The state of Artisanal and Small-scale Gold Mining in River Indus and it’s tributaries in Gilgit Baltistan, Pakistan.

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The country

- **Location:** Southern Asia
- **Population:** 180 million
- **Geographic coordinates:** 30°00' N, 70°00'E
- **Land boundaries:** total: 6,774 km
  - border countries: Afghanistan 2,430 km, China 523 km, India 2,912 km, Iran 909 km
- **Coastline:** 1,046 km
- **Terrain:** flat Indus plain in east; mountains in north and northwest; Balochistan plateau in west
- **Elevation extremes:** lowest point: Indian Ocean zone: mostly 0 m with highest point: K2 (Mt. Godwin-Austen) 8,611 m
- **Environment - international agreements:** party to:
  - signed, but not ratified: Marine Life Conservation.
<table>
<thead>
<tr>
<th>S.#</th>
<th>Category</th>
<th>Kg Hg/year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Minimum</td>
</tr>
<tr>
<td>1</td>
<td>Extraction and use of fuel/energy sources</td>
<td>111.143989</td>
</tr>
<tr>
<td>2</td>
<td>Production of other minerals and materials with mercury impurities</td>
<td>500</td>
</tr>
<tr>
<td>3</td>
<td>Intentional use of mercury in industrial purposes</td>
<td>1320</td>
</tr>
<tr>
<td>4</td>
<td>Consumer products with intentional use of mercury</td>
<td>761.42595</td>
</tr>
<tr>
<td>5</td>
<td>Custom import data of Biocides and pesticides with quantity</td>
<td>5779</td>
</tr>
<tr>
<td>6</td>
<td>Waste incineration</td>
<td>32.944</td>
</tr>
<tr>
<td>7</td>
<td>Waste deposition/land filling and waste water treatment</td>
<td>2342.5534</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>10847.07</strong></td>
</tr>
</tbody>
</table>
Total Release (%age)

- Land: 16%
- Waste: 57%
- Air: 15%
- Water: 12%
The Hotspot: Gilgit-Baltistan

- Spread over 27,000 sq miles With a fragile ecosystem established over millions of years of natural evaluation
- The region consists of valleys with rivers, streams, lakes and glaciers and tall mountains, Many unique and endangered habitats and species
- The second tallest mountain peak, K2 and other 8000 m high peaks
- Three largest glaciers outside the polar regions.
- The impact of environmental changes far beyond its boundaries.
Small Scale Gold Mining (Gold washing)

- The gold washing / panning is a centuries-old profession in Indus, its all tributary rivers and streams in Gilgit-Baltistan and Chitral.
- The gold particles shed from mountains to basin with sand and soil erosion.
- The gold washing is tribal/family profession of a community of gold washers locally known as “Soniwal”
- Around 100-150 families out of a total of about 1000-1500 families of the tribe directly and indirectly involved in gold washing activities.
- Mercury is generally used during the panning and gold extraction
- The mercury is easily available in open market to buy without any restriction.
Socio economic profile of the miners

- The Gold washers is marginalized community with very low socio economic indicators. The poverty remains through generations as a vicious cycle.
- The whole family including women and children involved in gold washing work as a group.
- In winter (Oct- April) when the flow of river is at low level, the gold washers collect panned concentrates from around big boulders and dry sites along the banks of rivers and river beds for gold extraction.
- The nomadic life of the community does not allow them to access to education and health.
- The community possess no assets like land and capital, nor other skills, to shift their professions.
- The gold washers live in the huts. The amalgamation process took place inside the huts.
Health hazards of mercury on the Occupational Group

- The hazards on the health of occupational group is established in study by Khan et.al, Peshawar University (2012)

- Total Hg concentrations ranged from 41.7-129.9 μg/L in occupational adult (18-50 years) with mean concentration of 57.1 μg/L in male and 68.5 μg/L in female.

- The female workers have shown higher concentrations of total Hg as compared to male workers.

- Total Hg concentrations ranged from 2.5-30.6 μg/L in urine samples of occupational children (8-15 years) with mean concentration of 8.3 μg/L in male and 6.5 μg/L in female children.

- These concentrations were significantly (P<0.01) higher in occupational than non-occupational children.
## Health hazards of mercury on the Occupational Group

<table>
<thead>
<tr>
<th>Complaints</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>slow growth was observed in children of the occupational</td>
<td>67-71</td>
</tr>
<tr>
<td>chest pain</td>
<td>57-67</td>
</tr>
<tr>
<td>skin rashes</td>
<td>38-48</td>
</tr>
<tr>
<td>kidney diseases</td>
<td>30-56</td>
</tr>
<tr>
<td>sensory problems</td>
<td>28-31</td>
</tr>
<tr>
<td>individuals (both male and females workers) complained of tiredness and headache</td>
<td>23-67</td>
</tr>
<tr>
<td>cough and sputum</td>
<td>22-31</td>
</tr>
<tr>
<td>palpitation</td>
<td>21-28</td>
</tr>
<tr>
<td>cognitive impairment</td>
<td>20-45</td>
</tr>
<tr>
<td>disturbance in smell and taste</td>
<td>12-16</td>
</tr>
<tr>
<td>tremor</td>
<td>9-16</td>
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</tbody>
</table>
Challenges

- Informal activity
- Poor Regulatory Regime (laws, policies and procedures)
- Deficiency of data about number of families, quantity of gold extracted and quantity of Hg used.
- Capacity of government and NGOs to assess and offset the impacts of Hg on down stream, hydrosphere, aquatic life and food chain.
- Provision of health and education due to nomadic life of gold washer community.
Way forward

- Research on the sector to assess the impact of Hg on the workers, water, ecology and food chain.
- Registration of gold washers and maintenance of their record.
- Control the import and trade of hg in the country to not allow its use in ASGM sector.
- Provision of health and education to the families involved.
- Explore and promote appropriate non-hg gold extraction practices.
- Impart alternate skills to shift the profession or alternative livelihoods (vocational and technical trainings).
Recommendation

- Review the mercury inventory to include ASGM practices in Gilgit-Baltistan and other hotspots in Pakistan.
- Control and regulate mercury trade and distribution in Pakistan.
- Sign and ratify the mercury treaty.
- Prepare the National Implementation Plan and National Action Plan.
Thank you for your attention

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