death of the family head or members of the family, etc. (GMP, 2006; Harada, 2004).

In Poboaya, despite the growing socio-economic, health, casualties, accidents and environmental problems from the ASGM activities, Health Agency of Palu City hesitated to provide extensive health services arguing that most of the inhabitants there were migrants and involved in illegal business (interview, 2011). A church supported health service and charity organization fills this gap by providing a health service twice a week at the site using a van turned into a mobile clinic. However, some local communities and ethnic groups interpreted the services as a religious-driven interest and at some point create another tension.

In Lebak Regency, women who are working on crushing near the tailing pond, which very often feel dizzy, inhaled mercury emissions every day without knowing the risks of their job. The quick cash seemed to be the main attraction of this sector to solve short term poverty problems. This situation also appeared to be the general norm in all ASGM sites.

Further, in Sekotong, high mercury found in children's hair far exceeding the safe level set by WHO. This situation is worsen by the malnutrition problem and chronic poverty all over Lombok. Local health agency do not have specific measures and programs to respond this situation.

Better income perception and inflation

From the study, most ball-mills workers, owners and communities realised that the cost for the water they use for gold processing and for domestic use were getting more expensive compared to last year. Only few of them understood the situation that the water price was increasing as the resources become more scarce and actually affected their production cost and monthly expenses. Moreover, as the mining activity grows, local community and miners become more dependent on the traded goods, leading to inflation. Although miners and local residents in the three hotspots earned better wages than from other sectors, about USD 2-5 per day, or USD 1.5 million per month (approx. USD 170), their daily expenses also increased due to the 'local' inflation at the mining or processing sites and, moreover, the life-time debt to the *kongsi* boss or the financiers.

In Palu and Sekotong, people who live at the downstream part of the area, affected by the ASGM activities but have no way to address it or asking for compensation for the ASGM actors. Some communities in Palu City, even did not have courage to speak up because they were afraid of the thugs and the bad responses from the police or army who were backing up the miners (interview, 2011).

However, in the three hotspots, other sectors, such as agriculture, fisheries, forestry, and tourism, have a huge potential to be developed as the alternative sustainable livelihoods especially for the local communities. When manage and plan properly, a certified or fair trade community logging or fisheries or cloves, could provide similar opportunities of income as the ASGM activities.

Health impacts and mis-perception

Despite the fact that health records in several local clinics near the mining sites and hospitals showed an increase in the number of diseases related to respiratory, nerves, skin diseases and fever,

most of the Health Agency officials in the three hotspots perceived the health problems recorded but denied the correlation between the health cases and the use of mercury and cyanide in the ASGM activity (interview, 2012). Hence lack of awareness among the health workers to associate some of the diseases with the ASGM activities.

Most miners are aware about the harmful effect of mercury as well as the risk and consequences of working in the underground mining shaft with poor safety equipment and no health insurance. Some of them hide their pain or conceal their illness to keep the job as stated by Poboya miner. Alcohol and energy drinks as well as cigarettes are widely consumed to maintain the physical fitness of the miners and workers including children workers. A reference from another ASGM site, reported that some young miners were sexually abused and raped by the male co-workers as part of the initiation and 'to make stronger' (interview, 2011).

Livelihood, culture and social mobility

Socio-economic activities such as agriculture, fisheries and forestry are often affected by the mining activities and recognised but never quantified and investigated further by the authority. Local villagers who lost their previous livelihood due to the pollution or environmental degradation caused by the ASGM activities, do not have channel to address their complaints and ask for compensation. Some of them unwillingly or forced changed their professions, without adequate training and knowledge, to new professions which could be more harmful and less sustainable than their previous livelihoods. Without a particular skill, the farmer is likely to be forced to work at the lowest level with low-wage. This proletarianization situation will lead to economic informalization in the society and from the Marxist perspective is considered a form of downward social mobility (Debord, 1992; Tabak et al., 2000).

In the case of Sekotong, the ASGM activities reduced the number of villagers going abroad as migrant workers (interview, 2012). While in Lebak Gedong, some farmer who turned their profession as miners, at the third stage of ASGM cycle, choose to go outside of their village and go to Maluku to explore the new ASGM frontier based on their experience in Lebak, repeating the same practice and mistakes (interview, 2012).

The three hotspots showed similar cultural degradation, 'modern or urban' lifestyle as oppose to moderate and rural style lifestyles, growing consumerism, loosened family values and norms, selfish oriented, etc. Education is less important when a quick cash can be earn easily by anyone without any skill and without any warning about the potential risks of their jobs. Many child labour in the three sites were dropped out intentionally and sometimes forced to work to help their parents directly and indirectly.

Illicit economy

The authorities and public in general acknowledge the dark issues such as the illegal trading of mercury and cyanide, illegal retributions by various local thugs, sex and drugs business related to the mining activities and red tapes to police, military or government officials.

In regards with the illegal trading of mercury and cyanide, the authority enforce and refer to the law issued by the Ministry of Environment regarding the trade and distribution of mercury and cyanide but the implementation of the law on the ground is tricky and challenging. Compared to mercury, cyanide has more clear regulatory framework but still can be bend. Most of cyanide in the market is mainly imported and distributed by a state-owned company called Indonesian Trading Company or

PT. Perusahaan Perdagangan Indonesia.³⁴ The distribution of cyanide at the local level are handled by *PT. Perusahaan Daerah (PT. Perusda)*, a local state-owned company. The shareholder of PT. Perusda is the local government office.

It is well-known that cyanide or any products sold by PT. Perusda have fix standard market prices. However, the same company could sell the same product with different price; one price is a normal and legal price, another price is cheaper than the legal one. Whenever the police found someone or another company selling the cyanide without a proper paperwork related to PT. Perusda, the police retain the right to confiscate the cyanide. PT. Perusda usually managed or working with third party who will share the profit at the end of the fiscal year. Sometimes they sell the cyanide less than the normal price to increase their revenue and avoid tax (interview, 2011).

Local sustainable development plan and institutional approach

Almost in all ASGM hotspots in Indonesia spread out in 23 provinces, local government have no plan to regulate and control this sector. In general, all mining related activities are subject to the National Law No.4 year 2009 concerning Mineral and Coal Mining. ASGM falls under the category of community mining which is stipulated under all chapters. However, to be operational, the law needs to be elaborated further into several Government Regulations, such as on community mining designated areas and community mining permits, which could be adopted by provincial and local governments as the umbrella to develop local development plan on ASGM. These government regulations to be operational still have to go through a consultation process and approval from the parliament. Ideally, government regulations supporting such law, be available at least two years after the issuance of the law. Hence lack of local government plan on ASGM.

In 2005-2009, GEF UNIDO-UNDP program on ASGM conducted in several countries, including Indonesia. The GEF project focused their intervention in Central and East Kalimantan. Various awareness materials, assessment and guidance documents were available and can be distributed and adapted by most local governments. However, the relevant national agency did not take further action to adopt it as a mainstream program due to the complexity of inter-departmental coordination. Some technical programs, such as the promotion of retort to capture mercury vapor, still on going pragmatically and non-systemic.

5.2.Human Rights impacts

The right to a safe, healthy and ecologically-balanced environment

The environment as a pre-requisite for the enjoyment of human rights. The environment and nature are the important component of the villagers ad local communities' live. Environmental quality and services in the three ASGM hotspots with different stage across all the streams are decreasing compare to the situation before the ASGM activities started in the area. Without the environment and nature, the local communities will not be able to maintain their cultural practices and daily life (Lebak and Poboya), and feed their families from fishing and agriculture (Sekotong). Without the environment and nature, and peaceful situation to enjoy it, their existence as a human being is not complete. Poor environment and bad environmental practices, could harm people's health and could lead to a huge social and economic losses and conflicts.

³⁴ <http://www.tradingindonesia.com/#>

Over time, the environment and nature degraded and improved naturally and in some cases at a smaller scale, a self-recovery process took place. The ASGM activities and the use of mercury as well as cyanide in the process, speed up the destruction process of environment which lead to various adverse effects and irreversible damage to people's health and the nature's metabolism. The toxics emission of mercury and contamination to land/soil and water not only harmful for the workers but also for people who live nearby or at the downstream of the ASGM activities. Some workers only involved for a couple of months and then move to another sites or other jobs. It is not fair for the local community, especially those who has no benefits or nothing to do with the ASGM, who most suffered from the pollution and the damage in the long-term.

Child labor

Although there is no data about the number of children working in the three ASGM sites, the number of children workers below 18 are very obvious. They are working with same pace and same working hour with the adult workers but paid less as they are still young or for their level works (easy task but actually dangerous for the children).

The Indonesian Children Protection National Committee stated that at least about 26% of Indonesian child labour age between 5 and 17, or about 1.7 million, work in hazardous working environment, including in mining sector.³⁵ Economic reason and poverty always use as the main reasons to let the children drop out from school and work in the field either to help their parent or to become the bread winner of the family (Lebak, Palu). ILO Convention No. 138 marks out minimum ages for different types of employment: age 15 for ordinary work; age 18 for hazardous work; age 13 for light work.

Child labour, then, is simply work done by children who are younger than the designated minimum age in one or another of these categories. A report on Working Children in Indonesia (2009) stated that the definition of child labor includes working children between the ages of 13 and 14 who work more than 15 hours per week, and children between the ages of 15 and 17 years who work more than 40 hours a week.³⁶ The working children - some are still in school, doing unpaid work for their families or involved in the mining sites or gold processing plant - worked an average of 25 hours per week. The full time child labor in Poboaya and Sekotong work for a full 2 weeks, 12 hours per day and then have 2-3 days break before start to work again.

For children working in ASGM sites, the hazards are obvious. It is the physical and psychological hazards, like abuse, forced to work underground or under the water for a long time, or other exploitation that make this form dangerous. Children age 10-18 are often "achievers" and especially boys, like challenges. They want to perform well, go for extra mile, and are inexperienced and untrained in dealing with hazards (IPEC, 2002). Tools are not made for them, and thus pose more hazards. There are no personal protection devices for children. Additionally, they are also not organized and powerless. Girls are at special risk. They often begin to work at a younger age and have a double work burden (at home and in the fields). They frequently work longer hours, and in different cultural settings may get poorer nutrition. Both boys and girls are expose to high risk of sexual abuse and exploitation.

³⁵ <http://www.tempo.co/read/news/2012/06/04/173408068/17-Juta-Anak-Bekerja-di-Lingkungan-Berbahaya> accessed in June 27, 2012

³⁶ <http://www.thejakartaglobe.com/national/17-million-child-laborers-in-indonesia-survey-says/358199>

Occupational hazards cause not only short-term health effects (mainly injuries, skin problems, etc), but most effects are long-term and will only become evident in adulthood. Therefore, they are difficult to measure and to quantify. Cancer, infertility, chronic backpain, tuberculosis, HIV/AIDS and IQ reduction are some of the expected long-term outcomes.

In 2006-2007, ILO Indonesia in cooperation with local NGO in East Kalimantan, PADI, conducted a program to shift the family with child labor stop sending their children to the ASGM sites by the provision of a suitable species of tree, planted in family lands or collective land, which will produce a non-forest products, such as rubber and spices, with good price in the local market. The program successfully stopped 40% of the child labor back to school and do not return to the mining site. The rest were quit for a short period of time and back to work in different sector although the parent still keep the alternative livelihood.

The right to social security

ASGM activities recognized as informal and illegal form of business. Currently, there is no regulations exist or applied to control the ASGM practices in Indonesia. Indonesian Act No. 13 year 2003 regarding Employment required every employer to treat their employees properly, securing their safety and rights and provide decent job and to ensure his/her achieve the standard of living adequate for the health and well-being of him/herself and of his/her family. No safety equipment provided for all workers, no proper training received by the workers. However, since the 'company', financiers, and/or the employers are not registered as a legal entity, the contract or agreement between the employer and the employees are heavily depends on the generosity of the employer.

In Poboya and Sekotong, when the miners injured, the *kongsi* boss will cover all the necessary health treatment cost as long as it costs them less than IDR 1 million. In the case of casualties or death, the *kongsi* boss and the village committee will cover all the transportation back to their village plus IDR 1 million, or more, compensation for the family's loss. In general, due to the informality nature of works, not all workers registered or acknowledge by the local village committee or authority. When some of them were death or wash out by flooded or buried under the landslides, they really disappeared and do not exist anymore. Their right as employees or labor do not respected fully by their employers/financiers.

Access to information and participation in decision-making

Communities who live around the ASGM hotspots most of the times received different story from the local authority about the potential, land use plan or development plan of the area. Most of the time local communities plan their own life and livelihoods in response to the ASGM activities. In all ASGM sites, farmers were no longer able to plant their crops because the water resources have been dried up or highly contaminated by mercury or cyanide. No information received by farmers what is happening and what will be happen in the future with their current livelihood. Same problem applied to fisher folks.

When the local government or local university conducted study or survey and published, local community never informed about the follow up plan or improvement plan. In all three ASGM sites, local community committee establish their own rules towards the ASGM miners and migrants. Village responses plan usually came up at the second stage of the cycle and announced to the all residents. There is no information about when the pollution will be clean up, how to settle the

dispute between the people and the miners, etc. However, in many places, the village committee's decision very much in favor to protect the investment of the financiers or shareholders of the *kongsi*.

Access to environmental justice

All local community around the ASGM hotspots have their previous livelihood as crop growers, vegetables farmers, rice farmers, fishermen, cow/cattle farmers, rattan harvesters, non-timber forest harvests, etc. They have been used the water resources, the forests products and other natural resources for years. The population who live downstream also enjoyed the water supply from the spring up in the mountain as well as clean groundwater for all domestic purposes.

After the ASGM activities taken place, almost all of the environmental services qualitatively and quantitatively were decreasing, degraded and/or gone. Farmers loss their crops and agriculture land, fish and cows died after drinking the water in the pond contaminated by cyanide, etc. Communities now have to buy water and other consumer goods from outside of their village in line with the growing consumerism brought up by the ASGM miners and workers. Conflict between farmers and the owner of gold processing plants sometimes settled by common understanding leaving the disadvantage groups unsatisfied but have no other options. Legal channel will be cost them more. So they have to accept whatever the offer given by the polluters.

In the case of Poboya, local environmental agency already issued a regulations, requesting all gold processing facilities to submit environmental impact assessment documents. However, to make and submit such document, one should hire a certified environmental experts and could cost them up to US\$ 5,000. As a result, only few plant owners submit the document required and paid half of that amount under the table to the agency to settle the environmental permit (interview, 2011). More over, this issue complicates by the involvement of some officials as the shareholders of the gold extraction plants make environmental justice more difficult to be enacted.

6. Conclusion and recommendations

The damage to environmental services and human health, at the local and broader levels, from ASGM remains underrepresented in estimates economic impact from this activity. Unintentional costs to local economies can arise from human health impacts on miners and the wider community, most particularly children.

Opportunity costs also result from ASGM-degraded biodiversity and ecosystem services that support production and export from other sectors such as forestry, fisheries and agriculture. Furthermore, some of the auxillary livelihood activities generated following gold rushes severely damage social fabric, including the introduction of under-aged prostitution, sexual abuse, criminals, alcoholism and child labour.

ILO recently (2011) released a report called "Children in hazardous work: What we know, what we need to do," that stated that more than one-fifth of child miners reported increased health problems since starting work; over 40 percent suffered from musculoskeletal pain and 30 percent from exhaustion, while one-third of the child miners complained of respiratory and genito-urinary diseases. Of children who fell ill or were injured, 43 percent were not able to access medical services. One-third continued working despite his or her illness. Individuals who become entrapped in child labour are typically the poorest and most vulnerable members of society. Furthermore, a

comprehensive and systematic survey need to be done to develop the baseline and necessary health interventions as well as development plan and strategy on ASGM at the local level.

Generally speaking, absolute poverty cannot be reduced without economic growth. ASGM may contribute to local economic growth and by extension national economic growth; however, the magnitude of the contribution is uncertain due to the lack of including the extensive externalities associated with the activity. At the most essential level, this sector has the potential to both reduce vulnerability to income shocks as a result of living close to or below the poverty line (below US\$1 a day) and also increase the poor's vulnerability through destruction of environmental services and human health impacts, in addition to the social costs that affect small mining communities.

Through mercury pollution, ASGM contributes to economic vulnerability with increased financial, health and environmental risks. For the most part however, externalities associated with ASGM have not been estimated and as such, there is a lack of available information to draw from to assess their combined magnitude. Of all sources of external costs in this activity however, mercury use is considered amongst the most damaging for human and ecosystem health. What is more, with the mercury treaty currently under negotiation, mercury is seen as an 'entry point' through which the international community can act on other health, environment and social ills associated with this activity.

ASGM activities are strongly related to the global market and gold price. Poverty and poor law enforcement are the favorable conditions for ASGM to grow, expanded and boom in many places. ASGM answers the poverty and livelihood problems for a temporary period of time. The negative externalities caused by ASGM activities at all stage of its cycle become the burden of the local communities and local governments.

The externalities not only costly but also violating the human rights in all aspects, from the right to a healthy environment, access to sustainable environmental services, sustainable livelihoods, decent jobs, labor rights to social security, child labor, access to information and participation to decision making process as well as access to environmental justice.

Alternative sustainable livelihoods should be explored together with the the local communities based on the previous knowledge and practices and improved with market approach. In Lebak, cloves and eco-tourism had been identified by the local communities as the potential alternative livelihood. While in Poboya, shallot and rattan used to be the main contributor to the local economy but non-forest timber harvesting within the forest grand park and community logging outside the park boundaries could be identified as the potential alternative livelihood. Meanwhile, in Sekotong, community fisheries, organic crops, coastal tourism and community logging identified as the potential alternative livelihoods. By ensuring people's livelihood and maintaining the environmental services supported by strong political will, the human rights essentials can be fulfilled.

To prevent further damage, there are several recommendations can be done by relevant stakeholders:

- Local governments:

- Establish a multi-stakeholders forum on ASGM;
- Identify and recognize the ASGM activities in the region;
- Conduct rapid assessment followed by baseline data survey;
- Develop a local strategy to control and manage the ASGM activities;
- Develop a local action plan to eliminate and ban the use of mercury in ASGM;

- Provide necessary infrastructures and utilities to ensure the standard living of local communities and ASGM workers;
 - Develop measures to protect miners, workers, communities, especially children and women from the harmful effect of ASGM activities including mercury and cyanide use;
 - Provide alternative and sustainable livelihoods with strong community empowerment components;
 - Conduct regular environmental, social, economy and health monitoring.
- Local community leaders:
- Uphold the human rights and the rights to healthy living environment;
 - Establish community committee or use the existing body/forum to discuss the ASGM issues;
 - Identify the stakeholders of ASGM in the area;
 - Say no to mercury and harmful chemicals use in ASGM;
 - Develop and announce the local regulations for ASGM miners, workers and migrants;
 - Coordinate and communicate with the local government agencies and other stakeholders.
- ASGM investors/financiers and related business:
- Form a cooperative or small business unit;
 - Register to the local authority;
 - Keep the list and identity of all workers;
 - Employ no child labor or workers age under 18;
 - Prepare and sign written working contract with all workers;
 - Provide health and safety insurance for all workers;
 - Provide and apply all health and safety protection for all workers;
 - Use non-mercury methods in gold extraction process;
 - Develop and implement environmental management for all ASGM activities;
 - Develop and implement the environmental rehabilitation post ASGM activities finished;
 - Uphold the human rights and sustainable livelihood over economic interest.
- Academia and civil society:
- Promote, support and advocate to eliminate and ban the use of mercury in ASGM;
 - Share and disseminate relevant information to the stakeholders;
 - Participate in the decision making process;
 - Get involve in environmental, social, economic, health and human rights monitoring;
 - Promote sustainable livelihoods and uphold the human rights above all.

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