8th Annual Asia Pacific Mercury Monitoring Network Partners Meeting

Ritz Carlton Hotel
Jakarta, 14 August 2019

Indonesia Experience

Mercury Exposure and Health Impact

dr. Jossep F William
Medicuss Foundation

How wide and how big are our problems?

Mercury Exposure in Indonesia

Mercury exposure in Indonesia

How bad it is?

Medicuss screening on Banian, Kotabaru – South Kalimantan….

Tabel 3.2 Data sebaran penyakit di Banian

No	Penyakit	Jumlah
1	Mialgia	95
2	Hipertensi	41
3	ISPA	39
4	Sindrom Dispepsia	38
5	*Low Back Pain*	30
6	*Tension Type Headhache*	21
7	Penyakit Kulit	13
8	Osteoarthritis	12
9	Infeksi Saluran Kemih	11
10	Migrain	6
11	Asma	6
12	Hemoroid	5
13	Vertigo	5
	Jumlah	322

Tabel 3.4 Jumlah dugaan pasien yang terkena intoksikasi merkuri

No	Daerah	Dugaan Intoksikasi Merkuri
1	MuaraLangkuit	3
2	Sindang	8
3	Pangi	3
4	Telkom	1
5	Puncak	1
6	Kura 1 GunungCalang	0
7	Kura 1 Puncak	0
8	Kura 2	1
	Jumlah	17

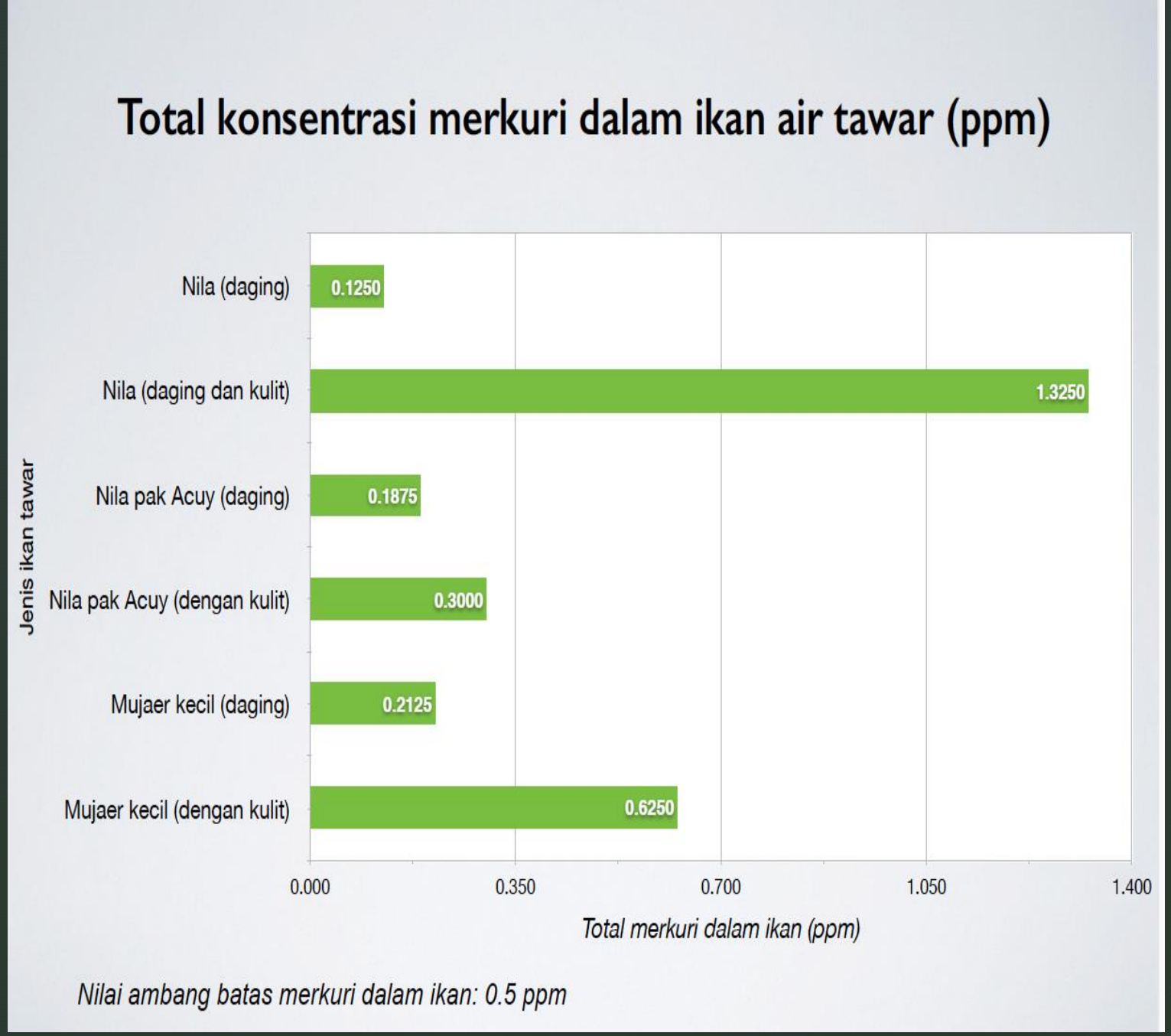
Tabel 3.5 Sumber Air dan Tempat Pembuangan Limbah

No	Daerah	Sumber Air	Pembuangan Limbah
1	MuaraLangkuit	Sungai	Sungai
2	Sindang	Mata Air Pegunungan	Sungai
3	Pangi	Mata Air Pegunungan	Sungai dan Tanah Sekitar Lokasi
4	Telkom	Sungai	Tanah Sekitar Lokasi
5	Puncak	Mata Air Pegunungan	Sungai
6	Kura 1 GunungCalang	Mata Air Pegunungan	Sungai
7	Kura 1 Puncak	Mata Air Pegunungan	Sungai
8	Kura 2	Mata Air Pegunungan	Sungai

So we have found out that around 5.2% of sample population was suspected mercury intoxication

No	Diagnosis	Jumlah
1	Hypertensi	21
2	Tuberculosis	1
3	Hemorroid	2
4	Dermatitis	16
5	Vertigo/Headache	29
6	Tinea	3
7	Dyspepsia	35
8	GEA	2
9	Katarak	1
10	Myalgia/Neuropathy	63
11	LBP	10
12	ISPA	14
13	OSMK	1
14	Karies Dentis	1
15	Stroke	1
16	Prebiskus	2
17	Pterigium	1
18	Susp Intoksikasi merkuri	27

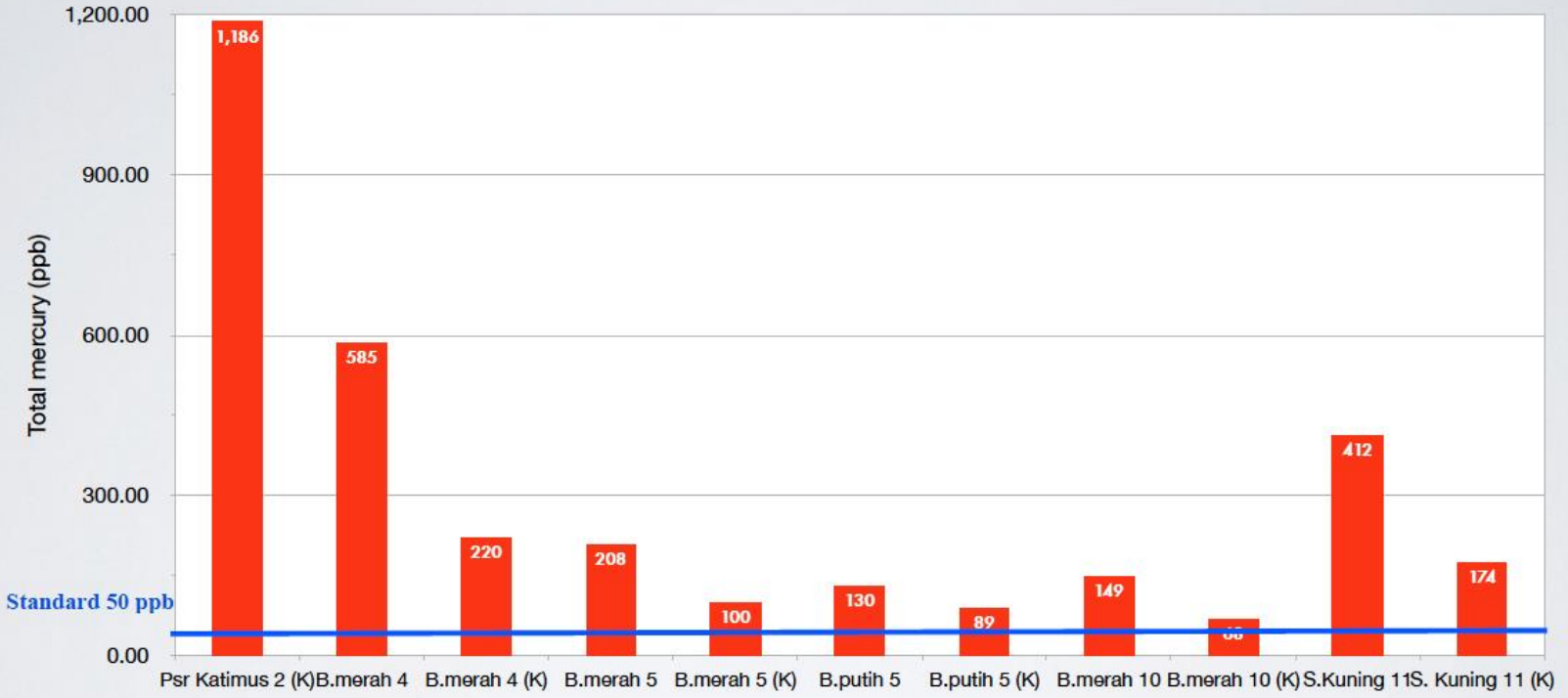
We have check out 132 villagers in Kasepuhan Cisitu, on the Province of Banten, and found out that around 27 peoples are suspected to have mercury intoxication, which mean that it reach around 20.4% of the population that we have checked that have been exposed to mercury intoxication.



Mercury level that being tested on fresh water fish in Kasepuhan Cisitu Banten.

BaliFokus 2014

SAMPEL BERAS DARI WILAYAH CISITU, KAB. LEBAK, PROV. BANTEN (FEB 2014)



Note: (K) = Kupas / tanpa kulit

'SNI' merkuri dalam beras: 50 ppb (ug/kg)

Mercury measurement in the rice that being stored by the villagers in Kasepuhan Cisitu, Banten Province.

BaliFokus 2014

Measurement of mercury levels in rice and sediments around ASGM activities at Cisitu Lebak Banten.

Tabel 1 Konsentrasi Hg pada sampel beras dengan kulit dan tanpa kulit bulan November 2013

No.	Sampel	Konsentrasi Hg (µg/kg)	
		Kulit	Tanpa Kulit
1	B-2013-1	412,5	-
2	B-2009	837,5	37,5
3	B-2009-M	37,5	12,5
4	B-2002-SK	12,5	25
5	B-2008-M	25	12,5
6	B-2003	25	4,125
7	B-2013-2	-	12,5
Rata-Rata		225	17,35

Tabel 2 Konsentrasi Hg pada sampel beras dengan kulit dan tanpa kulit bulan Februari 2014

No.	Sampel	Konsentrasi Hg (µg/kg)	
		Kulit	Tanpa Kulit
1	B-2011-PK	-	1186
2	B-2009-M2	585	220
3	B-2008-M	208	100
4	B-2008-P	130	89
5	B-2003-M	149	68
6	B-2002-SK2	412	174
Rata-rata		297	306
Standar Deviasi		196,14	434,83

Delicia Aprianne, Indah Rachmatiah S. Salami; "***Measurement analysis of mercury levels in rice and sediment around artisanal and small scale gold mining (ASGM) activities in Kasepuhan Adat Cisitu, Kecamatan Cibeber, Kabupaten Lebak, Banten Province***."; Jurnal Teknik Lingkungan Vol. 20, No.2, Oktober 2014 (Hal 120 -131).

Measurement of mercury levels in rice and sediments around ASGM activities at Cisitu Lebak Banten.

Tabel 3 Konsentrasi merkuri pada beras dengan klasifikasi umur beras

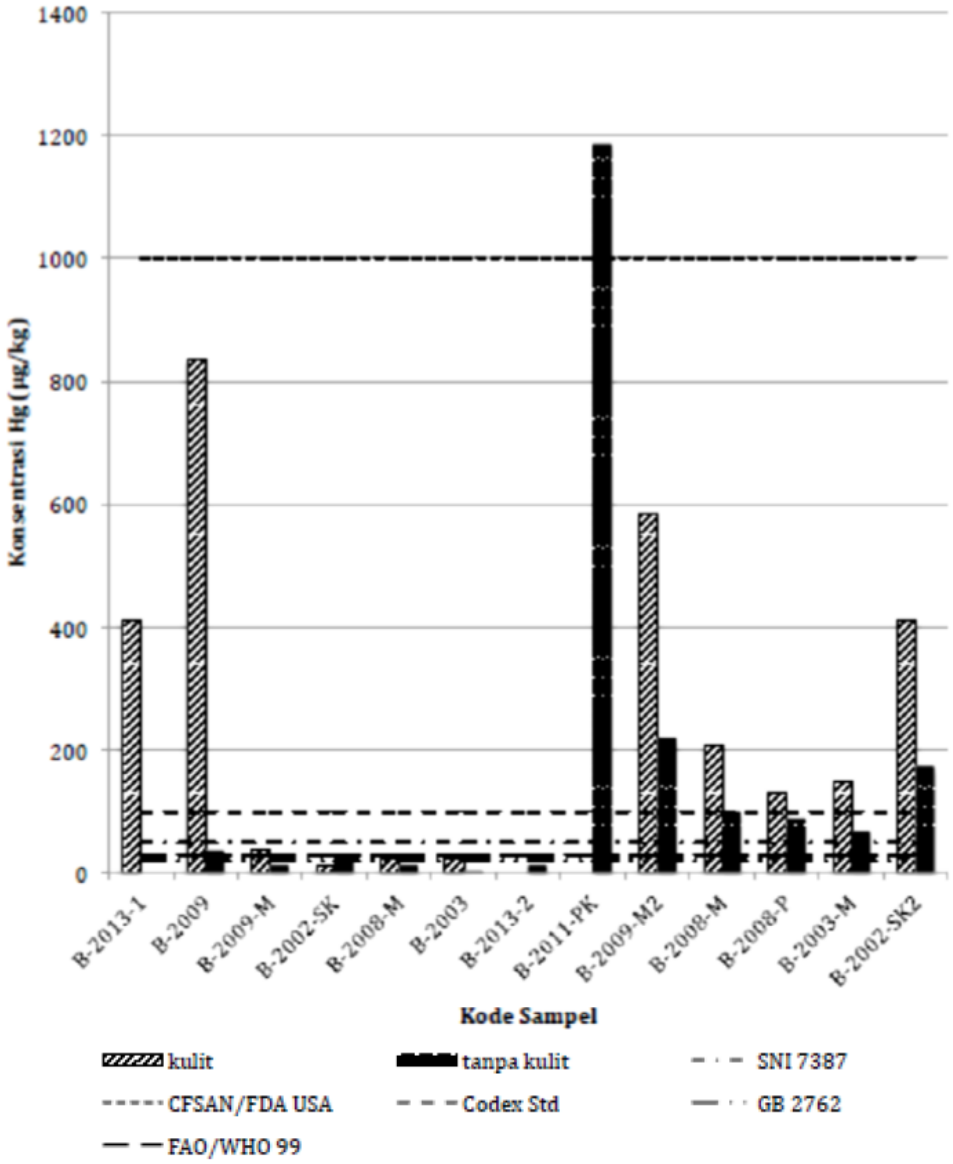
Umur Beras	Kode Sampel	Konsentrasi Hg (µg/kg)	
		kulit	tanpa kulit
2 bulan	B-2013-1	412,5	-
	B-2013-2	-	12,5
2 tahun	B-2011-PK	-	1186
4 tahun	B-2009-M2	585	220
	B-2009-M	25	4,125
	B-2009	25	12,5
5 tahun	B-2008-P	130	89
	B-2008-M	12.5	25
	B-2008-M	208	100
10 tahun	B-2003-M	149	68
	B-2003	37,5	12,5
11 tahun	B-2002-SK2	412	174
	B-2002-SK	837,5	37,5

Tabel 4 Klasifikasi sampel beras berdasarkan jenis beras

No.	Jenis Beras	Kode Sampel	Konsentrasi Rata-Rata
1	Putih	B-2013-1	259,88 µg/kg ± 368,43
2		B-2013-2	
3		B-2011-PK	
4		B-2009	
5		B-2008-P	
6		B-2003	
7		B-2002-SK2	
8		B-2002-SK	
9	Merah	B-2009-M2	140 µg/kg ± 175,46
10		B-2009-M	
11		B-2008-M	
12		B-2008-M	
13		B-2003-M	

Delicia Aprianne, Indah Rachmatiah S. Salami; "***Measurement analysis of mercury levels in rice and sediment around artisanal and small scale gold mining (ASGM) activities in Kasepuhan Adat Cisitu, Kecamatan Cibeber, Kabupaten Lebak, Banten Province***."; Jurnal Teknik Lingkungan Vol. 20, No.2, Oktober 2014 (Hal 120 -131).

Measurement of mercury levels in rice and sediments around ASGM activities at Cisitu Lebak Banten.



Gambar 5 Konsentrasi Hg pada sampel beras terhadap baku mutu merkuri

Tabel 5 Konsentrasi Hg pada sampel sedimen

No.	Sampel	Konsentrasi Hg (µg/kg)
1	S-2	3.337,5
2	S-3	4.737,5
3	S-6/7-K1	7.012,5
4	S-6/7-K2	10.775
5	S-9-SW	19.968,75
6	S-9-K	106.962,5
7	S-10	21.425
8	S-26/29	2.393,75
rata-rata		22.076,56
standar deviasi		35.059,85

Delicia Aprianne, Indah Rachmatiah S. Salami; "***Measurement analysis of mercury levels in rice and sediment around artisanal and small scale gold mining (ASGM) activities in Kasepuhan Adat Cisitu, Kecamatan Cibeber, Kabupaten Lebak, Banten Province***."; Jurnal Teknik Lingkungan Vol. 20, No.2, Oktober 2014 (Hal 120 -131).

Health assessment of artisanal gold miners in Indonesia.

Table 9
Comparison of adult Hg levels in blood, urine and hair between this study and three other gold mining areas (Tanzania, Zimbabwe and the Philippines) versus the German Environmental Survey (GerES III) (Becker et al., 2002; Becker et al., 2003; Bose-O'Reilly et al., 2004; Drasch et al., 2001; Drasch and Bose-O'Reilly, 2004).

		Gold mining areas										Germany
		Control areas				Mining areas						Random sample
		Indonesia— Sulawesi	Philippines	Tanzania	Zimbabwe	Indonesia — Kalimantan	Indonesia— Sulawesi	Philippines — Monkayo	Philippines — Mt. Diwata	Tanzania	Zimbabwe	Germany
Hg urine [µg/l]	Number	21	39	38	28	165	95	75	123	175	154	4741
	Minimum	<0.2	0.25	<0.2	<0.2	0.29	0.44	0.25	0.25	<0.2	0.44	<0.2
	Median	0.73	1.66	0.34	0.10	5.86	14.36	1.04	8.64	1.73	32.31	0.43
	Maximum	3.16	7.59	6.78	8.78	5240.00	564.00	8.55	294.20	224.00	1530.32	134.8
	Mean	0.90	2.06	0.70	0.65	89.71	37.63	1.42	23.05	9.11	86.12	3.3
	95th percentile	2.75	7.59	2.05	3.32	197.60	177.20	3.81	111.80	33.30	342.50	0.89
Hg urine [µg/g creatinine]	Number	21	39	38	28	165	95	75	123	175	154	4730
	Minimum	<0.2	0.39	<0.2	<0.2	0.46	0.48	<0.2	0.27	<0.2	<0.2	<0.2
	Median	0.40	1.62	0.24	0.11	3.55	5.27	1.22	5.64	0.94	23.38	0.34
	Maximum	1.35	9.31	1.99	3.57	1697.39	232.82	5.15	196.28	106.59	547.42	16.0
	Mean	0.43	2.56	0.34	0.38	36.02	21.65	1.40	14.89	4.46	50.30	2.0
	95th percentile	0.66	8.55	1.55	2.82	127.54	161.43	4.14	55.12	17.91	196.45	0.59
Hg blood [µg/l]	Number	21	39	38	28	165	95	75	123	175	154	4645
	Minimum	2.36	0.72	0.22	<0.2	1.45	3.42	0.25	1.22	0.45	0.60	<0.2
	Median	4.47	9.26	1.07	0.43	9.25	11.72	6.88	10.10	1.91	9.20	0.58
	Maximum	10.12	31.30	2.35	1.79	429.00	186.00	47.50	107.60	33.30	97.60	12.3
	Mean	4.92	10.44	1.16	0.52	25.12	21.38	9.11	14.44	3.50	16.23	2.5
	95th percentile	9.16	24.48	2.29	1.55	128.00	78.40	21.48	42.60	12.88	51.60	0.86
Total Hg hair (µg/g)	Number	21	39	38	28	165	95	75	123	175	154	
	Minimum	0.83	0.98	0.08	0.02	0.33	0.58	0.68	0.10	0.12	0.39	
	Median	1.53	2.72	0.37	0.08	3.08	3.57	2.98	2.81	0.59	3.31	
	Maximum	3.72	34.71	0.68	3.25	792.45	239.04	13.17	37.76	48.74	112.18	
	Mean	1.64	4.02	0.38	0.26	17.75	9.72	3.52	5.28	2.06	9.36	
	95th percentile	3.03	9.94	0.65	1.01	60.09	38.89	10.05	16.57	6.88	33.86	

Stephan Bose-O'Reilly, Gustav D., Christian B., Saulo R. et all; "***Health assessment of artisanal gold miners in Indonesia***."; Science of the Total Environment 408 (2010), 713-725.

Location of Debowae Village to ASGM activity at Gn Botak, Buru Island, Maluku.

Mercury level int the blood of the Debowae Villagers, in Buru Island, Maluku.

	Desa Deboway				
22	Tn.	41 tahun	Deboway	127 µg/L	
23	Tn.	64 tahun	Deboway	28,4 µg/L	
24	Tn.	45 tahun	Deboway	20,1 µg/L	
25	Tn.	26 tahun	Deboway	18,2 µg/L	
26	Tn.	44 tahun	Deboway	30,5 µg/L	
27	Tn.	39 tahun	Deboway	33,3 µg/L	
28	Tn.	62 tahun	Deboway	22,1 µg/L	
29	Tn.	33 tahun	Deboway	20,8 µg/L	
30	Tn.	42 tahun	Deboway	31,7 µg/L	
31	Tn.	45 tahun	Deboway	18,8 µg/L	
32	Tn.	33 tahun	Deboway	15,8 µg/L	
33	Tn.	43 tahun	Deboway	23,5 µg/L	
34	Tn.	58 tahun	Deboway	14 µg/L	
35	Tn.	45 tahun	Deboway	23,8 µg/L	
36	Tn.	39 tahun	Deboway	23,7 µg/L	
37	Tn.	51 tahun	Deboway	19,9 µg/L	
38	Sdr	22 tahun	Deboway	13,9 µg/L	
39	Tn.	27 tahun	Deboway	21,4 µg/L	
40	Tn.	41 tahun	Deboway	32,4 µg/L	
41	Tn.	22 tahun	Deboway	13,1 µg/L	Nilai Rujukan <= 9 µg/L
42	Tn.	40 tahun	Deboway	49,6 µg/L	
43	Tn.	42 tahun	Deboway	13,6 µg/L	
44	Tn.	44 tahun	Deboway	36,5 µg/L	
45	Tn.	75 tahun	Deboway	10,5 µg/L	
46	Tn.	40 tahun	Deboway	19,2 µg/L	
47	Tn.	40 tahun	Deboway	18,2 µg/L	

Conducted by Kodam Pattimura in 2015, cq. Letjen Doni Monardo.

Gogorea ASGM site on Buru Island, Maluku

Estimated mercury used each month from ASGM site in Gogorea, Buru Island, Maluku

Keterangan		Merkuri yang di gunakan
Per unit gelundung		5 kg/kali proses
	Estimasi sehari 8 – 10 kali	50 kg/hari
Di lokasi terdapat 5 unit gelundung yang beroperasi		250 kg/hari dalam lokasi Gogorea
	Dalam sebulan anggap 25 - 30 hari kerja	6.250 kg – 7.500 kg
	Total penggunaan merkuri perbulan di Gogorea	**6.250 kg– 7.500 kg**

Medicuss Foundation with Kodam Pattimura 2015
cq. Letjen Doni Monardo

City of Iha Luhu in West Seram, Maluku Province.

Mercury level in the blood of Iha Luhu vilagers, West Seram Island, Maluku.

NO	NAMA	UMUR	ALAMAT	HASIL	KET
	Negeri Iha Luhu				
1	Ny. [redacted]	44 tahun	Iha luha	15,8 µg/L	Nilai Rujukan
2	Ny.	50 tahun	Iha luhu	23,7 µg/L	<= 9 µg/L
3	Tn.	55 tahun	Iha luhu	35 µg/L	
4	Tn.	31 tahun	Iha luhu	18,7 µg/L	
5	Tn.	45 tahun	Iha luha	14,6 µg/L	
6	Tn.	44 tahun	Iha luhu	8,1 µg/L	
7	Tn.	28 tahun	Iha luhu	14,1 µg/L	
8	Tn.	35 tahun	Iha luhu	10,2 µg/L	
9	Tn.	51 tahun	Iha luha	10,7 µg/L	
10	Tn.	57 tahun	Iha luhu	13,3 µg/L	
11	Tn.	20 tahun	Iha luhu	20,2 µg/L	
12	Tn.	18 tahun	Iha luhu	13,5 µg/L	
13	Tn.	39 tahun	Iha luha	16,5 µg/L	
14	Tn.	20 tahun	Iha luhu	15,9 µg/L	
15	Tn.	50 tahun	Iha luhu	21,3 µg/L	
16	Tn.	37 tahun	Iha luhu	19 µg/L	
17	Tn.	29 tahun	Iha luhu	18,8 µg/L	
18	Tn.	48 tahun	Iha luhu	14 µg/L	
19	Ny.	38 tahun	Iha luha	18,4 µg/L	
20	Tn.	42 tahun	Iha luhu	13,7 µg/L	
21	Ny.	37 tahun	Iha luhu	12,9 µg/L	

Conducted by Kodam Pattimura, cq. Letjen Doni Monardo, in 2015.

Mercury level on fresh water fish on the Citarum River West Java, check by Kodam III/Siliwangi

LOKASI	HASIL UJI KADAR MERKURI	STANDAR
1. IKAN LELE CILAMPENI	6,57 x 10^{2} Ug/gram	≤ 0.5 Ug/gram
2. IKAN LELE CIMARANGI	8,64 x 10^{2} Ug/gram	≤ 0.5 Ug/gram
3. IKAN MAS CISANTI	5,32 x 10^{2} Ug/gram	≤ 0.5 Ug/gram

Check on January 2018

Cq. Letjen Doni Monardo

Contents of mercury in soil and rice soil, in West Lombok and Central Lombok.

Table 3. Mercury content in soil sample (ppm) in rainy season and first dry season in West Lombok and Central Lombok Districts

District	Sub-district	Village	RS	Criteria	DS	Criteria	RS	I DS
West Lombok	Sekotong Timur	Jelateng I	1.1	critical	0.02	Normal	0.0002	nd
		Jelateng II	1.2	critical	nd	Normal	0.0003	nd
		Penyeleng	0.8	critical	nd	Normal	nd	nd
	Sekotong Tengah	Sayong Baru	3.5	critical	0.3	critical	nd	nd
		Batu Puteq	0.3	critical	nd	Normal	nd	nd
		Kelep	0.7	critical	0.04	Normal	nd	nd
	Lembar	Kebun Talo	0.4	critical	0.004	Normal	nd	nd
		Grepek	0.2	critical	0.02	Normal	nd	nd
	Gerung	Menang	0.8	critical	nd	Normal	nd	nd
	Kediri	Merembu	0.4	critical	0.7	critical	nd	nd
		Dasan Baru Selatan	1.1	critical	3.4	critical	nd	nd
Central Lombok	Pringgeratee	Pidade	1.4	critical	nd	Normal	nd	nd
		Salakan	0.7	critical	nd	Normal	nd	nd
		Goak	1.6	critical	0.22	Normal	0.00009	nd
		Dasan Baru Jabon	2.2	critical	0.15	Normal	nd	nd
	Jonggat	Presak	0.9	critical	nd	Normal	nd	nd
		Ombak	0.4	critical	nd	Normal	nd	nd
		Jembe	0.3	critical	1.24	critical	0.00006	nd
	Mujur	Selanggaran	0.9	critical	0.08	Normal	0.0002	nd
		Bilelando	1.5	critical	0.04	Normal	nd	nd

Mercury Content Analysis in Soil (ISRI Bogor), and water (BBIA Bogo), nd: not detected, limit of detection: 0.01 ppm (ISRI Bogor); RS = rainy season; DS = dry season; IDS = first dry season

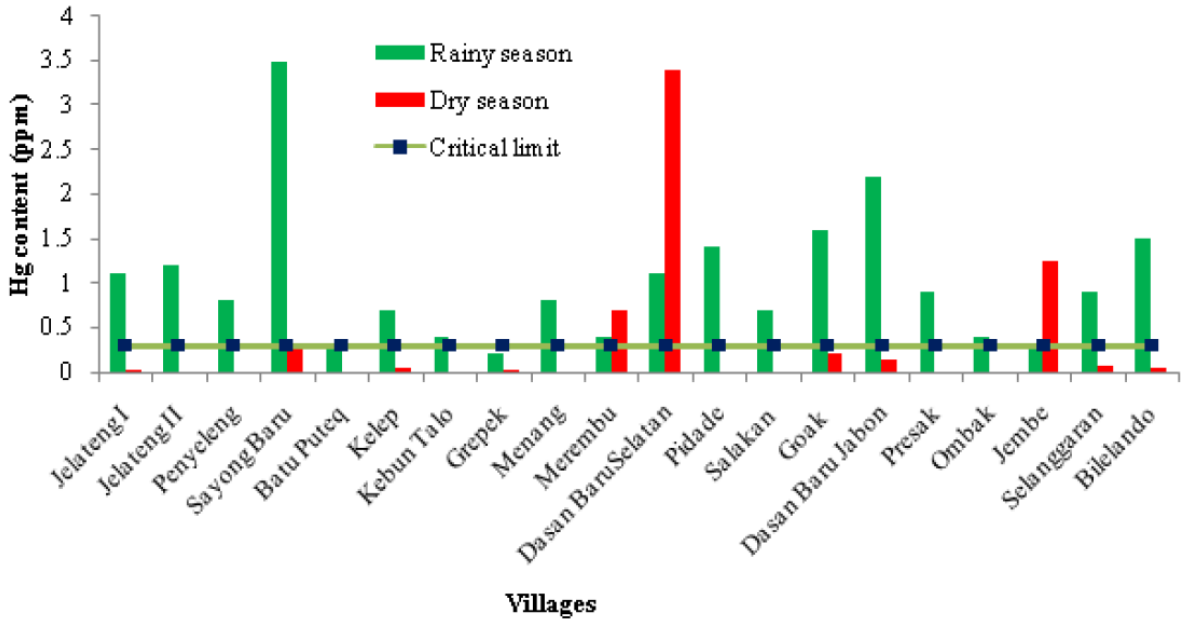


Figure 2. The dynamics of mercury content analysis in soil samples at each point of observation in West Lombok and Central Lombok Districts.

T. Sugianti, F. Zulhaedar, SF. Batubara; "***Mercury Content in Wetland Rice Soil and Water of two different seasons at small scale gold mine processing areas***"; Journal of Degraded and Mining Lands Management, Vol. 3, Number 3, (April 2016): 559-564, ISSN: 2339-076X(e); 2502-2458 (p).

Mercury exposure and health problems in urban gold mining in Makassar, South Sulawesi.

Table 2. Total mercury concentration in the hair of the control group and exposed group.

Statistical Test	Total Mercury Concentration in Hair (μg/g)		
	Control Group	Indirect Exposed	Direct Exposed
Mean (SD)	2.8 (1.9)	6.5 (3.5)	10.8 (9.5)
Median	2.5	5.0	6.6
Min–max	0–12	2.5–15	2.7–43.0
Independent *t*-test (each exposed group vs. control group)		7.7, $p < 0.000$	7.2, $p < 0.000$
Independent *t*-test (directly exposed vs. indirectly exposed)		2.7, $p < 0.000$	

Hasriwiani H. Abbas, Masayuki S., Koichiro Sera, Lukmanul Hakim A., "***Mercury Exposure and Health Problems in Urban Artisanal Gold Mining (UAGM) in Makasar, South Sulawesi, Indonesia***."; Geosciences 2017, 7,44.

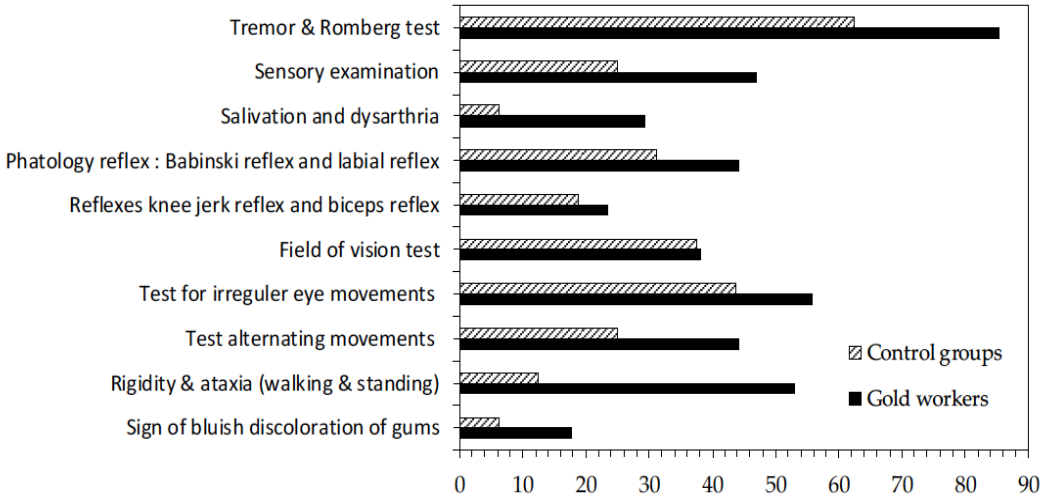


Figure 4. Occurrences of the 10 neurological symptoms in the control group and gold workers.

Table 3. Occurrences of the 10 neurological symptoms and mercury level in the gold workers and the control group.

Neurological Symptoms	Gold Workers		Control Group	
	1–5 μg/g	>5 μg/g	1–5 μg/g	>5 μg/g
Sign of bluish discoloration of gums	1	5	0	1
Rigidity and ataxia (walking & standing)	5	12	1	1
Test alternating movements	3	12	2	2
Test for irregular eye movements	7	12	3	3
Field of vision test	3	10	3	3
Reflexes knee jerk reflex and biceps reflex	3	8	1	2
Pathology reflex: Babinski reflex and labial reflex	7	7	3	1
Salivation and dysarthria	2	7	1	0
Sensory examination	6	8	2	2
Tremor and Romberg test	12	17	4	4

Based on the threshold limit of the Human Bio Monitoring (HBM) Commission of the German Federal Environment Agency.

Mercury contamination on Cattles, at Bombana, Southeast Sulawesi.

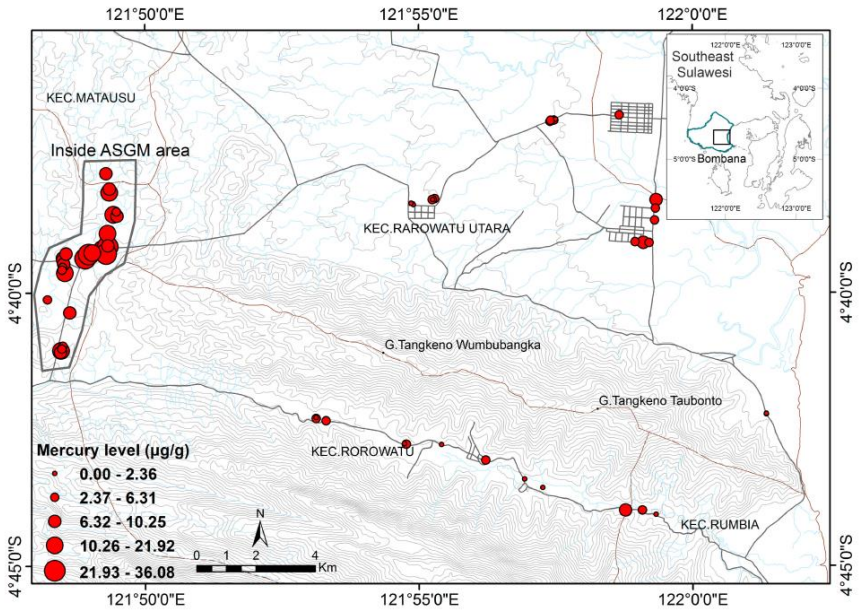


Figure 2. The location of the samples site and distribution of Hg level.

Table 1. Number, sex, and age of cattle, distribution by location and Hg concentration.

Animal Data			Sample Location: Inside of ASGM Site (n = 34)	Sample Location: Outside of ASGM Site (n = 29)	Mann-Whitney U Test
Quartile		Q1 Q3	5.20 8.22	1.03 4.57	
Hg levels (µg/g) and sample location		Mean ± SD Median	11.44 ± 9.52 8.22	2.89 ± 2.45 2.14	p (0.000) < 0.05 *
Age (years) and sample location		Mean ± SD Median	6.00 ± 2.90 6	4.00 ± 3.07 3	p (0.003) < 0.05 *
Hg levels (µg/g) sex and sample location	Male (n = 21)	Mean ± SD Median	10.17 ± 7.13 7.52	2.41 ± 2.40 1.89	p (0.037) < 0.05 *
	Female (n = 42)	Mean ± SD Median	11.98 ± 10.45 8.62	3.19 ± 2.51 3.12	p (0.084) > 0.05 **

* Significant at $p < 0.05$; ** Non-significant at $p > 0.05$.

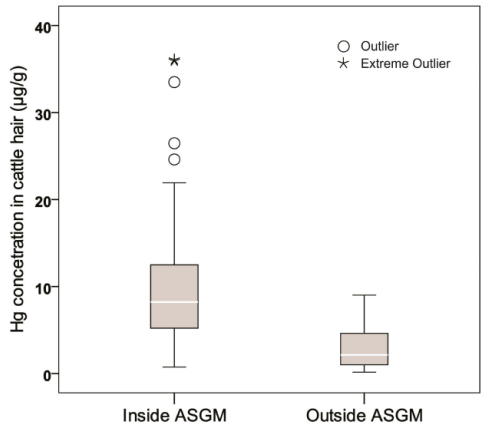
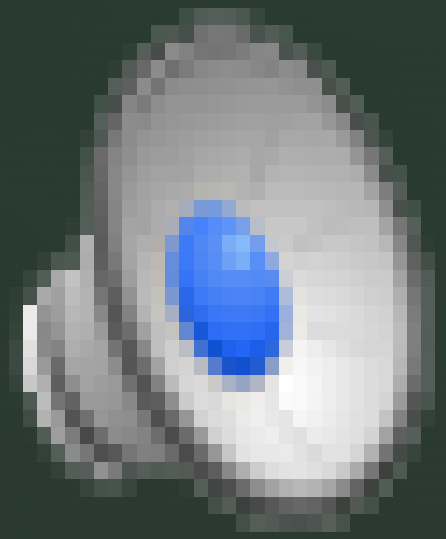


Figure 4. The box plot of Hg concentration in cattle hair inside and outside the ASGM sites.

Basri, Masayuki S., Koichiro S., Idham A. K.; ***"Mercury contamination of cattle in artisanal and small-scale gold mining in Bombana, Southeast Sulawesi, Indonesia."***; Geosciences 2017, 7, 133.

On location in Sukabumi



Tabel 1. Hasil Pengukuran Sampel Udara dan Tanah di Kabupaten Sukabumi

Lokasi	Media	Hasil Pengukuran
Desa Parakansalak	Udara*	– Maks. Di atas 999 μg/m³ (di mulut teko tempat keluarnya merkuri hasil ditilasi/penyulingan) – Rata-rata 102.07 μg/m³ – Min. 0.00 μg/m³ (di bagian tumpukan karung goni yang belum digunakan)
	Tanah**	Maks. 5,100 ppm (di ujung tungku pembakaran) Rata-rata 1,827.64 ppm Min. 18 ppm (area kebun dan tanaman pisang yang berjarak 6 meter dari tungku)
Desa Bojong Genteng	Udara*	maksimum 39.6 μg/m³ (pada lokasi saluran pembuangan residu merkuri dari teko dan tungku) rata-rata pengukuran 8.82 μg/m³
	Tanah**	maksimum 11,300 ppm ; rata-rata 6,981 ppm

Sumber: Direktorat PB3, 2016

- *(Batas paparan merkuri dari US Occupational Safety and Health Administration : 100μg/m 3).**
- *(Baku mutu tanah: PP 101/2014 TK-C Hg : 0.3 ppm dan TK-B Hg : 75 ppm).***

Measurement of mercury on the site of smelter cinnabar to mercury in Sukabumi area, West Java.

Hasil Penyelarasan Naskah Akademik Rancangan Undang-undang Pengesahan *Minamata Convention on Mercury* (Konvensi Minamata mengenai Merkuri), Badan Pembinaan Hukum Nasional Kementerian Hukum dan Hak Asasi Manusia Republik Indonesia, 2017

Tabel 2. Hasil Pengambilan Sampel Kesehatan di Desa Parakansalak

	Kadar merkuri	
	rambut (mg/l)	kuku (ppm)
Sampel 1	9.57	2.657
Sampel 2	9.31	1.765
Sampel 3	5.70	2.062
Sampel 4	56.18	16.302
Sampel 5	13.39	
Sampel 6	4.18	
Rata-rata	**16.38**	**5.70**
Baku mutu (IPCS)	1 – 2 mikrogram/l	
baku mutu (WHO)	1 - 2mg/kg	

Sumber: Direktorat PB3, 2016

Mercury level on hairs of the some villagers in Parakansalak district (on the area of mercury smelting), Sukabumi West Java.

Hasil Penyelarasan Naskah Akademik Rancangan Undang-undang Pengesahan *Minamata Convention on Mercury* (Konvensi Minamata mengenai Merkuri), Badan Pembinaan Hukum Nasional Kementerian Hukum dan Hak Asasi Manusia Republik Indonesia, 2017

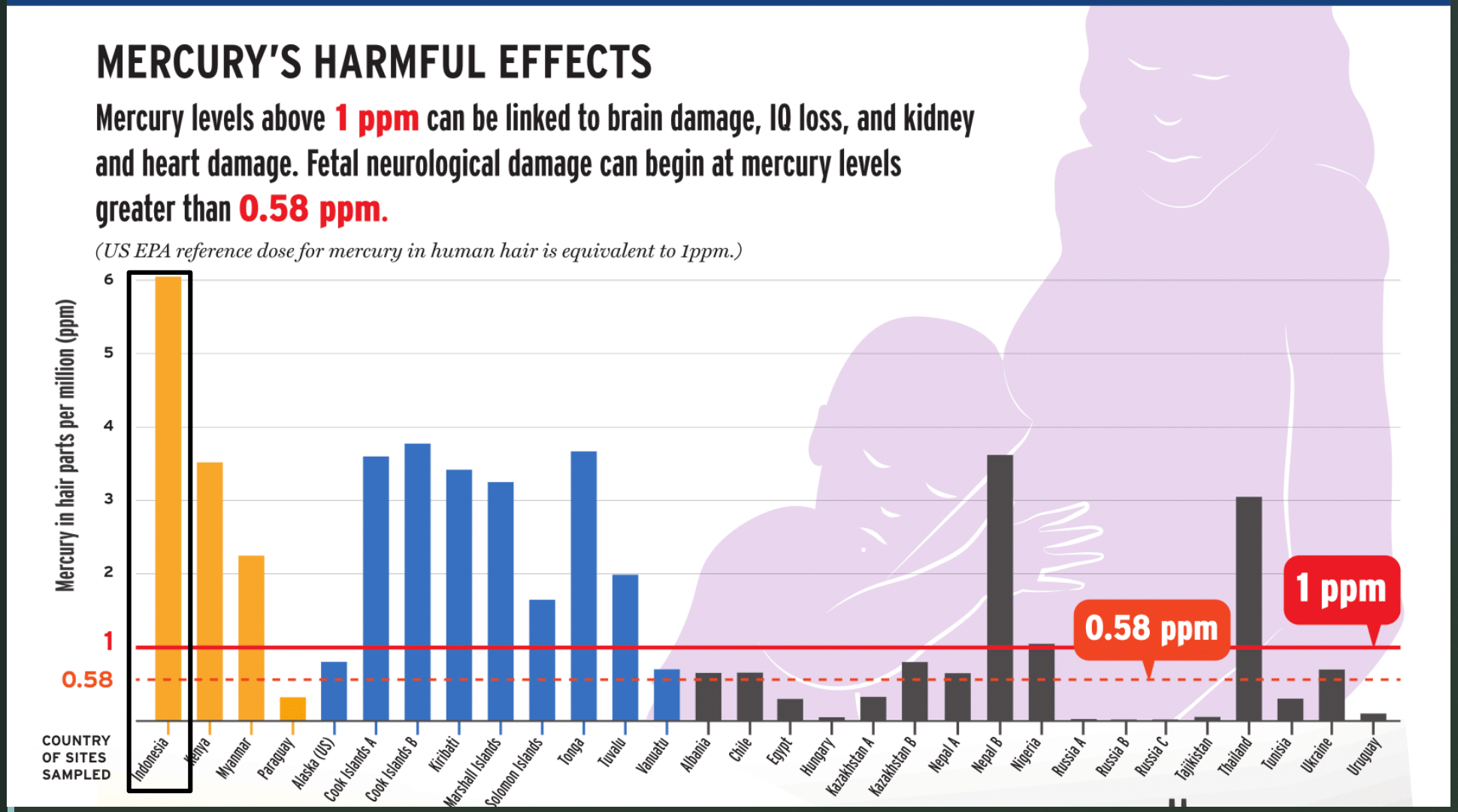
Lokasi	Jumlah gelundung	Merkuri yang dipergunakan pergelundung	Perhari/gelundung perhari merkuri yang dipergunakan (Perhari 5 kali produksi) 1 0ns = 28.3 gr	Total merkuri yang di pergunakan (Kg)	Total merkuri perbulan (Kg)
Cisolok	1335 unit	3-4 ons perkali	566 gr	755.61	22668.3
Cicadas	760 unit	3-4 ons perkali	566 gr	430.16	12904.8
Ciemas	166 unit	-	-		
Waluran	23 unit	-	-		
Simpenan	325 unit	3-4 ons perkali	566 gr	183.95	5518.5
Total merkuri					**41091.6**

Penggunaan merkuri di daerah Sukabumi yang di survey adalah sekitar ***41 ton perbulan***

Hasil survey Medicuss Foundation bersama Kodam III Siliwangi

HIGH MERCURY LEVELS IN WOMEN

GLOBAL STUDY SHOWS PUBLIC HEALTH THREAT TO WOMEN & CHILDREN

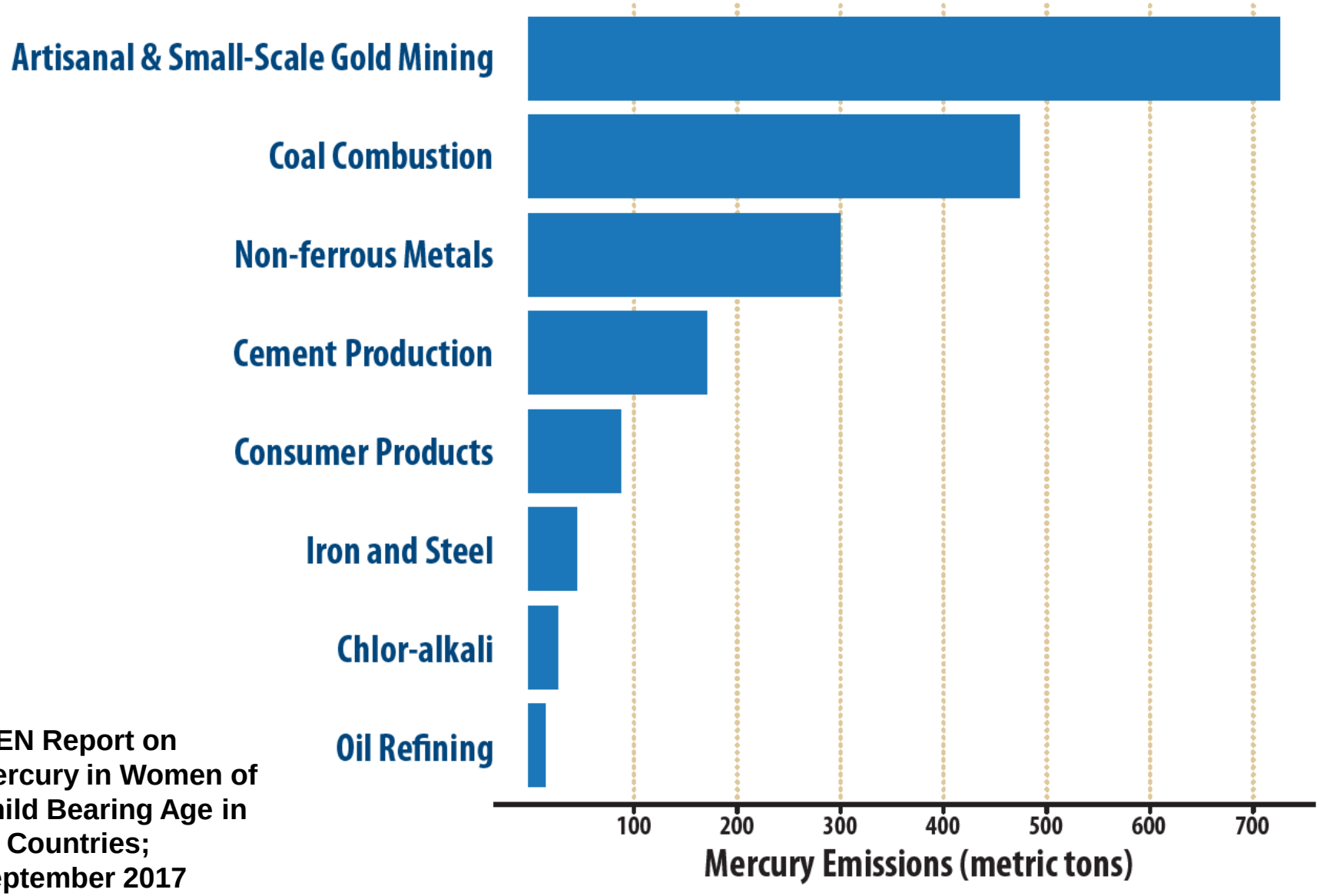


IPEN Report on Mercury in Women of Child Bearing Age in 25 Countries; September 2017

Mercury exposure in Indonesia

How big our trouble are?

Figure 17. Global sources of mercury emissions to air.



IPEN Report on Mercury in Women of Child Bearing Age in 25 Countries; September 2017

Mercury contamination on some of bodies of water.

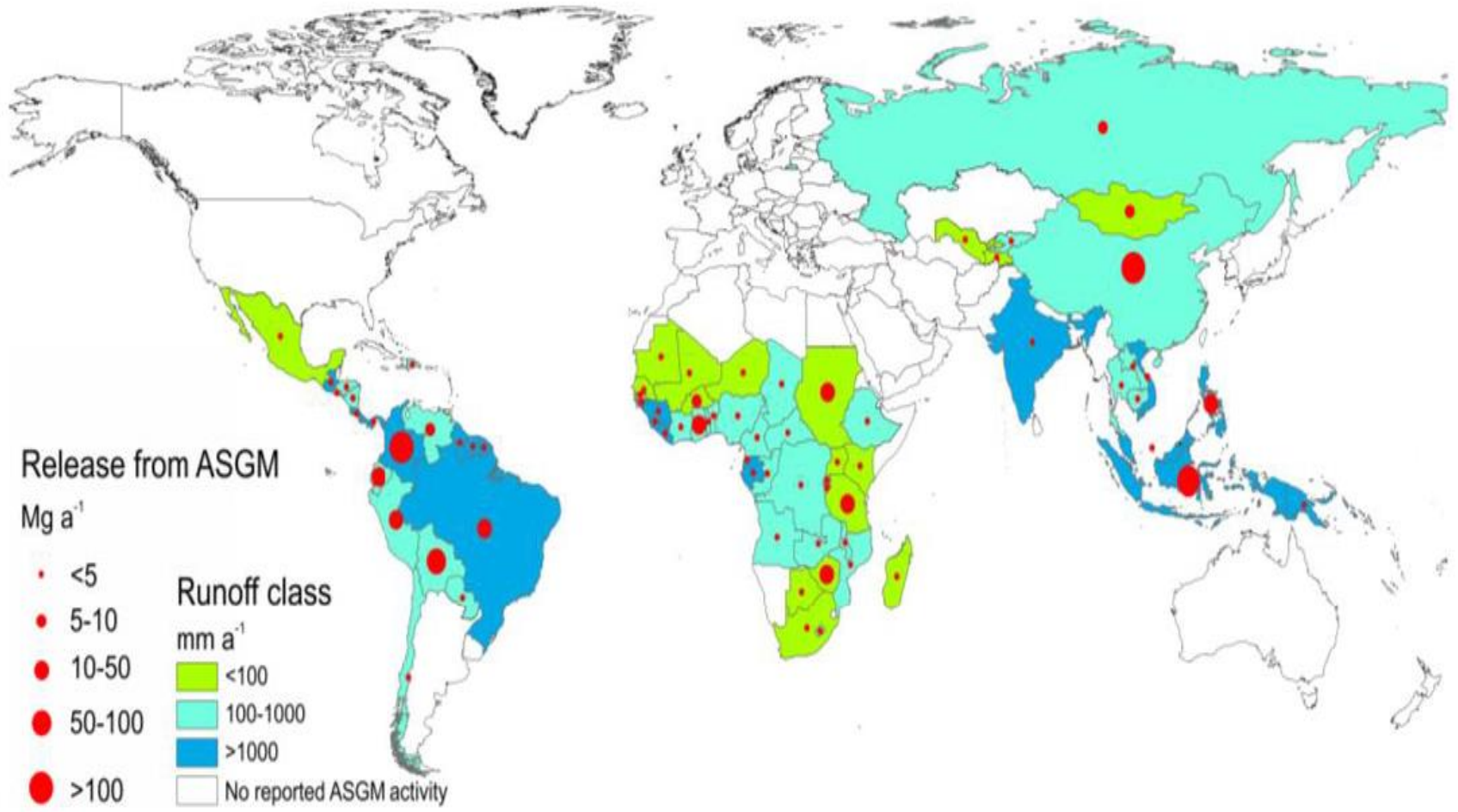


Figure 3. Estimated releases of Hg from artisanal and small-scale gold mining (ASGM) to terrestrial systems (land and water) and surface runoff class [30] for countries with known ASGM activities.

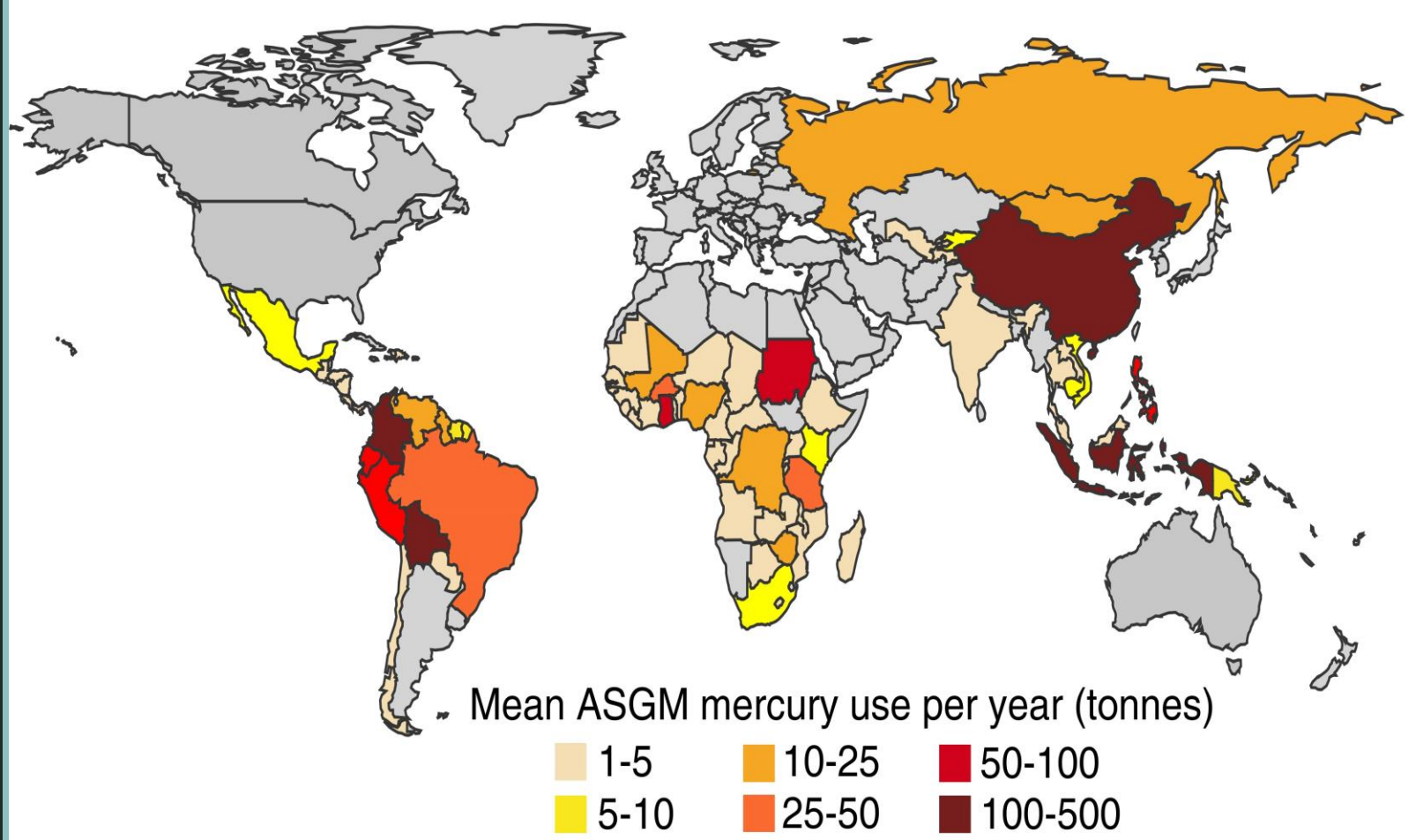
David Kocman et all, "***Toward an Assessment of the Global Inventory of Present day Mercury Release to Freshwater Environtments.***", International Journal of Environmental research and Public Health, 2017,14, 138.

Figure 12 ASGM Hot Spots in Indonesia

Source: Ministry of Environment and Forestry, Indonesia

ASGM hotspot in Indonesia…

Estimated mercury release to environments by ASGM activity



Up to 1400 tonnes Hg emissions annually from >70 countries

15-25% of global gold production

37% of global mercury pollution

10-19 million miners including 4-5 million women & children

Louisa j. Esdaile and Justin M. Chalker, "***The mercury problem in artisanal and small scale gold mining.",*** Chemistry European Journal, 2018.24, 6905-6916

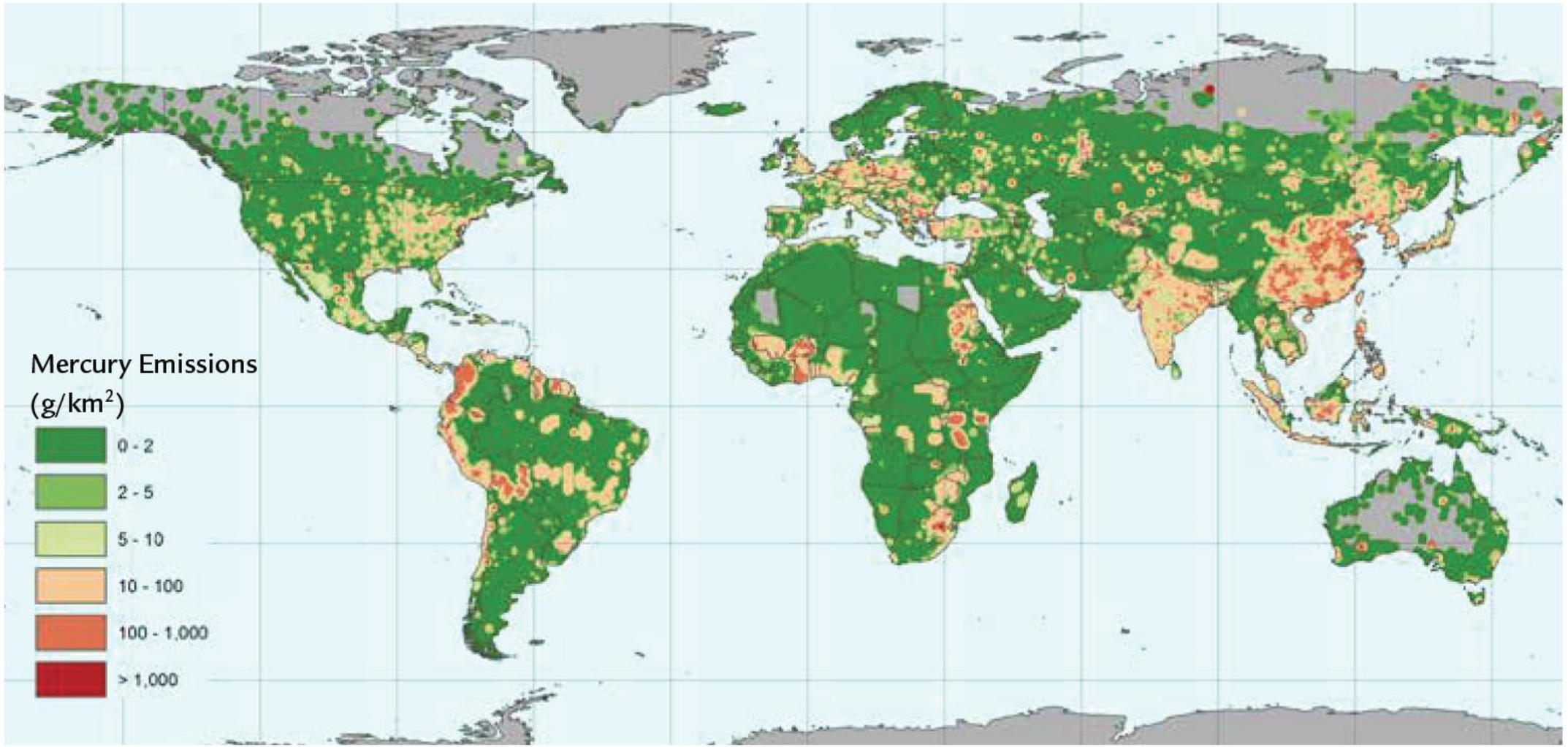


Figure 1. Global distribution of anthropogenic mercury emissions for 2010 (reproduced using data from AMAP/UNEP 2013).

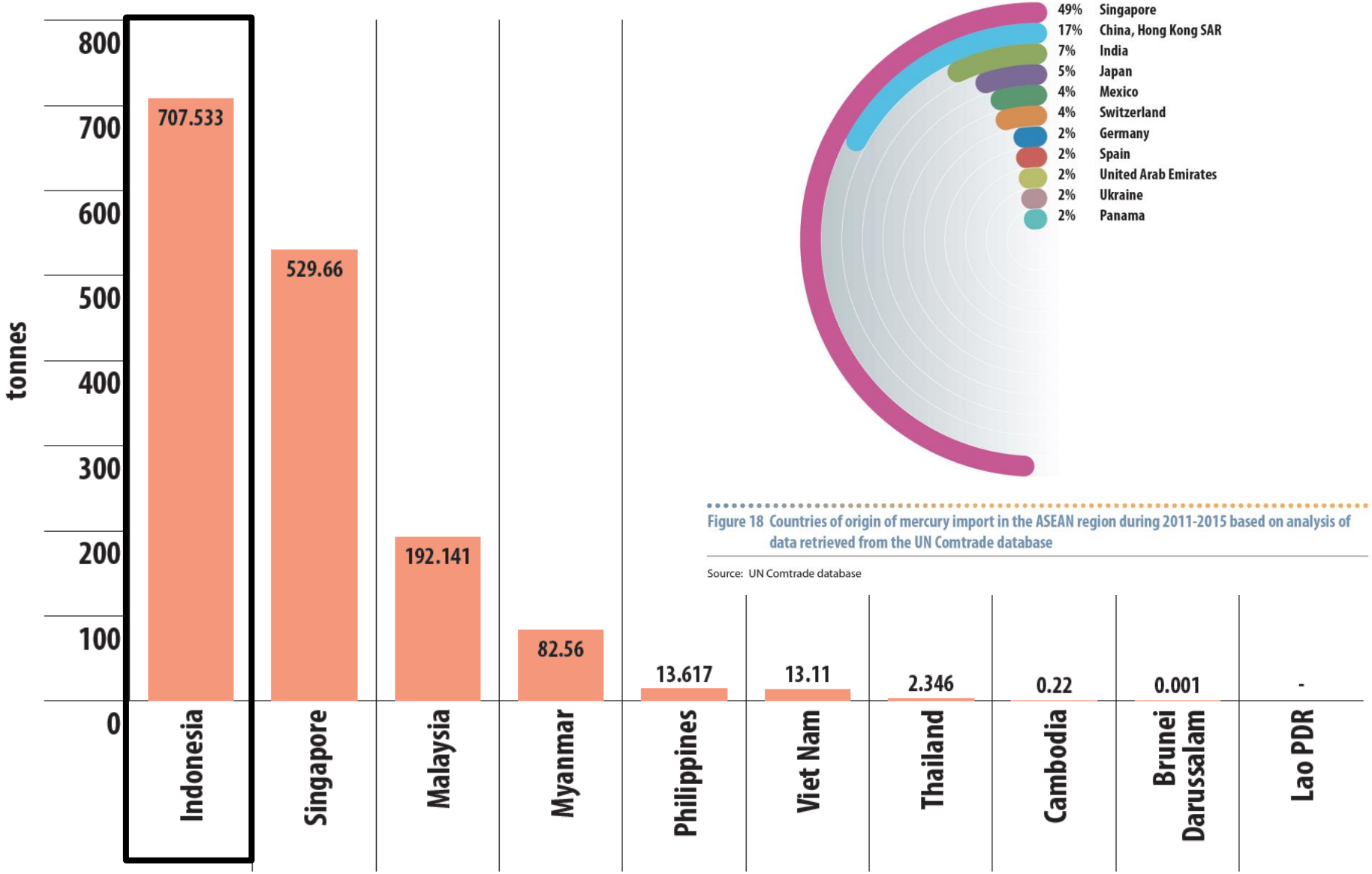


Figure 18 Countries of origin of mercury import in the ASEAN region during 2011-2015 based on analysis of data retrieved from the UN Comtrade database

Source: UN Comtrade database

Figure 17 The total import of mercury by each ASEAN member state during 2011-2015

Data taken from UN Comtrade report 2016.

Table 3. Global primary mercury mining, 2015

Country or region	Mercury marketed (tonnes)
China	800 – 1 000
Mexico	400 – 600
Indonesia	400 – 500
Kyrgyz Republic	30 – 50
Peru and other countries	minimal
TOTAL	**1 630 – 2 150**

Estimated mercury production…

Data taken from UN Comtrade report 2016

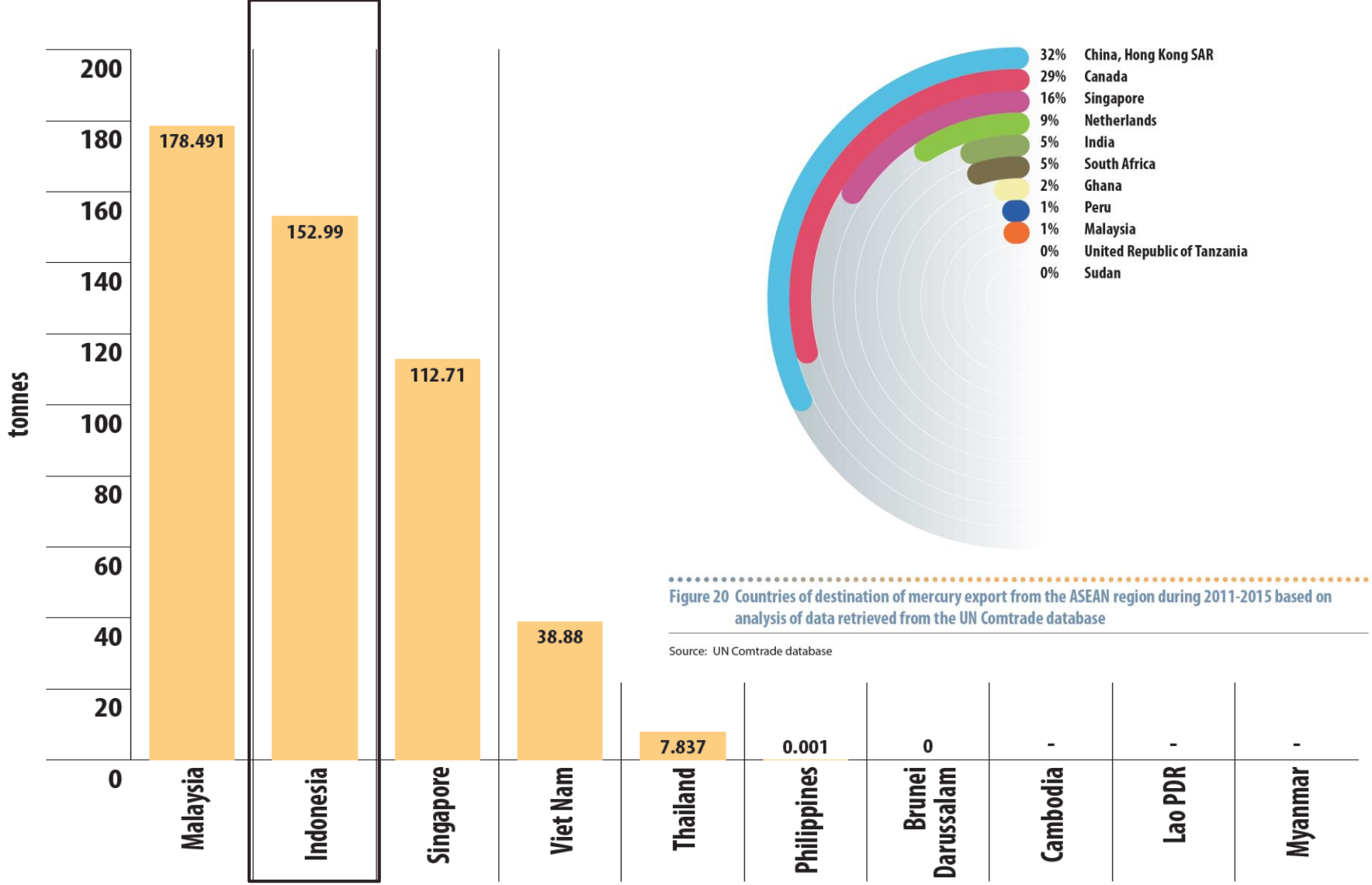


Figure 20 Countries of destination of mercury export from the ASEAN region during 2011-2015 based on analysis of data retrieved from the UN Comtrade database

Source: UN Comtrade database

Mercury exporter in Asean countries…

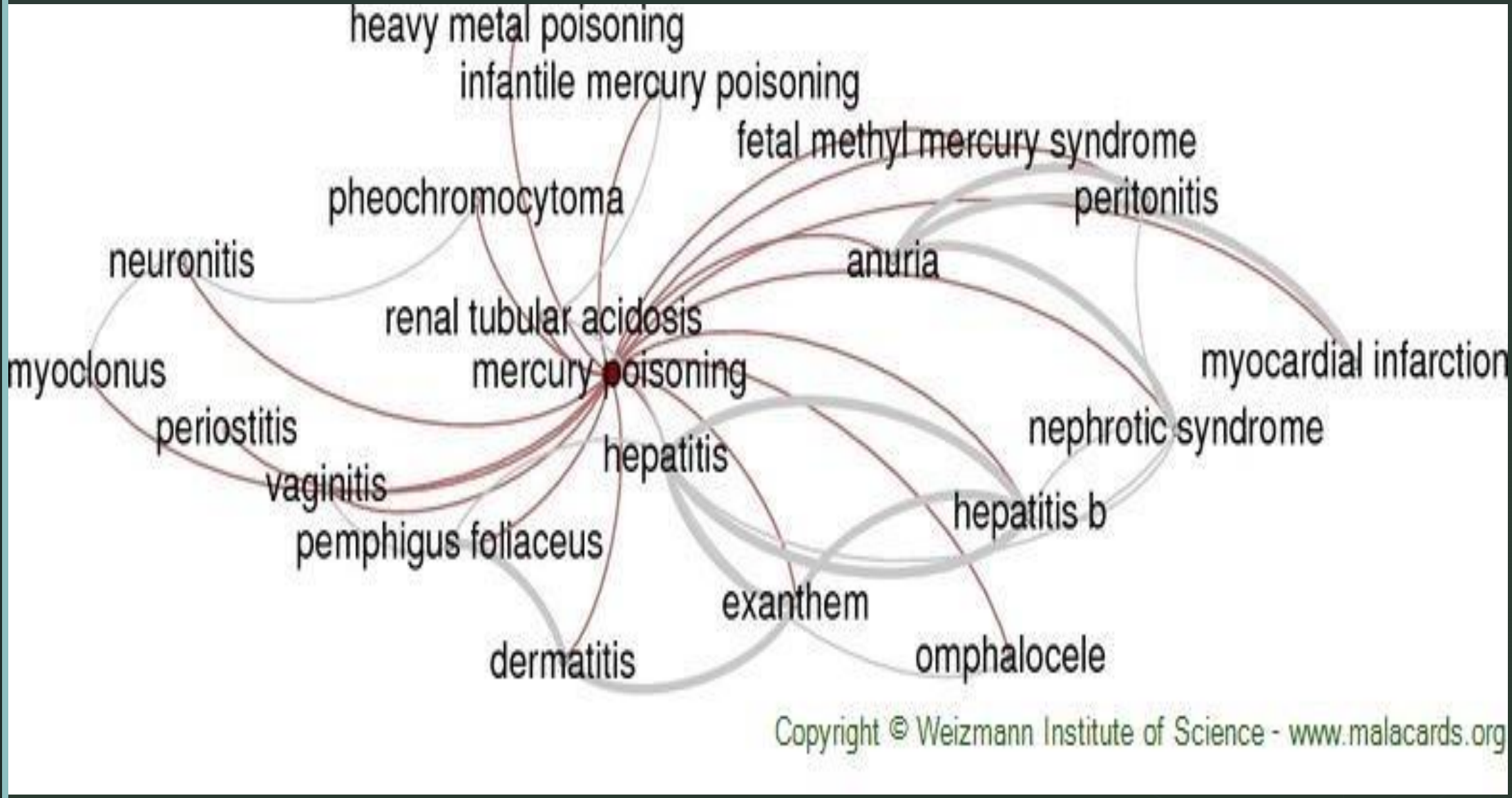
Figure 19 Total export of mercury by each ASEAN member state during 2011-2015

Source: UN Comtrade database

Data taken from UN Comtrade report 2016

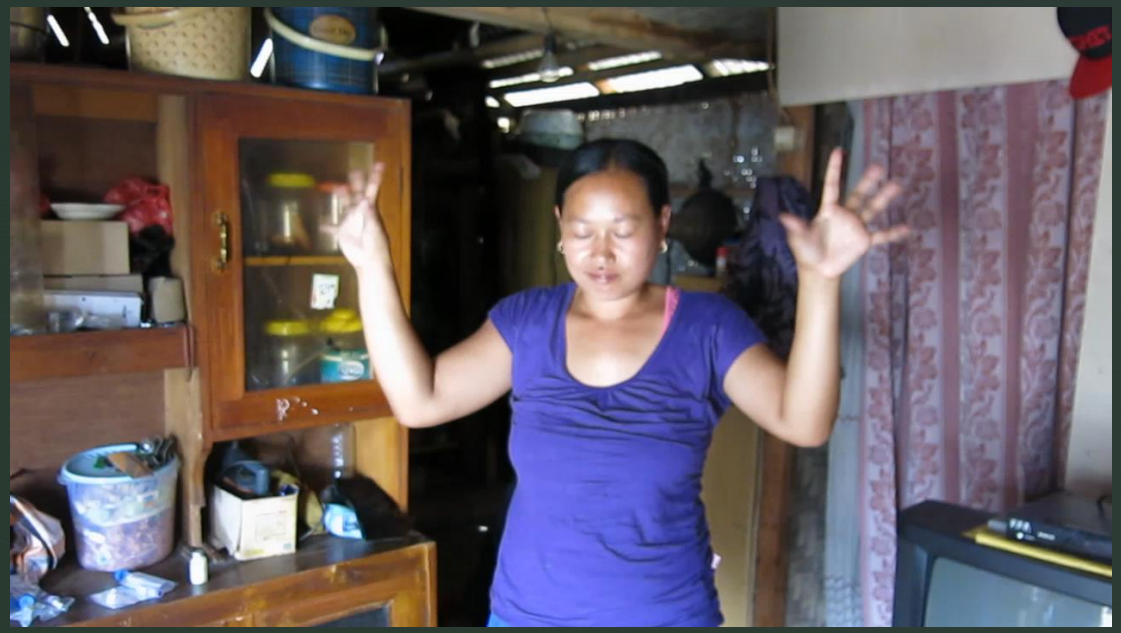
Our finding

The Victims that we found


heavy metal poisoning
infantile mercury poisoning
fetal methyl mercury syndrome
pheochromocytoma
peritonitis
neuronitis
anuria
renal tubular acidosis
myoclonus
mercury poisoning
myocardial infarction
periostitis
nephrotic syndrome
hepatitis
vaginitis
hepatitis b
pemphigus foliaceus
exanthem
dermatitis
omphalocele
Copyright © Weizmann Institute of Science - www.malacards.org

Child with disabilities in Sukabumi

Kasepuhan Cisitu, Banten Province.



Kasepuhan Cisitu, Banten Province

Our Current finding on Cisitu (BaliFokus and Medicuss Foundation; March 2015)

On one village in Sekotong, Lombok.

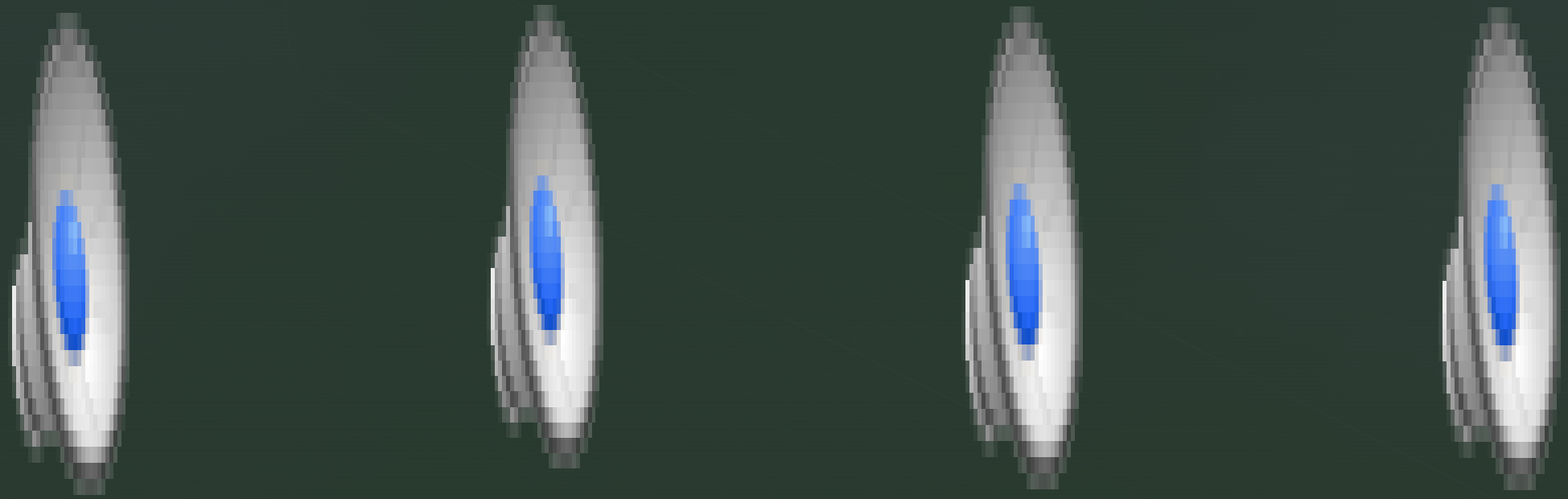
Bombana, Southeast Sulawesi.

Our tryout shed a light to those victims

A little hope…

Sukabumi case that we found…

A good improvement after 3 months supplementation of Spirulina 8gr each day…



A child with blister skin

May this presentation be useful.

Thank you very much

MEDICUSS FOUNDATION MG MG