Concessions for mining in Peru

Lima (= 30% of the Peru population) enjoys the income from mines

Bebbington and Bury, 2009
Open cast- gold mining

- Average concentration is **1 g gold per 1.8 ton of ore** (=low)
  - First step: explosions, transport and grinding of rock
  - Second step: leach out the gold, silver, mercury and other precious metals out by HCN (cyanide acid, dangerous but controlled...)
  - Third step: process leachate to "**Doré bar**" (75% gold + 20% silver), to be exported from Peru
- Literally destroying mountains at > 3500 m, making a very deep pit and creating heaps of tailings close to the processing plant
- Problems **during** operation: heavy metals, acid water (from sulfide oxidation; often pyrite or FeS$_2$ present), open pit requires pumping, destruction of ecosystems...
- Problems **after** operation: Restoration possible? Take the money (gold) and run?
Open cast pit:
- different pits in action
- requires pumping for excavation
- => lowering water table
- => springs dry up

E.g. 500 m

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Up to 100 m height
Largest cyanide leaching (pH 9.5 to 11) heap in the world

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Total area of all heaps = 270 ha

544 000 ton/day

Blasthole drilling

Shovel crane

Haul trucks (85 ton)
2007 situation

- Open pits
- Leach pads
- Processing leachate
- Waste dump (low grade)
Lagunas de Alto Peru
(lakes in original Jalca-ecosystem)

Protected ????
= Headwaters Rio Jequetpeque
(rice growing area along the coast)

Water: symbol of the conflict

- Cajamarca known for its pastures with dairy products: especially cheese.

Water: symbol of the conflict

- Cajamarca known for its pastures with dairy products: especially cheese.
New artificial “source" of the Rio Grande
by water pumped from the mine pit
Natural springs dried up
**Rio Grande (de Mashcón)**

- Dam paid by Yanacocha mine
- Drinking water captation for Cajamarca
- Tres Molinos irrigation water captation

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**Multisectoral water rights**

<table>
<thead>
<tr>
<th>Use</th>
<th># users</th>
<th>Area (ha)</th>
<th>Granted flow (m³/s)</th>
<th>Volume Mm³/year</th>
<th>% of demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>7869</td>
<td>1669</td>
<td>0.766</td>
<td>24.3*</td>
<td>41.2</td>
</tr>
<tr>
<td>Domestic use</td>
<td>89296</td>
<td>-</td>
<td>0.456</td>
<td>14.4*</td>
<td>24.6</td>
</tr>
<tr>
<td>Mining use</td>
<td>1</td>
<td>16000</td>
<td>0.634</td>
<td>20.0</td>
<td>34.2</td>
</tr>
</tbody>
</table>

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**Water reported by the mine**

- **38.6 Mm³/year should correspond to ***

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*Leuven 11/10/2016 Guido Wyseure*
Sustainable mining?

- "Concession" = underground  <> "Topsoil" = privately owned
  - Conflict mining companies with local population over land properties (e.g. Familia Chaupe-Acuña, de facto expropriated against their will)
  - Peruvian and other governments enjoy the income from the mines (and give out concessions to mining industry)

- **Propaganda machines** at full swing (resistance are criminals, drug smugglers, “*Shining path*” members, against development...)

- Possible to execute open-cast mining without environmental impact?

- **What after the closure ?????**

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**CIERRE DE MINAS**

**Revegetación**

After closure

No problem according to “*Propaganda*” by Yanacocha SRL

1. Aplicación de cal y abono para preparar el terreno.
2. Fertilización.
3. Siembra de pastos nativos y exóticos.
4. Transplante de especies nativas: “ichu”.
5. Forestación.

Stupid “*Propaganda*”:

*Jalca is above the three line !!!*
Laguna Yanacocha=
lake with black water

How to restore ????

Concluding remarks

• Lack of information on water resources
• Lack of proactive policy about mining
• Lack of regulations + their enforcement
• Large concerns for the after closure situation impact on water sustainability in Cajamarca.