Project: “Development of the Minamata National Action Plan (NAP) to reduce and to the extent possible eliminate the use of mercury in ASGM in Costa Rica, to protect human health and the environment, and in accordance with Law 8904

October, 2023. Costa Rica
Location of the Project area
Scope

Total mapped area, Abangares, Guanacaste, Costa Rica
National Action Plan

Strategies and Studies developed

- Public health strategy
- Strategy for managing trade and preventing the diversión of mercury
- ASGM formalization strategy
- Worst practices elimination strategy

Organizational structure

Committee: involved different national institutions

- Strategy for involving stakeholders
- Baseline estimates of the quantities of mercury used and the practice
- Social and economic study
- Environmental evaluation

National Action Plan

Strategies and Studies developed

- Public health strategy
- Strategy for managing trade and preventing the diversión of mercury
- ASGM formalization strategy
- Worst practices elimination strategy
National action plan

Activities

• At least 10 Workshops: miners and institutions

• Environmental monitoring: sediments, Waters, talings, air, fish
Guidelines developed

Good mining practices

Manuel para el uso, fabricación y mantenimiento de la retorta de tubo

Plan Nacional de Acción para la extracción de oro artesanal y en pequeña escala en Costa Rica

Brochure of the NAP
Information material
Maped Areas

Area 1: 2800 Ha

Area 2: 2080 Ha

Area 3: 800 Ha
Metodology
Used Technology

Precision Receptors GNSS
- RTK y PPK
- Precision: 8 mm RTK 5mm PPK

Sensor Lidar Zenmuse L1
- Precision: 10 cm
- Range: 100 m
- Camara RGB 20 MP

Drone Matrice 300 RTK de DJI
- Tecnology RTK
- Range 15 km
- Flight time 55 min.

Camara Zenmuse P1
- Resolucion: 45 MP
- Sensor: 35 mm
- Camara RGB 20 MP
Softwares

Photogrammetric analysis and Point Clouds

Agisoft Metashape

DJI TERRA

Terra solid

For land Uses and GIS

ERDAS IMAGINE

QGIS
LiDAR, which stands for Light Detection and Ranging, is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth.
Results
Identified sites

Extraction and processing sites

Number of sites per áreas:

First: 109 sites
Second: 76 sites
Third: 1 sites

A total of 186 extraction and processing sites in a total área of 5680 Ha

- 53 sites inside the Abangares Protected area
- 133 sites outside the Abangares Protected area
Inventory classification

Coverage of land use
- Forest
- Superficial water
- Crops
- Waste land
- Grass
- Urban

Site description
- Buildings and mining dump
- Mining dump
- Tailings
- Tailings, buildings and mining dump
- Tailings and buildings
- Tailings and mining dump

Size
- Small
- Medium
- Big

Stratification of land use
- Forest
- Grass
- Urban
Coverage of Land Uses

<table>
<thead>
<tr>
<th>Cobertura</th>
<th>Área Km²</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bosque/Forest</td>
<td>45.302</td>
<td>75.58</td>
</tr>
<tr>
<td>Cuerpos de Agua/ superficial water</td>
<td>0.550</td>
<td>0.92</td>
</tr>
<tr>
<td>Cultivos/Crops</td>
<td>0.115</td>
<td>0.60</td>
</tr>
<tr>
<td>Erial/waste land</td>
<td>0.358</td>
<td>0.19</td>
</tr>
<tr>
<td>Pastos/Grass</td>
<td>12.361</td>
<td>20.62</td>
</tr>
<tr>
<td>Urbano/Urban</td>
<td>1.257</td>
<td>2.10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>59.943</strong></td>
<td></td>
</tr>
</tbody>
</table>
Stratification of Land use

<table>
<thead>
<tr>
<th>Uses</th>
<th># Sites</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest</td>
<td>107</td>
<td>57.84</td>
</tr>
<tr>
<td>Grass</td>
<td>36</td>
<td>18.92</td>
</tr>
<tr>
<td>Urban</td>
<td>43</td>
<td>23.24</td>
</tr>
<tr>
<td>Total</td>
<td>186</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Site description

Forest
Land use

Grass
Land use

Urban
Size categories

Big: 106,561 m²

Small: 413 m²

Medium: 31,130 m²
**Jenks classification**

<table>
<thead>
<tr>
<th>Category</th>
<th>Area m²</th>
<th># Sites</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>0 – 6,870</td>
<td>172</td>
<td>92.47</td>
</tr>
<tr>
<td>Medium</td>
<td>6,871 – 31,130</td>
<td>11</td>
<td>5.91</td>
</tr>
<tr>
<td>Big</td>
<td>31,131-106,562</td>
<td>3</td>
<td>1.61</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>183</td>
<td>100.00</td>
</tr>
</tbody>
</table>

**Size categories**

- **Pequeño**: 92.47%
- **Mediano**: 5.91%
- **Grande**: 1.61%
## Categories

### Site description

<table>
<thead>
<tr>
<th>Description</th>
<th># of sites</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Buildings and mining dump</td>
<td>18</td>
<td>9.68</td>
</tr>
<tr>
<td>Mining dump</td>
<td>46</td>
<td>24.73</td>
</tr>
<tr>
<td>Tailings</td>
<td>20</td>
<td>10.75</td>
</tr>
<tr>
<td>Tailings, buildings and mining dump</td>
<td>35</td>
<td>18.82</td>
</tr>
<tr>
<td>Tailings and buildings</td>
<td>55</td>
<td>29.57</td>
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<tr>
<td>Tailings and mining dump</td>
<td>12</td>
<td>6.45</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>186</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>
Site description

Buildings and mining dump
Site description

Mining dump
Site description

Tailings and buildings
Site description

Tailings
Site description

Tailings, buildings, mining dump
Site description

Tailings and buildings
28 sites with mining dump
197 tailings among all the sites
Total tailing area: 1361.2 m²
Benefits

- Allows to quantify the size of the ASMG relatively quickly.
- Track activity growth.
- Facilitates identification and prioritization in the field.
- The use of this type of technology allows access to remote places that are difficult to access or have a degree of danger.
- The versatility of this tool allows you to identify land use, ASGM distribution, quantification of tailings as well as waste Dump.
Recommendations

• It is recommended to generate field verification work on some sites based on sampling to complement the information obtained.

• It is recommended to feed the GIS layers with future data provided by other projects or studies, to take advantage of the data management and analysis that these tools allow.
Questions