FACT SHEET

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A GEF Initiative

Roadmap to Mercury Avoided in Six (6) Project's Sites

Introduction

One of the GOLD-ISMIA objectives is to avoid 15 tonnes of mercury through the introduction of Best Environment Practices (BEP), Best Available Technology (BAT) and socially and environmentally sound Artisanal and Small-scale Gold Mining (ASGM) practices where the Project will establish 1 mercury-free processing plant and 5 small-mobile plant. The decision of implementation BEP and BAP at each of mining site will be depending upon the result of socio-economic baseline survey (including collection of sex-disaggregated data) and mercury/gold mass balance inventories.

The establishment of mercury-free processing plant is therefore a key point in development of a roadmap on calculating the 15 tonnes of mercury avoided. As stated in the project document, collaboration with the existing processing plants and partnership with training centers owned by the Government of Indonesia (GoI) shall be taken into con.

Government Regulations as an in-kind support

The Government of Indonesia has undertaken significant steps toward the elimination of mercury in ASGM through:

1. on 10 October 2013, signing the Minamata Convention.
2. on 9 March 2017, the President of Indonesia released an instruction to ban the use of mercury in the ASGM sector. To implement this instruction, the Coordinating Ministry for Maritime Affairs through the Deputy for Infrastructure Coordination was mandated to eliminate the use of mercury by cutting the production and distribution lines of mercury, prosecuting illegal mercury export and coordinating the closure of the mercury-producing cinnabar mine.
3. on 20 September 2017, the ratification of the Minamata Convention through the issuance of Law No. 11 Year 2017.
4. on 22 April 2019, the President of Republic Indonesia signed a Presidential Decree No. 21 Year 2019 regarding National Action Plan on Mercury Reduction and Elimination.
5. on 18 October 2019, to implement the Presidential Decree, the Ministry of Environment and Forestry issued a Regulation No. P.81/MENLHK/SETJEN/KUM.1/20/2019 providing guidance to the Sub-National Government in development, monitoring and evaluation, and reporting of Sub-National Action Plan on Mercury Reduction and Elimination.

Following the regulations mentioned above, elimination and reduction of mercury used in ASGM has become a national priority target in which provision of alternative mercury-free and environmental friendly processing technologies are offered as solution. In 2019, a total of seven (7) mercury-free processing plants were built by the Ministry of Environment and Forestry (MoEF) in 7 provinces. In addition, the Agency for Assessment and Implementation of Technology (BPPT) established one (1) mercury-free processing plant in Kulonprogo District, Yogyakarta.

Furthermore, BRIN has recommended the application of a manageable leaching-cyanidation as a mercury-free technique to recover gold from primary ore. Since 2017, as consequences to the GoI's formal ban on the use of mercury and commitment to reduce/eliminate mercury used in ASGM sector by 2025, there is an increasing number of cyanidation processing plant built by miners at project sites, also in other mining sites around Indonesia. This is an indication that due to very limited access to mercury supply, the miners have been shifting to a mercury-free technique to sustain their livelihood as a gold miners.

Mercury avoided calculation

A fundamental question in calculating the avoid mercury used is "*How much mercury has been used by the miners?*", to which the Project conducted a field assessment and data collection at three (3) project sites. The results of data collection was cross-checked and elaborated with the similar data from national and international publications and it is concluded that "*each trommol processing 10 kg of ore is fed with 250 gram of mercury, and this equals to 25 kg of mercury feed per 1 ton of gold ore*". Based on this ratio, it is further calculated that *"99,35% of mercury feed is recovered for reusing, and thus 0.65% mercury loss to environment"*.

The above concept of mercury avoided is applied when:

1. *the technique used is shifting from mercury to mercury-free technique means ore is sequentially processed not by amalgamation anymore then cyanidation.*
2. *per ton of ore processed, 25 kg feeding mercury is used and 0.65% of which loss to environment, meaning that 0.16kg mercury avoided/ton gold ore.*

Within the above calculation and in consideration that the Project will establish 5 (five) small-mobile plants and 1 (one) mercury-free ore processing training plant, it is predicted that the amount of mercury avoided from the Project's processing plants will be lower that the project target (i.e., 15 tonnes of mercury by 2023). It is therefore necessary for the Project to utilize the existing processing plant owned by both the GoI and the miners.

In light of the above, the Project's strategy in calculating mercury avoided is to utilize the:

1. Existing processing plants owned by the GoI (i.e., MoEF and BPPT);
2. Existing processing plants owned by the miners as an **indirect contribution** on reducing mercury used;
3. New processing plants owned by the miners through the Project's interventions (Grant) as a **direct contribution** on reducing mercury used; and,
4. Micro-leaching Project's processing plants as a **direct contribution** on reducing mercury used.

Correlation of Hg loss with mass of gold produced

We surveyed for determining the calculation of the mass of gold produced by tong across four locations as follow:

Location	Anggai	Tatelu	Penangan	Buwun Mas	Total
Number of tong	20	30	73	24	
Average tong capacity (tonnes)	5	5	5	6	
Number batch processed per month	2	5	4	3	
Total tonnes ore processed per month	200	750	1460	432	
Total tonnes ore processed per year	2400	9000	17520	5184	34104
Total Hg used (tonnes)	60	225	438	129.6	852.6
Hg lost per year (tonnes)	**0.39**	**1.46**	**2.85**	**0.84**	**5.54**

Location	Anggai	Tatelu	Penangan	Buwun Mas	Total
Number of tong	20	30	73	24	
Gold (98-99%) produced per tong (g)	150	150	120	120	
Number batch processed per month	2	5	4	3	
Gold produced per month (g)	6000	22500	35040	8640	
Gold produced per year (g)	72000	270000	420480	103680	866160
Gold produced per year (tonnes)	**0.07**	**0.27**	**0.42**	**0.10**	**0.87**

Total gold produced was 0.87 tonnes, from 34,104 tonnes of ore processed, for an average gold grade of 25.4 g/tonne.

The ratio of Hg released (5.54 tonnes) to gold produced (0.87 tonnes) is 6.875 to 1. This means for ever gram of gold produced, nearly 7 grams of mercury is released to the environment.

The data interpretation reported here agrees with internationally published case studies stated '*when Hg is used inside ball mills to amalgamate the whole ore, the amount of Hg lost is at least 10 times the amount of gold produced*'.

The results

1. Unfortunately, there is no data collected from the processing plant which owned by the government of Indonesia. Due to unresolved technical challenges during handing over the processing plant.

2. Utilizing the existing processing plant owned by the miners as an indirect contribution for mercury reduction. Learning from the 3 project sites that have implemented cyanidation system (Table 1) which **the table showed that miners were able to avoid 23.06 tonnes mercury lost to environment through cyanidation system and produced 3.34 tonnes mercury-free gold.** This technique thereby suggesting as a promising opportunity for reducing

mercury use or the toxicological dangers of using cyanide in conjunction with mercury.

3. Utilizing the new processing plants owned by the miners as a direct contribution for mercury reduction. The newly established processing plants are the results of the Project's influence through funding assistance mechanism wherein the miners' cooperatives are capacitated to apply for loans for mercury-free processing equipment/investments. The funding assistances are intended to: (i) enhance the capacity of their members; (ii) strengthen the cooperatives' capital capacity to keep up with the volatility of gold price; (iii) increase their bankability; and, (iii) provide the members with financial insurance for their health and work safety (Table 3,4, 5 and 6) which **the table showed that miners were able to avoid 220.84 kg mercury lost to environment through cyanidation system and produced 15.51 kg mercury-free gold.**

4. Project has established 12 micro-leaching tank in 3 project site. The micro-leaching tank will lead to more affordable for miners and manageable in term of tailing issues. The trommol that owned by miners will still be using for grinding the gold ore with an effort on optimizing the particle size till less than 0.2mm so the sludge can be further processed by the micro-processing plant. This step is for reducing the cost of a mercury-free processing plant. T**he table 7 showed that miners will be able to avoid 31.56 kg mercury lost to environment through cyanidation system per year and will able to produce 4.32 kg per year.** This micro-leaching tank might potentially reducing mercury more than its expected when the number of equipment is multiply by number of miners.

From three (3) project sites, the project has identify that Batu Emas cooperative from Tatelu is the only cooperative which has a simple but complete book keeping and recording system and well organize for monitoring the amount of ore dig out and collected to be processed by the cooperative members (Figure 1). The cooperative is recording the number of sack per day is taken out from their legal community mining area. Thus, the project is using the data from Batu Emas cooperative to calculate the amount of mercury avoided from this location to apply those formulas (Table 2).

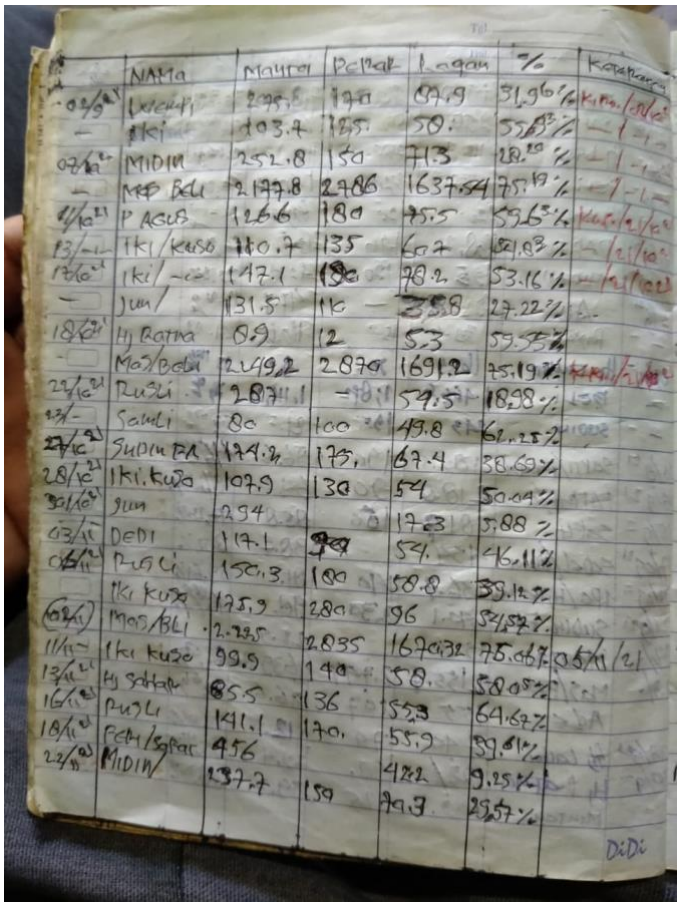

Figure 1. Book keeping and recording system by Batu Emas Cooperative

In 2022, there is a significant increase in number of cyanidation tank in Buwun Mas Village (35 tank) and Pelangan Village (132 tank). The cyanidation tanks in Buwun Mas Village are owned directly by miner who also has a mine shaft, however the cyanidation tank in Pelangan Village owned by miner and renting it also to other miners (mostly for renting).

Table 1. Calculation the mercury avoided loss to environment from 3 project sites through indirect intervention.

Location	Anggai, South Halmahera				Tatelu and Talawaan North Minahasa				Buwun Mas and Pelangan West Lombok				Total			
	2019	2020	2021	2022	2019	2020	2021	2022	2019	2020	2021	2022	2019	2020	2021	2022
Number of cyanidation tank	20	18	17	12	30	53	70	81	24	30	36	167				
Average tank capacity (tonnes)	5	5	5	5	5	5	5	5	6	6	6	4				
Number batch processed per month	2	2	2	2	5	6	6	6	3	3	3	6				
Total tonnes ore processed per month	200	180	170	120	750	1590	2100	2430	432	540	648	4008				
Total tonnes ore processed per year	2400	2160	2040	1440	9000	19080	25200	29160	5184	6480	7776	32064				
Total Hg feed (tonnes) per year	60	54	51	36	225	477	630	729	129.6	162	194.4	801.6	414.6	693	875.4	1.566
Total Hg avoided loss to environment per year (tonnes)	0.39	0.35	0.33	0.23	1.46	3.10	4.10	4.74	0.84	1.05	1.26	5.21	2.69	4.5	5.69	10.18
Total mercury-free gold produced (tonnes)	0.06	0.05	0.05	0.03	0.21	0.45	0.60	0.69	0.12	0.15	0.18	0.75	0.39	0.65	0.83	1.47

Table2 . Calculation of total Hg feed and avoided loss to environment contributed by Batu Emas mining cooperative.

Timestamps	Total ore processed per month (tonnes)	Total Hg avoided feed per month (tonnes)	Total Hg avoided loss to environment per month (tonnes)	Total gold produced per month (kg)
	A	B = A*0.025	C = B*0.65%	D = C/6.857*1000
Jan-19	74.64	1.87	0.01	1.77
Feb-19	56.00	1.40	0.01	1.33
Mar-19	79.60	1.99	0.01	1.89
Apr-19	51.08	1.28	0.01	1.21
May-19	49.88	1.25	0.01	1.18
Jun-19	0.00	0.00	0.00	0.00
Jul-19	477.32	11.93	0.08	11.31
Aug-19	1996.68	49.92	0.32	47.32

Sep-19	232.32	5.81	0.04	5.51
Oct-19	1706.60	42.67	0.28	40.44
Nov-19	1888.44	47.21	0.31	44.75
Dec-19	1760.12	44.00	0.29	41.71
Jan-20	574.48	14.36	0.09	13.61
Feb-20	1052.12	26.30	0.17	24.93
Mar-20	1242.32	31.06	0.20	29.44
Apr-20	2220.96	55.52	0.36	52.63
May-20	1890.36	47.26	0.31	44.80
Jun-20	1867.52	46.69	0.30	44.26
Jul-20	1966.56	49.16	0.32	46.60
Aug-20	1616.96	40.42	0.26	38.32
Sep-20	2205.48	55.14	0.36	52.27
Oct-20	2132.96	53.32	0.35	50.55
Nov-20	2119.16	52.98	0.34	50.22
Dec-20	2233.88	55.85	0.36	52.94
Total	**29495.44**	**737.39**	**4.79**	**699**

From the table 2 it can be seen that by shifting the technique used from mercury to mercury-free, the Batu Emas cooperative has indirect contributed to the total Hg avoided feed from January 2019 to December 2020 reached 737.29 tonnes that lead to an avoidance 4.79 tonnes of mercury loss to environment. There was 699 kg of gold produced only from this spot which can be claimed as a responsible gold which is produced with no-mercury, ore comes from designated community mining area, the miners is joining mining cooperative, the mining cooperative holds community mining permit. Noted that the amount of 699 kg gold produced is similar with the estimation of total mercury-free gold produced (tonnes) in Table 1 for 2019 and 2020 at 0.21 + 0.45 = 0.65 tonnes. This is to prove that the indicators and formula applied is closed enough to the real amount on the field.

The newly established processing plants are the results of the Project's direct intervention through funding assistance mechanism. From the grant scheme, the project is able to calculate the amount of mercury avoided from Matuari Mandiri Cooperative (Table 3), Permata Obi Raya cooperative (Table 4) and Hargo Selo Kencono (Table 6). The cooperative is also implementing a book keeping and recording system for monitoring the amount of ore process on their facility.

Table 3 . Calculation of total Hg feed and avoided loss to environment contributed by Matuari Mandiri mining cooperative Through direct intervention.

No	Name	Date of processing	Ore (sack)	Total ore processed per-batch (kg)	Total Hg avoided feed per-batch (kg)	Total Hg avoided loss to environment per-batch (kg)	Gold produced in real time per-batch (gram)
			A	B = A x 40 kg	C = B x 0.025	D = C x 0,65%	
1	03/01/2022	Christin Mantiri	100	4000	100	0,65	180
2	10/01/2022	Donny Lumewan	110	4400	110	0,72	120
3	17/01/2022	Jeksen	90	3600	90	0,59	120
4	07/02/2022	Victor	250	10000	250	1,63	230
5	14/02/2022	Ishak	100	4000	100	0,65	700

6	28/02/2022	Wenny Pauth	130	5200	130	0,85	280
7	13/03/2022	John Lausan	250	10000	250	1,63	290
8	15/03/2022	Jefry Roring Delfina	195	7800	195	1,27	380
9	23/03/2022	Ronny Turangan	150	6000	150	0,98	180
10	30/03/2022	Kevin Dipan	150	6000	150	0,98	50,5
11	07/04/2022	Deicy Lausan	100	4000	100	0,65	90
12	14/04/2022	Deicy Lausan	100	4000	100	0,65	90
13	24/04/2022	Delfina Ngangi	200	8000	200	1,30	300
14	15/05/2022	Christin Mantiri	100	4000	100	0,65	205
15	28/05/2022	Delfina Ngangi	177	7080	177	1,15	310
16	10/06/2022	Selvie Lausan	100	4000	100	0,65	120
17	20/06/2022	Donny Lumewan	100	4000	100	0,65	210
18	30/06/2022	Ronny Tulangan	90	3600	90	0,59	80
19	15/07/2022	Delfina Ngangi	200	8000	200	1,30	180
20	29/07/2022	Christin Mantiri	100	4000	100	0,65	410
21	21/08/2022	Delfina Ngangi	100	4000	100	0,65	180
22	10/10/2022	Nefry	200	8000	200	1,30	280
23	25/10/2022	Hasan	56	2240	56	0,36	0
24	08/11/2022	Nefry	200	8000	200	1,30	280
25	26/11/2022	Dike Makadah	260	10400	260	6.50	240
26	23/12/2022	Dike Makadah	200	8000	200	1,30	280
27	31/12/2022	Christin	90	3600	90	0,59	120
28	08/1/2023	Nefry	200	8000	200	1,30	280
	Total					**24,99**	**6185,5**

Table 4 . Calculation of total Hg feed and avoided loss to environment contributed by Batu Api mining cooperative Through direct intervention.

No	Date of processing	Name	Ore (sack)	Total ore processed per-batch (kg)	Total Hg avoided feed per-batch (kg)	Total Hg avoided loss to environment per-batch (kg)	Gold produced in real time per-batch (gram)
			A	B = A x 40 kg	C = B x 0,025	D = C x 0,65%	
1	01/01/22	Adam Mandagi	200	8000	200	1,3	350, 5
2	08/01/22	Arter Pantow	100	4000	100	0,65	161, 1
3	15/01/22	Jefry Katordjo	100	4000	100	0,65	180, 5
4	22/01/22	Ferry Toad	100	4000	100	0,65	200
5	29/01/22	Christian Umboh	200	8000	200	1,3	300
6	05/02/22	Ferry Tangkere	200	8000	200	1,3	300, 5
7	12/02/22	Petrus Luntungan	100	4000	100	0,65	176, 5
8	19/02/22	Jefry Katordjo	200	8000	200	1,3	275,6
9	26/02/22	Derek Pantow	100	4000	100	0,65	150, 5
10	05/03/22	Decky Tangkere	100	4000	100	0,65	100, 6
11	12/03/22	Wellem Toad	100	4000	100	0,65	98,5
12	19/03/22	Arter Pantow	200	8000	200	1,3	275, 5
13	26/03/22	Petrus Luntungan	100	4000	100	0,65	180
14	02/04/22	Adam Mandagi	200	8000	200	1,3	300,1
15	09/04/22	Christian Umboh	100	4000	100	0,65	200,1
16	16/04/22	Derek Pantow	200	8000	200	1,3	300,1
17	23/04/22	Arter Pantow	100	4000	100	0,65	100,5
18	30/04/22	Petrus Luntungan	100	4000	100	0,65	150, 7
19	07/05/22	Wellem Toad	100	4000	100	0,65	300

20	14/05/22	Ferry Tangkere	200	8000	200	1,3	350,7
21	21/05/22	Jefry Katordjo	200	8000	200	1,3	180,6
22	28/05/22	Christian Umboh	100	4000	100	0,65	280
23	04/06/22	Derek Pantow	100	4000	100	0,65	350
24	11/06/22	Arter Pantow	100	4000	100	0,65	200
25	18/06/22	Wellem Toad	200	8000	200	1,3	285, 6
26	25/06/22	Petrus Luntungan	100	4000	100	0,65	300, 5
27	02/07/22	Adam Mandagi	200	8000	200	1,3	300
28	09/07/22	Ferry Tangkere	200	8000	200	1,3	250
29	16/07/22	Christian Umboh	100	4000	100	0,65	180
30	23/07/22	Jefry Katordjo	100	4000	100	0,65	200, 5
31	30/07/22	Derek Pantow	100	4000	100	0,65	100, 6
32	06/08/22	Artur Pantow	100	4000	100	0,65	120, 5
33	13/08/22	Wellem Toad	100	4000	100	0,65	150
34	20/08/22	Petrus Luntungan	100	4000	100	0,65	98
35	27/08/22	Inaray Umboh	200	8000	200	1,3	250
36	03/09/22	Christian Umboh	100	4000	100	0,65	185
37	10/09/22	Jefry Katordjo	200	8000	200	1,3	350
38	17/09/22	Ferry Tangkere	200	8000	200	1,3	286, 5
39	24/09/22	Derek Pantow	100	4000	100	0,65	135
40	01/10/22	Wellem Toad	100	4000	100	0,65	98, 9
41	08/10/22	Arter Pantow	100	4000	100	0,65	155
42	15/10/22	Petrus Luntungan	100	4000	100	0,65	175, 7
43	22/10/22	Inaray Umboh	100	4000	100	0,65	156, 9
44	29/10/22	Sanding Longdong	200	8000	200	1,3	350, 9
45	05/11/22	Jefry Katordjo	100	4000	100	0,65	145, 1
46	12/11/22	Ferry Tangkere	200	8000	200	1,3	287, 6
47	19/11/22	Christian Umboh	100	4000	100	0,65	189, 9
48	26/11/22	Welem Toad	100	4000	100	0,65	98,5
49	03/12/22	Derek Pantao	100	4000	100	0,65	110,5
50	10/12/22	Artur Pantouw	100	4000	100	0,65	120
51	17/12/22	Deski Mandagi	200	8000	200	1,3	195
52	24/12/22	Andri Nender	100	4000	100	1,3	135,2
53	07/01/23	Christian Umboh	100	4000	100	0,65	125
54	14/01/23	Jefri Potorjo	200	8000	200	1,3	
55	21/01/23	Derek	100	4000	100	0,65	135
56	28/01/23	Artur Pontouw	200	8000	200	1,3	241
57	04/02/23	Sanding Longdong	200	8000	200	1,3	350
58	11/02/23	Welem Toad	100	4000	100	0,65	150
	TOTAL					**52**	**7329,4**

Table 5 . Calculation of total Hg feed and avoided loss to environment contributed by Permata Obi Raya mining cooperative Through direct intervention.

No	Date of processing	Ore (sack)	Total ore processed per-batch (kg)	Total Hg avoided feed per-batch (kg)	Total Hg avoided loss to environment per-batch (kg)	Gold produced in real time per-batch (gram)
		A	B = A x 40 kg	C = B x 0,025	D = C x 0,65%	
1	15 June 2022	350	14000	350	2,275	38,28
2	27 June 2022	300	12000	300	1,95	43,33
3	4 July 2022	400	16000	400	2,6	43,5
4	13 July 2022	400	16000	400	2,6	35,37

5	21 July 2022	2000	80000	2000	13	62,63
6	29 July 2022	450	18000	450	2,925	31,65
7	8 August 2022	1700	68000	1700	11,05	65,86
8	11 August 2022	1500	60000	1500	9,75	10,79
9	27 August 2022	800	32000	800	5,2	85,25
10	27 August 2022	2000	80000	2000	13	102,13
11	02 September 2022	780	31200	780	5,07	58,77
12	10 September 22	150	6000	150	0,975	91,75
13	15 September 2022	1500	60000	1500	9,75	10,48
14	25 September 2022	1500	60000	1500	9,75	37
15	28 September 2022	1500	60000	1500	9,75	39,17
16	30 September 2022	200	8000	200	1,3	25,11
17	03 October 2022	400	16000	400	2,6	43,04
18	09 December 2022	1200	48000	1200	7,8	149,41
19	30 December 2022	100	4000	100	0,65	163,7
20	06 January 2023	500	20000	500	3,25	185,31
21	11 January 2023	500	20000	500	3,25	142,61
22	16 January 2023	500	20000	500	3,25	210
23	21 January 2023	240	9600	240	15,6	87,48
24	29 January 2023	300	12000	300	2,275	127.05
25	29 January 2023	300	12000	300	1,95	118.55
	TOTAL				**141,57**	**1762,62**

Table 6. Calculation of total Hg feed and avoided loss to environment contributed by Hargo Selo Kencono mining cooperative through direct intervention.

No	Date of processing	Total ore processed per-batch (kg)	Total Hg avoided feed per-batch (kg)	Total Hg avoided loss to environment per-batch (kg)	Bullion produced in real time per-batch (gram)	Pure gold produced in real time per-batch (gram)
		B	C = B x 0,025	D = C x 0,65%		
1	21 December 2022	3000	75	0.48	80	16
2	28 Desember 2022	3000	75	0.48	46	15
3	05 Januari 2023	2000	50	0.33	15	2.8
4	20 Januari 2023	2000	50	0.33	7	0.9
5	02 Februari 2023	2000	50	0.33	12	2
6	16 Februari 2023	2000	50	0.33	81	17
	TOTAL			**2.28**	**241**	**53,7**

A series of picture the mercury-free gold produced per-batch form Permata Obi Raya can be seen below:

Table 7. Estimation of mercury avoided through direct intervention on establishment of micro-leaching at 3 project site.

Item	Anggai Village, South Halmahera	Hulawa Village, North Gorontalo	Buwun Mas and Pelangan Village, West Lombok
Number of micro-processing tank (unit)	2	6	4
Average tank capacity (kg)	150	150	150
Number batch processed per month	9	9	9
Total ore processed per month (kg)	2700	8100	5400
Total Hg avoided feed per month (kg)	67.5	202.5	135
Total Hg avoided loss to environment per month (kg)	0.44	1.32	0.87
Total mercury-free gold produced per month (kg)	0.06	0.18	0.12
Total Hg avoided loss to environment per year (kg)	5.28	15.84	10.44
Total mercury-free gold produced per year (kg)	0.72	2.16	1.44

Conclusions

1. The largest portion of total mercury avoided loss to environment is expected from the existing mercury-free processing plants owned by the miners at the project sites as indirect intervention. This highlights the double roles taken up by the miners in mercury reduction efforts: as the main actors causing mercury pollution/emission and as the frontiers in environmental protection through shifting to mercury-free technologies. The existing regulations has ushered the miners to take up the latter role (i.e., as the frontiers).
2. The Project will be playing an important role on facilitating the government to support the implementation of banning mercury by, among others, (i) supporting licensing of ASGM activities, and, (ii) providing relevant trainings and campaign raising awareness on the dangers of mercury, the importance of formalization, and the economic benefits of mercury-free techniques.
3. The project is able to reach the targeting avoiding mercury by 23.06 tonnes mercury lost to environment through cyanidation system and produced 3.34 tonnes mercury-free gold.
4. Through project processing plant as a direct intervention, miners are able to avoid 220 kg mercury lost to environment through cyanidation system and produced 15.51 kg of mercury-free gold.

Recommendation

Monitoring the amount of rock processed by the miners' equipment is the key to calculating avoidable mercury at the national level. Moving forward from the results of field researches, the Project has developed a mobile application and a web portal database through which the estimation of the mercury avoided from the mercury-free processing units within the project locations can be monitored in a systematic way and on regular basis. The mobile application allow the Project collects the site-specific variables from the owners of processing units on a daily basis, by using certain variables such as number of tank, average tank capacity, number batch processed and gold produced per tank. Meanwhile, the web portal database will assist the Project estimate the total mercury avoided from a specific site or region (i.e., at the levels of extraction unit, processing unit, ASGM site, region or country). Both the mobile application and web portal database have been launched in January 2022.

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