

# PHILIPPINE HG-FREE METHOD GAANG MINES, BALBALAN, KALINGA: THE BANAOD BODONG ASSOCIATION (BBA) EXPERIENCE

Leoncio Na-oy  
Ban Toxics / Benguet Federation of Small-Scale Miners



10 February 2012



# The Banao Bodong Association

- § A tribal organization in Northern Luzon
- § It was organized in 1982 purposely to unify the Banao Tribe of Kalinga
- § Its main goal is to protect and wisely utilize all natural resources within the territory of the ancestral domain of the Banao Tribe
- § The Association is headed by the Chairman/President with two (2) Vice Chairmen/Presidents and 3 representatives from each barangay comprising the Board of Trustees
- § BBA is currently composed of 5,000 members
- § In 1996, the BBA was recognized as one of the most peaceful tribes in the Philippines



# The Gaang Mining Area

- § Situated 7 kms south of Talalang, the host community
- § The mining site is inaccessible to transportation and can only be reached after three hours of hiking.
- § It is proclaimed by the people as a minahang bayan although not everybody is allowed to mine inside the area.
- § There are certain restrictions and fees imposed to regulate entry of outsiders.





# The Gaang Mining Area

- § Mining activities in Gaang are regulated by the BBA in accordance with our customary laws, policies and traditions
- § Gold panning commenced in Gaang in 1984 when a miner from Bontoc, Mountain province pointed out traces of the precious metals along the Saltan River
- § With the advent of underground mining in 1985, mercury use was also introduced, influenced mainly by miners from Benguet.



# Profile of the Gaang Mining Area

- § There are 150 tunnels, about 80 of which are currently operational
- § There are 180 camps/groups within the mining area; each camp is composed of 5 to 10 miners
- § There are about 1,000 residents in Gaang; all are engaged in small-scale gold mining
- § There are about 100 ballmills, all of which are naturally powered by water force and aligned into series so that the water used from the first mill can be utilized by the other mills.
- § The area can accommodate a maximum of 168 rod mills operating simultaneously.





# Mining Practices in Gaang Mines

- § Ores extracted from the tunnels are usually brought to the camp's milling area for crushing and grinding.
- § If the gold ore sample has high gold content, direct amalgamation is practiced where mercury is fed directly into the drum.
- § If the ore has low gold content, it is concentrated in a small sluice covered with cloth.
- § Gold concentrates are recovered and mercury amalgamation is subsequently practiced.
- § After about an hour of milling, the mercury-gold mix is removed from the drum. The mercury-gold mix is panned to recover the mercury laden with gold.
- § The mix is squeezed and the remaining amalgam is burned in an enclosed chimney to liberate the gold.



# Mining Practices in Gaang Mines

- § One ballmill has the capacity to process two (2) sacks of ore. A ballmill with about ¼ inch diameter costs P10,000 and has an estimated useful life of about 3 months.
- § This is based on the assumption that the ballmill operates continuously (24 hours a day; 7 days a week). Within 24 hours, the ballmill operates in 6 batches with each batch having duration of three hours.
- § About 500 grams of mercury are applied for every ton of recovered concentrates.
- § An average of 20 grams of gold is likewise recovered for every ton of ore extracted.
- § For every unit of gold produced, two units of mercury are consumed.





## Gold and Mercury Trading

- § Miners in Gaang collectively produce an average of 10 kilos of gold monthly.
- § Purity of gold produced ranges from 14 to 16 karats.
- § They are sold at US\$30 per gram to the local gold traders who also operate as mercury suppliers.
- § There are at present 11 gold buying stations in the mining site.
- § Gold sold to local dealers are further traded in Baguio City.
- § Mercury used in ASGM in Gaang is sourced out from the mercury traders in Baguio City at US\$128 per kilo.
- § It is sold locally at US\$0.70/gram or US\$700 per kilo.





# Embracing Mercury-Free Techniques

- § Forging of MOU between and among BBA, LGU Balbalan and BAN Toxics for improved mining practices in Gaang focusing on mercury reduction/elimination.
- § Information dissemination campaign by BAN Toxics on the threats of mercury to human health and the environment.
- § Hands-on training on the use of improved sluice, panning and burning of concentrates using borax.



## **Philippine Hg-Free Method**



**Step 1: Grind ore with rod mill/ball mill without using mercury**





## Philippine Hg-Free Method



**Step 2: Wash out the slime and letting heavier materials like gold subside.**

- All excess from the sluice box is focused on the launder which has a felt carpet.
- Wash the felt carpet in a separate tub prior to panning.

**(There are specific techniques that can be used to improve this process.)**





# Philippine Hg-Free Method



**Step 3: Panning**  
- Panning is a learned technique





# Philippine Hg-Free Method

## Step 4: Melting process with Borax



# 1. Gaang Amalgamation vs. Philippine Hg-Free Method

Areas of Comparison	Amalgamation (current mining method practiced in Gaang)	Sluicing and panning (mercury-free method introduced by Ban Toxics)	Remarks
Time/duration (number of hours used in processing 3 loads of grinded ore)	7 hours	4 hours	<ul style="list-style-type: none"> <li>The time spent for amalgamation was based on the feedback given by the participants</li> <li>The time spent for sluicing was based on the result of the training documentation</li> </ul>
Equipment and materials used	Small sluice Small launder Mercury Borax Charcoal Furnace	Improved sluice box Launder Borax Detergent soap Charcoal Furnace	<ul style="list-style-type: none"> <li>The difference in the process and materials used comes after the grinding of the ore</li> </ul>
Recovery efficiency	1.2 grams/load	3.2 grams/load	<ul style="list-style-type: none"> <li>Based on the seven loads of ore from the same source</li> </ul>
Gold quality/karat	14.3	15.9	<ul style="list-style-type: none"> <li>Based on feedback from the participants from the tests conducted in Baguio City</li> </ul>



# Camarines Norte Project Results



## Cam Norte Amalgamation vs. Philippine Hg-Free Method

Areas of Comparison	Amalgamation (current mining method practiced in Cam Norte)	Sluicing and panning (mercury-free method introduced by Ban Toxics)	Remarks
Time/duration (number of hours used in processing 1 batch)	3.35 hours	3 hours	<ul style="list-style-type: none"> <li>The 3 hours for BT included hands-on training with miners the process could have been done in 1 hour.</li> <li>Additional 2 hour re-grinding for amalgam method</li> </ul>
Equipment and materials used	Small sluice Small launder Mercury Borax Charcoal Furnace	Improved sluice box Launder Borax Detergent soap Charcoal Furnace	<ul style="list-style-type: none"> <li>The difference in the process and materials used comes after the grinding of the ore</li> </ul>
Recovery efficiency	25 mg / batch	550mg / batch	<ul style="list-style-type: none"> <li>Based on the seven loads of ore from the same source</li> </ul>
Additional Cost	Mercury Citrus Carbide		<ul style="list-style-type: none"> <li>US\$59 additional for amalgamation</li> </ul>



# In Applying the Philippine Hg-Free Method..



## Consideration:

- Gold classification of the ore.
- The method has been successful with rough gold.
- Experience with water gold in Kalimantan requires modification to the basic methodology.



## Next Steps:

- § Train more miners on mercury-free gold production techniques
- § Promotion of Philippine Hg-F among the miners
- § Establishing mercury-free schools program
- § Formulation of BBA Policy prohibiting the use of mercury in small-scale gold mining in Gaang.





**Thank you for listening!**  
**Terima kasih!**



**[www.bantoxics.org](http://www.bantoxics.org)**

**TeleFax: +63 2 355 7640**

**E-mail: [info@bantoxics.org](mailto:info@bantoxics.org)**

---