
Workshop Report on

SUSTAINABLE ASGM PRACTICES

Mataram • Indonesia • 9-11 February 2012

Organized by:

BALIFOKUS IRC-MEDMIND

Supported by:



MERCURY
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PROJECT



SUMMARY

ASGM practices found in all regions in Indonesia with a general similar pattern. A discovery of gold deposit attracts gold prospectors, miners and non-miners from various areas, using cheap but destructive gold-extraction technology with mercury and cyanide followed by amalgamation and open burning. In parallel, after the prevalence of small-scale mining, the people who used to reject the presence of large-scale mining operations became more accepting as they gain direct benefit from the activities regardless the negative long term impact to their health, local socio-economic and the environment.

Mining activities always produce irreversible negative environmental impact. Small-scale mining appear profitable to the people, but comes at a higher cost than the selling price of gold, in the form of health, environmental and social hazard. When the practice of illegal ASGM have grown to involve a large number of people, it is more difficult for law enforcement to curb the practice. Many local government categorised ASGM as illegal activities but could not stop the practices for various reasons.

The best option for the long term 'sustainable' ASGM practices is to improve the current mining activities, develop proper community mining management and technical plan and capacity building, and prepare the shift of people's livelihood from mining to other or alternative livelihoods such as from agriculture, fisheries and forestry. However, with the limitations and reality on the ground, closing-down operations and outreach programs are often only successful in the short term. From previous experience, the problem remained, even escalated in the last ten years.

Therefore, concerted control efforts are needed, in form of limiting and eventually eliminating the supply and distribution of mercury, training people to switch to non-mercury techniques and provide a special area for regulated community mining. The momentum of sharply increasing price of mercury should be seized to reduce the reliance of small-scale miners on mercury. The capacity of health care practitioners to handle mercury poisoning cases and educate people on matters of mercury hazard need to be increased, improved and conducted in scale and systematic way. Research on remediation of contaminated land should be continued with more options to clean up the contaminated soil and water as well as the final process and disposal plant.

Mercury-free ASGM techniques are already available and relatively cheap, but the implementation need to be adapted and adjusted to the characteristics of the local ores and the miners/community's current practices. One of the solutions can be reached by conducting miners-to-miners training coupled with the formalization process. The effort must be guided by a national policy towards elimination of mercury in ASGM, localise the ASGM activities within the designated Community Mining Areas, midterm plan of transitional livelihood, clean up and remediation plan and long term rehabilitation strategy. Synergy is needed, not just by district/local governments and the Ministry of Environment, but also other departments such as the Mining and Energy, Trade, Health and Social Welfare. Caution must be exercised when choosing to formalize and legalize small-scale mining so as not to clash with existing laws, especially on forestry and environment.

PREFACE

This report was developed as a result of a workshop conducted in February 9-11 in Mataram, Lombok, Indonesia.

The Sustainable ASGM Workshop was conducted as a separate part of the international conference on environmental, socio-economic, and health impacts of Artisanal and Small-scale Mining Conference conducted in Malang in Feb 7-8, 2012. The ASM Conference was organized by the International Research Centre for Management of Degraded and Mining Lands (IRC-MEDMIND), a research collaboration between Brawijaya University (Indonesia), Mataram University (Indonesia), Massey University (New Zealand) and Institute of Geochemistry, Chinese Academy of Sciences (P.R. China), aimed to provide opportunity for scientists, policy makers and mining industries to get together and exchange experience in the ASM sector.

This ASGM Workshop in Mataram was the first ASGM gathering which participated by 60 participants representing various stakeholders from 7 countries, 5 provinces, 12 local governments, 6 universities, 3 international/regional NGOs, 3 national NGOs and 3 local NGOs, representative or miners and community leaders as well as private sector representative.

Due to the limitation of time, the workshop only able to identify the snapshots of problems from 5 sub-regions (Sumatera, Java, Kalimantan, Sulawesi, and West Nusa Tenggara) through the sub-regional panel presentations with special focus on West Nusa Tenggara Province. The workshop also shared non-mercury techniques practiced in other countries, mercury reduction technique and phytoremediation options for mercury contaminated sites.

The field trip which was conducted on the following day provided the participants with the real situation on the ground and a practical/technical demo session at the village hall attended by the local miners and local communities in one of ASGM hotspots in West Lombok Regency at Pelangan Village.

On behalf of the organizers, BALIFOKUS and IRC-MEDMIND, we would like to expressed our gratitude to all institutions who support this workshop and made it happen especially to UNEP ASGM Partnership Area, Ministry of Environment, Provincial Government of West Nusa Tenggara, NRDC, EEB-ZMWG, Mercury Policy Project, and IPEN. We also would like to express our appreciation to all participants who actively contribute and provided valuable insights in this workshop.

We are hoping this workshop would lead to another momentum to improve the ASGM sector in Indonesia.

Workshop Coordinator,
Yuyun Ismawati

Report

Workshop on Sustainable ASGM Practices

Mataram, 9-11 February 2012
Indonesia

1. BACKGROUND

In 2010, the Indonesian population was estimated to be 236.7 million. About 17.8% lives below the national poverty line, and 53.8% population lives with an income of less than USD \$2 per day.¹ Cheap labor, low skills, low education and economic pressures make them an easy target for any investment or business opportunities including in the ASGM sector.

In Indonesia, in the last five years the number of artisanal and small-scale gold mining hotspots has almost doubled. Sites are located on public or private land which is managed together by groups of miners or a community. In 2010, there were about 900 hotspots with an associated more than 250,000 miners, including women and children, and over 1,000,000 populations who relied on the sector for their livelihood.² From various studies, it was estimated that every miner could produce at least 10 grams of gold per day.

The new law on mining and coal released by the Ministry of Energy and Mineral Resources No.4 year 2009 (*UU Mineral dan Batubara* No. 4/2009), allows local government give permits for community/small-scale mining activities up to medium size companies in any potential sites including the river banks and sensitive areas. However, the implementation of the regulation at the local level facing many challenges including harmonization of all relevant regulations at various level, national, provincial and local level.

1.1. ASM Conference on Environmental, Socio-economic, and Health Impacts of Artisanal and Small-scale Mining

Artisanal and small-scale mining (ASM) plays an important economic role in many developing countries. Small-scale mining can be extremely environmentally damaging and often has serious health and safety consequences for workers and surrounding communities. The international conference on environmental, socio-economic, and health impacts of ASM which will be conducted in Malang in Feb 7-8, 2012 provide opportunity for scientists, policy makers and mining industries to get together and exchange experience in the ASM sector.

The ASM conference is organized by the International Research Centre for Management of Degraded and Mining Lands, as research collaboration between Brawijaya University (Indonesia), Mataram University (Indonesia), Massey University (New Zealand) and Institute of Geochemistry, Chinese Academy of Sciences (P.R. China) in attempting to create opportunities in ASM areas.

The objectives of the ASM conference is to share recent research trend, experiences and research work among scientists, industry, community, and policy makers; and discuss

¹ Badan Pusat Statistik, 2010. http://dds.bps.go.id/eng/tab_sub/view.php?tabel=1&daftar=1&id_subyek=23¬ab=4 accessed by July 19, 2011.

² Ismawati, Y. 2010. Presentation at the National Mercury Roundtable Forum, Jakarta, 4 August 2010.

direction of collaborative research in management of ASGM as well as to strengthen the relationship among scientists, industry, community, and policy makers.

The conference offer participants to have a field trip to Lombok, West Nusa Tenggara to visit one of the ASGM sites in West Lombok, to discuss views, exchange knowledge, and establishing research collaboration in management of ASGM to draw support from the industrial, government and NGO sectors.

The ASGM Workshop will be conducted in the conjunction with this field trip. Beside involving the leading scientists speakers of the ASM Conference, this ASGM Workshop will be the first forum in Indonesia which conven all the related ASGM stakeholders from 17 cities/regencies from 7 provinces, small-scale gold mining actors/miners, NGOs and private sector. In this workshop participants will exchange ideas and experiences on various aspects of social, technical, environment and policy related to sustainable ASGM practices.

1.2. Mercury use in ASGM and its related impacts

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 practices is Whole Ore Amalgamation (WOA) which releases much more mercury, up to 20-50 grams of mercury per gram of gold.³ Measures to reduce the mercury use in ASGM such as retort and fume hood have been introduced by several agencies. However, the effectiveness of technical intervention needs to be coupled with economic incentive and regulatory framework.

GMP (2007) reported that mercury in fish in Central Kalimantan around the ASGM site was ranging from 0.09 up to 1.6 ppm. Several studies conducted in Jambi 1977, West Kalimantan (2000), North Sulawesi (2002), West Java (2003) and Palu, Central Sulawesi (2008, 2010) found high mercury concentration in the river, soil and fish affecting community and miners' health.^{4,5,6,7}

Recent study in in Palu City, Central Sulawesi and surroundings, found mercury in the air also considerably high, ranging between 20 nanogram/cubic meter up to 40,000 nanogram/cubic meter^{8,9} risking the downstream population's health. Mercury in water and sediment in several ASGM sites are ranging from 0.6 ppm up to 4 ppm which is 600-3000 times higher

³ Kevin Telmer, 2007. Mercury and Small Scale Gold Mining –Magnitude and Challenges Worldwide. GEF/UNDP/ UNIDO Global Mercury Project

⁴ Subanri, 2008. Kajian Beban Pencemaran Merkuri (Hg) Terhadap Air Sungai Menyuke Dan Gangguan Kesehatan Pada Penambang Sebagai Akibat Penambangan Emas Tanpa Izin (Peti) Di Kecamatan Menyuke Kabupaten Landak Kalimantan Barat. Program Pasca Sarjana Magister Kesehatan Lingkungan Universitas Diponegoro. Semarang. Indonesia.

⁵ Daniel Limbong et al, 2002. Emissions and environmental implications of mercury from artisanal gold mining in north Sulawesi, Indonesia

⁶ Irwan Said, 2008. Tadulako University. Palu, Central Sulawesi.

⁷ Halimah Safrul, 2003. University of Indonesia. Pencemaran merkuri dan strategi penanganan penambangan emas tanpa izin (PETI) di Pongkor, Jawa Barat. Jakarta.

⁸ Lumex sampling result conducted by BALIFOKUS, June 2011.

⁹ Yuka Serikawa, 2011. Joint research Toyohasi University of Technology, Toyama Prefectura University and Tadulako University.

than the WHO standard (0,001 ppm).^{10,11,12} Other measures related to site rehabilitation, clean up contaminated site and biomonitoring in ASGM areas still poorly understood and receive low attention from all stakeholders.

2. OBJECTIVES

- To identify gaps, challenges, and opportunities of promoting mercury reduction and mercury-free ASGM practices at the local, national and regional level.
- To share and exchange information on policy, social, technical, environmental and economic approach for sustainable ASGM practices.

3. ORGANIZERS AND SUPPORTING INSTITUTIONS

Organizers:

- BALIFOKUS Foundation
- Environmental and Research Agency of West Nusa Tenggara (BLHP NTB)
- Environmental Agency of West Lombok Regency (BLH Lombok Barat)
- International Research Centre for Management of Degraded and Mining Lands (IRC-MEDMIND)

Supported by:

- UNEP ASGM Partnership Area
- Indonesian Ministry of Environment (KLH RI)
- Natural Resource Defend Council (NRDC)
- Mercury Policy Project
- European Environmental Bureau - Zero Mercury Working Group (EEB-ZMWG)
- International POPs Elimination Network (IPEN)
- Massey University
- Brawijaya University
- Mataram University

4. BUDGET AND FUNDING SUPPORT

The total budget for this workshop is USD 15,800.00 supported in form of cash and in-kind from:

- UNEP ASGM Partnership Area - travel grants for participants from Tanzania and the Philippines
- Ministry of Environment - in-kind travel support for national participants
- NRDC - to cover the meeting package and travel support of some participants

¹⁰ Gajah Mada University press release environmental monitoring study of Sekotong ASGM area. (2010).

¹¹ Prof. Mappiratu, Tadulako University. (2010). Laboratory result of Poboya ASGM site.

¹² Yayasan Tambuhak Sinta. (2010). Scoping Study Report of Poboya, Palu ASGM Site.

- EEB - ZMWG - travel support for NGO participants
- IPEN - to support the survey and workshop preparation
- Mercury Policy Project - documentation and workshop implementation
- Massey University, Brawijaya University and Mataram University - field trip preparation and implementation
- Environmental and Research Agency of West Nusa Tenggara Province - welcome dinner and workshop implementation
- Local government of West Lombok Regency - field trip implementation

5. EVENT SUMMARY

5.1. Opening Session

The workshop was opened at 09.00 am on Friday, 10 February 2012 by Mr. Bayu Susila, Director of Balifokus Foundation, who also acted as Moderator for the Opening and Technical sessions.

The first opening remark was delivered by Ms. Yuyun Ismawati, Advisor of Balifokus Foundation, via pre-recorded video. She addressed the general condition and distribution of artisanal and small-scale gold-mining (ASGM) in Indonesia, including the emergence of 900 new hotspots over the last 5 years. She highlighted that although ASGM appears beneficial to the livelihood of people, the apparent and hidden socioeconomic impact is high, as the health risks posed by mercury pollution due to the commonly used amalgamation method. The impact of mercury to the miners and communities' health have been detected in several ASGM sites in Indonesia as well as in other countries but not much exposed and understudied. The social, environmental and health costs associated to the impact of mercury use in ASGM is much higher than the price of gold and still undermined. Therefore an immediate action plan needs to be developed to prevent greater losses in the future. A strategy and action plan agreed and implemented by all stakeholders under a national policy framework supported by a global treaty could minimize the risk and prevent further damage from this sector.

The floor was next given to Ms. Halimah Syafrul, the Assistant Deputy for Hazardous Substances Management at the Indonesian Ministry of Environment, speaking on behalf for the Deputy Minister for Hazardous Substances, Hazardous Wastes and Solid Waste Management. She remarked on Indonesia's active participation in gradual elimination of mercury use, including discussion on preventing importation of mercury from developed countries to miners in developing countries at the Mercury Treaty International Negotiating Committee meetings in Tokyo and Nairobi. Thus far, one of the efforts with positive results in reducing the small-scale illegal gold mining activities was, among others but not limited to, through Comdev (Community Development) with participation of miners, local government and large companies in this example is PT. Aneka Tambang in Pongkor, West Java who owned the concession right to mine the gold in the area. The program implemented by not only suppressing miners, but also providing alternatives and technology transfer. The officials of Nanggung sub-district in West Java together with higher-level government

managed to reduce from 9,000 miners to only 10-20 today. At the end of her speech, Ms Halimah officially opened the workshop.

Prof. Dr. Eko Handayanto from Agriculture Faculty of Universitas Brawijaya, Chairman of the IRC-MEDMIND, highlighted several topics in the preceding International Conference on Environmental, Socio-economic, and Health Impacts of Artisanal and Small Scale Mining, recently held on 7-8 February 2012 in Malang, East Java. To address the emerging ASGM practices in Indonesia, research is conducted with the goal to develop a simple, cheap, easy-to-operate and financially rewarding technology to protect the safety and health of communities and the environment at ASGM locations. The current focus areas are phytomining and phytoextraction of hazardous substances in tailings, with experiments ongoing in West Nusa Tenggara and West Java provinces.

Mr. Richard Gutierrez, Executive Director of Ban Toxics! Philippines expressed the global perspective on elimination of mercury in ASGM. The biggest impact of mercury exposure is faced by developing countries, including Philippines, South America and Indonesia, affecting 10-20 million lives globally. With no threshold limit, exposure risks via fish and air, and primary risks to pregnant women and children, the adverse impacts of ASGM cannot be ignored. But the reality on the ground reveals that small-scale miners often do high-risk practices, such as open amalgamation in Ghana and Indonesia, mixing of cyanide and mercury and negligent disposal of contaminated tailings. Mr. Gutierrez also briefly mentioned the development from Global Mercury Project in 2002, to the decision to pursue legally binding instrument on mercury in 2009, and the UNEP ASGM Partnership to assist developing countries in reducing 50% of mercury in ASGM by 2017. The reality of ASGM practices is that they are decentralized, with little formal association, and the effectiveness of regulatory approaches is limited due to illegality. There is no silver bullet to solve this issue, but efforts can be made to restrict supply, formalize miners, develop successful transition models, and provide financial and technical support for scaling up.

5.2. Sub-Regional Discussion Session

Started at 10.30 am, the second session was divided into three parts based on focus regions, where participants with experience in the particular regions presented the condition of mercury in ASGM, followed by a discussion.

5.2.1. Java and Sumatera Region - Moderated by Ms Dyah Paramita, Indonesian Centre for Environmental Law/ICEL

Ms. Halimah (MoE) presented her experience in controlling the illegal gold mining activity in Pongkor, West Java. ASGM amalgamation practices without regard for health or safety had resulted in environmental, health and social impacts. A cooperation between government, commercial sector and community elements were expedited to address this, by (a) personal documents raid and expulsion, as most illegal miners were not local residents; (b) raids on mercury supply, gold processing and mining equipments; (c) economic and social empowerment through training and small business assistance; (d) education on the dangers of mercury; (e) land rehabilitation by reforestation. Introduction on new technology weren't conducted because the miners in question were illegal.

Mr Sahala Tua Manik, Head of the Mining and Energy Agency of Dairi Regency, North Sumatra Province expressed that his area had not seen high ASGM activity, but is at the stage of exploitation by large mining companies. The approach they take is following the existing laws on mining.

Mr Alfred Sitorus of Joint Committee for Leaded Gasoline Phase-out (KPBB) played videos on several areas that his organization had researched, including Sumatra, Baban Timur in East Java, and Lebong in Bengkulu. Though some are alluvial mining and some hard rock deposits, all areas generally employ the same techniques, first ore crushing with various equipments, followed by recovery by amalgamation and burning. Tailing disposal often go straight to the river. In Baban Timur, 741 ppm of Hg was detected by XRF on the top soil (in contrast to the Canada threshold value of 2 ppm). He ended by expressing disagreement with the term “tambang ramah lingkungan” (environmentally-friendly mining), as all mining, small or large scale, degrades the environment.

Mr Hendra Aquan of Blacksmith Institute asked about the success levels of MoE efforts in getting miners to change professions. Ms Halimah answered that the process took time, the efforts that started in 2000 only showed reductions in 2001. The initial step was socialization through entertainment events for locals, religious counseling and involvement of the police to address backers of the business. Using regional development budget and in cooperation with the Bogor Agricultural University, training centres were built, such as in welding skill and agribusiness. PT Aneka Tambang was involved by acquiring small-scale miners' land to mine in a more environmentally conscious way. However, it was noted that illegal mining activities would begin cropping up with a change of regional leadership, hence the necessity to continuously monitor and prevent resurgence.

5.2.2. Kalimantan and Sulawesi Region - Moderated by Ms Budi Susilorini, Blacksmith Institute Indonesia

Prof. Rachmadhi Purwana spoke about how mercury issue in Indonesia is not new, but had been detected since 1996 with findings of 2 ppm methylmercury content in the hair of people living near Kapuas River, West Kalimantan. High mercury content was also found in hair of miners in Pongkor, West Java (2001) and blood of people in Buyat Bay, North Sulawesi (2000). Question arose on what progress had been made in the last decade. He observed that plans had been made and many organizations came up with solutions, but the results were not significant. What seems to be missing is a national-level coordination, like in the National Family Planning programme, to connect between international framework and local needs of the people. He highlighted that right now is a good momentum to direct the people away to safer practices, with the rising price of mercury in the market.

Ms Wilianita Selviana, Executive Director of WALHI Central Sulawesi presented the contrast between the green and lush Poboya area in 2007 before popularity of ASGM and in 2011, with the tress cut down in place of mining holes and miner tents. Before ASGM lucrative business took place, the gold content was found by exploration of large gold mining companies (Rio Tinto/Newcrest/Bumi Resources) that faced rejection from the local population. After the amalgamation technology was introduced to locals by outside mining community in 2008, people began practicing ASGM and since 2009 the high influx of miners

coming from all over Indonesia to try their luck. At present, there are 20,000 trommels/ball-mills and 307 cyanide leaching facilities in Poboya area. Non-mercury panning technique like practiced in Buol area are not popular. At one point, ASGM in Poboya was legalized (except in river banks) and it became a popular escapade for miners chased away from Bombana (Southeast Sulawesi), North Sulawesi and Kalimantan. Public opinion regarding large mining companies had also changed from rejection to acceptance, as ASGM practices became common.

Ms Suhartini from Universitas Brawijaya questioned on Indonesian people's rights of their natural resources and the fact that mining products are mostly controlled by foreign companies. Prof. Rachmadhi addressed that by stressing that this is a multisectoral issue that mandated political will from the government and synergy starting from trade flow control until grassroot level to fully solve. Ms Wilianita offered a model of people's mining, with formalization and registration on existing miners and ban on use of hazardous substances (mercury and cyanide). She viewed it as the lesser of two evils compared to large-scale mining. She also reminded the audience of the supply-demand factor of ASGM economy, and that we should assess how much we really need gold.

Mr Richard Gutierrez mentioned that like in Indonesia, in the Philippines much health impact data available are also outdated (2002-2004). One question faced by those who want to take assessment is what course of action to take if they find mercury poisoning case in miners or area contamination. Prof. Rachmadhi said that unfortunately, in Indonesia too medical practitioners are not adequately trained in toxicology. The healthcare focus in a developing country is mostly in infectious and non-infectious diseases, but they are ill-prepared to handle the source of diseases. He was aware of an effort in the Philippines to use chelating agents, but noted that chelating the mercury will just push it to the kidney and destroy the kidney instead of cure the mercury toxication in general.

The meeting was suspended from 12.15-2.00 pm for lunch and Friday prayer break.

5.2.3. West Nusa Tenggara Region - Moderated by Mr Yani Sagaroa, Lembaga Olah Hidup

This session was opened with a coverage video by Al-Jazeera on ASGM in Lombok.

Mr Ahmad Musawal, Secretary of Pelangan Village, a community leader from West Lombok Regency spoke about the ASGM practices in his area. Closure efforts such as raids and control efforts to keep people from dumping tailings to the river had been done before the Regent declared ban on all gold mining activities in West Lombok in 2009, but success was limited due to high number (thousands) of miners relying in ASGM, resulting in physical clashes against the enforcement agency. After the ban, the price of mercury increased three-folds. The ban was supposed to be temporary as the government prepared formalization, but the progress was not clear.

Mr Nyoman Sembah of the Environmental Agency of West Lombok Regency explained the land use and zone division of Sekotong area (mining, tourism and fishery), and in practice the mining is conducted not only by authorized companies but also illegal miners. The locals are

taught mercury technique by miners from Java and Sulawesi in 2007. After the official moratorium on gold mining on 2009, illegal practices were still carried out by some miners. The district regulation on mining was made in 2010, but the zone assignment (WPR/Wilayah Pertambangan Rakyat or Community Mining Area) is still in the process awaiting for national regulation to proceed. The district government would like to promote the most sustainable technique for mining, including using cyanide with controlled waste. One effort in Sekotong is to have a vocational school (SMK) for mining, to teach techniques and in the long run help the small-scale miners scale up or work for medium and large-scale miners.

Ms Rahmawaty from Investment and Environmental Agency of Sumbawa Regency spoke about the start of ASGM boom in 2010, in the concession area of PT Ayubi Mineral, a mining company. The Environmental Agency monitored the mercury content in water, soil and organisms together with Universitas Mataram, KEHATI (Biodiversity) Foundation and BBLH Surabaya, and found significant figures in soil and fish, but still within limit in water. Efforts to close down the mines were taken, but miners only relocated. The Environmental Agency designates that companies should be responsible for environmental management in their concession area, including CSR to train small-scale miners to work in a more professional way and with proper safety equipments.

Mr Faisal from Mining and Energy Agency of Bima Regency raised that revoking of gold mining permits in his area caused physical clash, possibly due to unclear information from the government, but there was no ASGM activities in his area.

ASGM is also found in Mr Rahmat Mulyadi of Environmental Agency of West Sumbawa's Regency with roughly 1,000 trommel/ball mills equipments throughout the area. He was considering formalization as the option of total closure was not seen as feasible anymore.

Mr Idham Halid from Mining and Energy Agency of West Sumbawa Regency expressed that there is only one option to control illegal mining: closure. Training and monitoring is reserved for legal miners. He noted that the booming of illegal mining is also aided by media coverage about discovery of gold deposit, inspiring newcomers to come into the area. To avoid negligence, the regency government had formed an integrated team and proposed a solution to cut down mercury distribution lines and assign people's mining zones away from reserve areas (where most illegal mining areas are).

Mr Alfred Sitorus reminded all parties to be careful when choosing formalization or legalization, because the related agencies would be responsible of the impacts. A case example in Dharmasraya, West Sumatra, was the Regent's plan to legalize ASGM, but upon review found that legalization in that particular area would breach the Environmental Law (UU 32/1999).

5.2.4. ASGM Hotspot Mapping

Before the break, participants from West Nusa Tenggara were invited to contribute and share any relevant informations related to the existence of ASGM activities within their respective administrative areas.

From the mapping session, about 30 ASGM hotspots was identified in at least 5 administrative areas in West Nusa Tenggara involving at least 10,000 miners and communities. Some of them are consisted of mining activities until gold finished products but some others are only mining activities and the processing take place in the neighboring areas. Some of the hotspots also located inside the large scale mining concession areas and created horizontal and vertical conflicts in the area.

5.2.5. Introduction to Technical Presentation

Started at 3.20 pm, this session briefly introduces the techniques for gold mining and land remediation relevant to the goal of Hg-free ASGM. The full presentation was to be given during the field visit on the next day. The introduction techniques presented were as follows:

1. Mercury Reduction Technique by Mr. Sumali Agrawal, Technical Expert for Yayasan Tambuhak Sinta
2. Direct Smelting Technique by Mr. Haji Rehani, AGENDA for Environment and Responsible Development (Tanzania)
3. Ban Toxics! ASGM Project by Mr. Richard Gutierrez & a video on Hg-free Borax Technique by Mr. Leoncio Naoy, Ban Toxics! (Philippines)
4. Phytoremediation Technique by Dr. Christopher W. Anderson, IRC-MEDMIND/ Massey University (New Zealand)

A Q&A session was held at the end of the introduction. On the concern about treatment of borax method waste, Mr Naoy explained the need of tailing pond and reprocessing with sedimentation tank/dam so that the water is already clear when channeled to disposal. Mr Rehani added that the wastewater came from the sluicing process, whereas the borax itself is a dry process.

On the environmental impact of borax, Mr Gutierrez answered that Mr Agrawal had had the toxicity assessed in Denmark, and found that unless directly eaten, it is essentially benign. On the cost-effectiveness and suitability with individual areas, Mr Gutierrez stressed that the techniques presented are not instant solutions and need to be tailored to the characteristics. The cost-effectiveness comes from using the same equipment, taking out a cost item (mercury) and using methods with higher efficiency than amalgamation.

On the effectiveness of phytoremediation, Dr Anderson answered that approximately 15% can be removed, and using the law of diminishing return and repeat process to recover more. On the kind of plant used, he gave the criteria as ability to grow in contaminated soil and large quantity of biomass. Cassava was the only plant meeting the criteria during his research, although there is a point where the copper and mercury will kill it eventually. There must be an effort to prevent people eating the plants.

At 5.00 pm, Mr Bayu Susila delivered short closing remarks and ended the day's session.

5.2.6. Field Trip

The field trip was held on Saturday, 11 February 2012. The group departed on 7.15 am from the Hotel to 4 sites in Sekotong, Lombok Barat regency. The first site is a former tailing pond now used as phytomining experiment location by Universitas Mataram, and the technique was presented during this stop. The second site is a cyanide leaching plant which situated next to the mangrove areas where the tailing periodically discharged to the mangrove. The third site is an ore processing facility using trommel/ball-mills near the ferry harbor. The fourth site is a mining shaft adjacent to processing facility.

At the resting point at the *Bale Banjar* (community hall) of Pelangan Village, the technical presentation session on mercury-free mining methods was conducted in front of the workshop audience as well as the local miners and community representatives. The session was started by a talk on health impact of mercury by Prof. Rachmadhi Purwana, followed by presentation of mercury reduction techniques and demonstration of retort equipment usage by Mr Sumali Agrawal.

After the lunch break, Mr Haji Rehani presented the mercury-free direct smelting technique. Mr Leoncio Naoy played the video on borax method and presented the comparison between Hg-free method and amalgamation based on project results in two areas in the Philippines. Concern was raised about the difference between the coarse ore showed in both the presentation from Tanzania and Philippines and the finer ore in Sekotong area. It was explained that a concentrate as prerequisite of borax technique can still be produced with more time spent at the sluicing process. Lastly, as a fellow miner, Mr Naoy challenged the Pelangan miners to keep on thinking and improving themselves, and to embrace mercury-free techniques.

The event is officially closed by Ms Yunik Kuncaraning, Head of Subdivision for Evaluation of Hazardous Substances in Industrial Sector in the Indonesian Ministry of Environment.

Field trip guide was provided and distributed to participants during the registration.

6. CONCLUSIONS

ASGM practices found in all regions in Indonesia with a general similar pattern. A discovery of gold deposit attracts the mining community, who introduces the easy but environmentally destructive gold-extraction technology of amalgamation and open burning. In parallel, after the prevalence of small-scale mining, the people who used to reject the presence of large-scale mining companies became more accepting as they gain direct benefit from the activities regardless the negative long term impact of the activities to their health, local socio-economic and the environment.

Mining activities always produce irreversible negative environmental impact. Small-scale mining appear profitable to the people, but comes at a higher cost than the selling price of gold, in the form of health, environmental and social hazard. When the practice of illegal

ASGM have grown to involve a large number of people, it is more difficult for law enforcement to curb the practice.

The best option for health and environment is to change the source of people's livelihood from mining to alternative livelihoods. However, with the limitations and reality on the ground, closing-down operations and outreach programs are often only successful in the short term. From previous experience, the problem remained, even escalated in the last ten years.

Therefore, control efforts are still needed, be it in limiting and eventually eliminating the distribution of mercury and in form of training people to switch to non-mercury techniques. The momentum of sharply increasing price of mercury should be seized to reduce the reliance of small-scale miners on mercury. The capacity of health care practitioners to handle mercury poisoning cases and educate people on matters of mercury hazard need to be increased and conducted in scale. Research on remediation of contaminated land should be continued with more options to clean up the contaminated soil and water as well as the final process and disposal of the plants.

Mercury-free ASGM techniques are already available, but the implementation need to be adapted and adjusted to the characteristics of the local ores and the miners/community's current practices. One of the solutions can be reached by conducting a miners-to-miners training. The effort must be guided by a national policy towards elimination of mercury in ASGM, localise the ASGM activities within the designated Community Mining Areas, midterm plan of transitional livelihood, clean up and remediation plan and long term rehabilitation strategy. Synergy is needed, not just by district/local governments and the Ministry of Environment, but also other departments such as the Mining and Energy, Trade, Health and Social Welfare. Caution must be exercised when choosing to formalize and legalize small-scale mining so as not to clash with existing laws, especially on forestry and environment.

WORKSHOP MATERIALS

Workshop materials provided separately in a website link.

For further request on the workshop materials, please contact Armyn Gita, armyn@balifokus.asia and Andita Primanti, dita@balifokus.asia

Annex 1. Activity Schedule

Day-1 - Thursday, February 9, 2012

Time	Agenda	Person-in-charge
13.00 – 18.00	Participants arrival and registration	Organizer and hotel
19.00 – 21.00	Welcome dinner reception hosted by Provincial Government of West Nusa Tenggara	West Nusa Tenggara Environmental Agency (BLHP NTB)
	Welcome remarks from the District Secretary of West Nusa Tenggara Province	
	Free & easy	
	Briefing for workshop	Organizer

Day-2 - Friday, February 10, 2012

Time	Agenda	Person-in-Charge
08.00 – 08.40	Registration	Organizer
08.40 – 08.55	Opening	Bayu Susila/BF
08.55 – 09.05	Opening remarks by Yuyun Ismawati, Workshop Coordinator	Yuyun Ismawati, BF/Indonesia Toxics-Free Network/IPEN Mercury in ASGM/Mining Lead
09.05 – 09.25	Opening remarks by Deputy IV Ministry of Environment	Dra. Halimah Syafrul, MS, Assistant Deputy in Management of Hazardous Substances, Ministry of Environment
09.25 – 09.40	Overview on ASGM in Indonesia	Prof. Dr. Ir. Eko Handayanto, MSc, IRC-MEDMIND/Univ. Brawijaya
09.40 – 09.55	Global Issue of Mercury in ASGM	Richard Gutierrez, Ban Toxics!/Zero Mercury Working Group
09.55 – 10.10	Coffee/tea break	Hotel staff
10.10 – 11.05	Panel of Sub-regional presentations: Sumatera, Java and discussion	Moderator – Dyah Paramita/ICEL
11.05 – 12.00	Panel of Sub-regional presentations: Kalimantan, Sulawesi and discussion	Moderator – Budi Susilorini/Blacksmith Institute Indonesia
12.00 – 14.00	Lunch break and Friday prayers	Hotel staff and organizer
14.00 – 15.15	Panel of Sub-regional presentations: West Nusa Tenggara and discussion	Moderator – Yani Sagaroa/Lembaga Olah Hidup

15.15 – 15.30	Coffee/tea break	Hotel staff
15.30 – 16.30	Introduction to the technical session	Bayu Susila/BF
	Mercury reduction technique	Sumali Agrawal, Yayasan Tambuhak Sinta
	Direct smelting techniques	Haji T. Rehani, AGENDA (Tanzania)
	Mercury-free technique – Borax method	Leoncio Naoy, Ban Toxics! (Philippines)
	Phytoremediation techniques to clean up mercury-contaminated sites	Christopher Anderson, IRC-MEDMIND
16.30 – 17.00	Wrap-up and conclusion	Bayu Susila/BF

Day-3 - Saturday, February 11, 2012

Time	Agenda	Person-in-Charge
07.00	Gather at the hotel lobby	All field trip participants
07.15 - 10.30	Field trip to Sekotong, West Lombok	Organizer, West Lombok Environmental Agency
10.30 – 12.00	Technical Presentations and Discussion	Moderator
	Health aspect in ASGM	Prof. Rachmadhi Purwana
	Mercury reduction technique	Yayasan Tambuhak Sinta
	Direct smelting technique	AGENDA
	Mercury-free technique – Borax method	Ban Toxics!
	Phytoremediation techniques	IRC-MEDMIND
12.00 – 13.00	Lunch break	Organizer, West Lombok Environmental Agency
13.00 – 14.00	Discussion and technical presentation continued	Moderator – BF
14.00 – 14.15	Wrap up and recommendations	Moderator – BF

Annex 2. List of Participants

No	Name	Organisation	Post
1	Halimah Syafrul	Kementerian Lingkungan Hidup Republik Indonesia/Ministry of Environment	Ass. Deputy I / IV
2	Yunik Kuncaraning Purwandari	Kementerian Lingkungan Hidup Republik Indonesia/Ministry of Environment	Head of Sub-division
3	Airi Kaneko	Badan Lingkungan Hidup & Penelitian Provinsi Nusa Tenggara Barat/Provincial Environmental and Research Agency	Staff
4	B. Sri Wahyu	Badan Lingkungan Hidup & Penelitian Provinsi Nusa Tenggara Barat/Provincial Environmental and Research Agency	Staff
5	Aila Sakinah M	Badan Lingkungan Hidup & Penelitian Provinsi Nusa Tenggara Barat/Provincial Environmental and Research Agency	Staff
6	Sunardi	Badan Lingkungan Hidup & Penelitian Provinsi Nusa Tenggara Barat/Provincial Environmental and Research Agency	Staff
7	IB Gede Sutawijaya	Badan Lingkungan Hidup & Penelitian Provinsi Nusa Tenggara Barat/Provincial Environmental and Research Agency	Staff
8	Nur Lia WH	Badan Perencanaan Pembangunan Daerah Provinsi Nusa Tenggara Barat/ Provincial Planning and Development Board	Staff Land use/zoning & natural resources management
9	Nyoman Adi	Kepolisian Daerah Nusa Tenggara Barat/Provincial Police	Head of Area 2
10	Ikhwan Elhuda	Dinas Pertambangan dan Energi Provinsi Nusa Tenggara Barat/Provincial Mining and Energy Agency	Staff
11	Sasi Rustandi	Dinas Kelautan dan Perikanan Provinsi Nusa Tenggara Barat/Provincial Fisheries and Ocean Agency	Staff
12	Yuni Hariadi	Biro Hukum Provinsi Nusa Tenggara Barat/Provincial Law Bureau	Staff
13	Mulyono	Biro Administrasi SDA	Head of Sub-Division/Kepala Sub-bidang
14	Nyoman Sembah	Badan Lingkungan Hidup Kabupaten Lombok Barat/Environmental Agency of West Lombok Regency	Head of the agency
15	Dayat	Badan Lingkungan Hidup Kabupaten Lombok Barat/Environmental Agency of West Lombok Regency	Division Head
16	Rahmat Muliadi	Badan Lingkungan Hidup Kabupaten Sumbawa Barat/Environment Agency of West Sumbawa Regency	Kepala Sub-bidang Pemulihan/Recovery Sub-Division Head

17	Rahmawaty	Badan Penanaman Modal dan Lingkungan Hidup, Kabupaten Sumbawa/ Investment and Environment Agency, Sumbawa regency, West Nusa Tenggara	Kepala Bidang PBL/Sub-Division Head
18	Idham Halid, ST	Dinas Energi, Sumber Daya Mineral, Kebudayaan dan Pariwisata - KSIB	Kepala Seksi Teknik Lingkungan/Chief of Technical Section
19	Budiarta	Dinas Perindustrian & Perdagangan	Staff
20	Faisal, ST	Dinas Pertambangan dan Energi Kabupaten Bima/Mining and Energy Agency of Bima Regency, West Nusa Tenggara	Head of the agency
21	Sahala Tua Manik	Dinas Pertambangan dan Energi Kabupaten Dairi/Mining and Energy Agency of Dairi Regency, North Sumatra	Head of the agency
22	Sutiadi	Dinas Pertambangan dan Energi Kabupaten Lombok Barat	Head of Mining Section/ Kepala Bidang Tambang
23	Aminah Zubaidi	Dinas Pertambangan dan Energi Kabupaten Sumbawa	Head of Environmental Engineering Section/ Kepala Seksi Teknik Lingkungan
24	Salikin, S.Si	Kantor Lingkungan Hidup Kota Mataram/ Environmental Agency	Staff
25	A. Musawal, S.Adm.	Pelangan Village	Village Secretary/ community leader
26	Prof. DR. Rachmadhi Purwana	Fakultas Kesehatan Masyarakat Universitas Indonesia/Public Health Faculty	Public Health Professor
27	Budi Prasetya	Fakultas Pertanian Universitas Brawijaya/Agriculture Faculty	Lecturer
28	Didik Suprayogo	Fakultas Pertanian Universitas Brawijaya/Agriculture Faculty	Lecturer
29	Yulia Nuraini	Fakultas Pertanian Universitas Brawijaya/Agriculture Faculty	Lecturer
30	Sudarto	Fakultas Pertanian Universitas Brawijaya/Agriculture Faculty	Lecturer
31	Evi Kurniati	Fakultas Teknik Pertanian Universitas Brawijaya/Agriculture Technology Faculty Brawijaya University	Research Assistant
32	Suhartini	IRC-MEDMIND / Universitas Brawijaya	Secretary
33	Lia Nova Triadriani	Fakultas Pertanian Universitas Brawijaya/Fisheries Faculty Brawijaya University	Student
34	Bonauli Ch. Siahaan	Fakultas Pertanian Universitas Brawijaya	Student
35	Prof. DR. Ir. Eko Handayanto, MSc	Universitas Brawijaya	Professor
37	Nina Dwi Lestari, SP	Universitas Brawijaya	Staff
38	Rurin Kurniasari	Universitas Brawijaya	Staff
39	Sativandi Riza, SP	Universitas Brawijaya	Staff
40	Markum	Universitas Mataram	Staff
41	Sukartono	Universitas Mataram	Staff

42	Yusuf Palimbong	Perhimpunan Ahli Pertambangan Indonesia (Perhapi) Nusa Tenggara Barat Branch/ Mining Expert Association	Member
43	B. Mohan Kumar	Kerala Agricultural University	Professor & Asst. Dean (Forestry)
44	Augustine Doronila	University of Melbourne	Research Fellow
45	Hannah Alcantara	University of Melbourne	Student
46	Christopher Anderson	Massey University / IRC-MEDMIND	Senior Lecturer
47	Jianxu Wang	Institute of Geochemistry	Student
48	Joni Safaat	PT Newmont Nusa Tenggara	Senior Specialist in Environmental Affairs
49	Alfred Sitorus	Komite Penanggulangan Bensin Bertimbal	Divisi Kampanye
50	Yani Sagaroa	Lembaga Olah Hidup	Direktur Pelaksana
51	H. Mahdan	Lembaga Todong Mas Central Lombok/ Miners Association	Head of Association
52	Wilianita Selviana	Wahana Lingkungan Hidup (WALHI) Sulawesi Tengah	Direktur
53	Syamsul Hidayat	Santiri Foundation	Staff
54	Dyah Paramita	Indonesian Centre of Environmental Law	Researcher
55	Budi Susilorini	Blacksmith Institute Indonesia	Country Director
56	Hendra Aquan	Blacksmith Institute	Program Assistant
57	Sumali Agrawal	Yayasan Tambuhak Sinta	Technical Expert
58	Haji Rehani	AGENDA	
59	Leoncio Na-Oy	Ban Toxics!	Technical Expert
60	Richard Gutierrez	Ban Toxics!	Executive Director
61	Bayu Susila	BALIFOKUS	Director
62	I Wayan Teddy B	BALIFOKUS	Office Manager
63	Krishna Bayumurti	BALIFOKUS	Program Officer
64	Andita Primanti	BALIFOKUS	Program Officer
65	I Gede Armyrn Gita	BALIFOKUS	Program Officer
66	Arief	BALIFOKUS	Senior Field Officer
67	Adi	BALIFOKUS	Field Staff
68	Rudi	MataramNews.com	Journalist

Annex 3. Photos from the Workshop and Field Trip



Pic. 1. Bayu Susila, second from the right, Director of BALIFOKUS opened the workshop.



Pic. 2. Ibu Halimah Syafrul, Assistant Deputy in Management of Hazardous Substances, Ministry of Environment delivered her keynote speech on behalf of Ibu Masnellyarti Hilman, Deputy IV, Ministry of Environment.



Pic. 3. Prof. Eko Handayanto, IRC-MEDMIND Representative, delivered his opening speech.



Pic. 4. Richard Gutierrez, Ban Toxics! delivered his opening speech on behalf of ZMWG.



Pic. 5. Sub-regional panel presentations: Java and Sumatera region. From left to right: Ibu Halimah Safrul on Pongkor, West Java ASGM; Dyah Paramita/ICEL, moderator; Mr Sahala Tua Manik, Head of the Mining and Energy Agency of Dairi Regency, North Sumatra Province; Alfred Sitorus/KPBB on ASGM in Sumatera and East Java.



Pic. 6. Sub-regional panel presentations: Kalimantan and Sulawesi region. From left to right: Prof. Rachmadi Purwana, UI Public Health, on health impact of mercury use in ASGM; Budi Susilorini/Blacksmith Institute Indonesia, moderator; Wilianita Selviana/WALHI Central Sulawesi on Poboya and Central Sulawesi ASGM hotspots.



Pic. 7. Sub-regional panel presentations: Nusa Tenggara region. From left to right: Mr Rahmat Mulyadi of Environmental Agency of West Sumbawa Regency; Mr Nyoman Sembah of the Environmental Agency of West Lombok Regency; Yani Sagaroa/ Lembaga Olah Hidup/WALHI; Mr Faisal, Mining and Energy Agency of Bima Regency; Mr Idham Halid, Mining and Energy Agency of West Sumbawa Regency; Ms Rahmawaty, Investment and Environmental Agency of Sumbawa Regency; and Ahmad Musawal, Secretary of Pelangan Village/community leader from West Lombok Regency.



Pic. 8. Panel presentations on introduction to the technical aspect of non-mercury techniques. From left to right: Haji Rehani, AGENDA, Tanzania; Bayu Susila, BALIFOKUS, moderator; Sumali Agarwal, Yayasan Tambuhak Sinta, Central Kalimantan; Richard Gutierrez, Ban Toxics! Philippine.



Pic. 9. Participants from West Nusa Tenggara filled out the information of potential ASGM hotspots in their areas. In West Nusa Tenggara alone it was identified more than 30 hotspots spread out in 5 administrative areas involving more than 5000 miners and communities.



Pic. 10. Field trip first stop at a former tailing pond. Chales Anderson from Massey University, New Zealand, explained the phytoremediation research plan of MEDMIND in West Lombok.



Pic. 11. Field trip technical stop at a cyanide leaching



Pic. 12. Field trip second stop at the tailing pond of a cyanide leaching plant near the mangrove areas.



Pic. 13. Field trip stop in one of the ball-mill plants in the Pelangan Village which operates 24 hours and using mercury to extract gold.



Pic. 14. Field trip stop in one of the mine shaft and ball-mill plant in the Pelangan Village which located in the ricefield areas.



Pic. 15. Field trip discussion at the *Bale Banjar* (community hall) of Pelangan Village



Pic. 16. Field trip technical discussion and demo of retort by Sumali Agarwal and Budi Susilorini



Pic. 17. Field trip technical discussion on borax and direct smelting by Haji Rehani, AGENDA, translated by Andita Primanti, BALIFOKUS.



Pic. 18. Field trip concluded by planting trees within the community hall premises.

