

# ARTISANAL MINING

FERNANDO

UNIVERSITY SAN LUIS POTOSI  
MEXICO

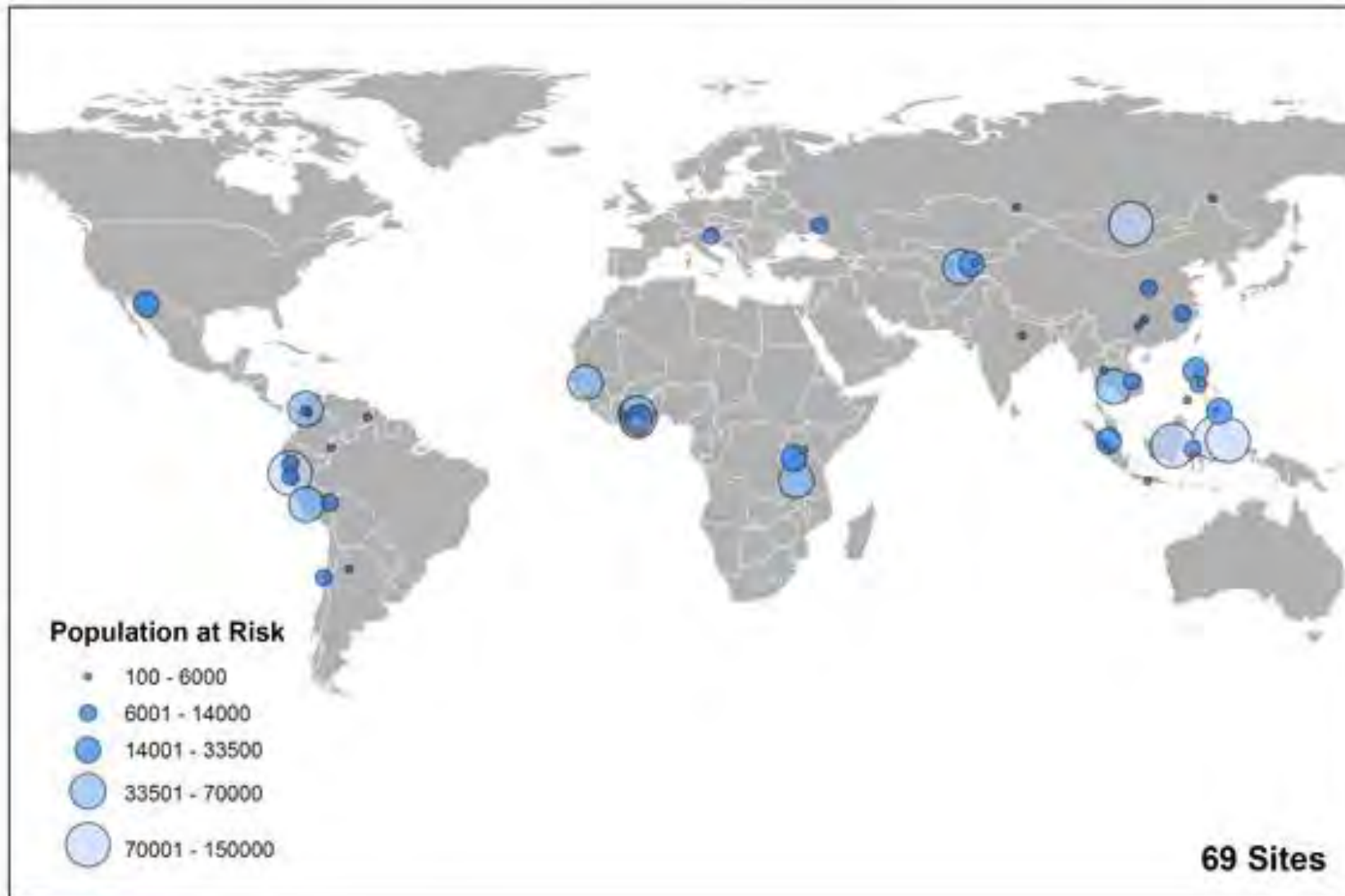


# OVER 16 MILLION ARTISANAL MINERS, IN THE WORLD, ARE INVOLVED IN GOLD EXTRACTION



Seccatore J , Veiga M , Origliasso C , Marin T , and De Tomi G (2014) An estimation of the artisanal small-scale production of gold in the world. *Sci Total Environ.* 496: 662-667.

# MERCURY IN MINING AREAS



# PRODUCCIÓN MUNDIAL DE MERCURIO



<b>CHINA</b>	<b>1,600 TONs</b>
<b>MÉXICO</b>	<b>100 o más</b>
<b>KYRGYZSTAN</b>	<b>100</b>
<b>OTROS</b>	<b>180</b>

# ARTISANAL MINING OF MERCURY



The ore is collected from the mines, it is crushed, screened and then heated in a furnace; mercury is obtained once the vapors generated in the furnace are cooled.



**Burning occurs in the mine area.**



# AND IN THE BACKYARDS



18 12:14 PM



# ABANDONED MINES





**SALUD TOXICOLÓGICA PARA OCUPACIONES PRECARIAS**



SALUD TOXICOLÓGICA PARA OCUPACIONES PRECARIAS

**Community-Based**

**Habilitation**

**Intervention**

**Legislation**

**Development**



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**Community-Based**

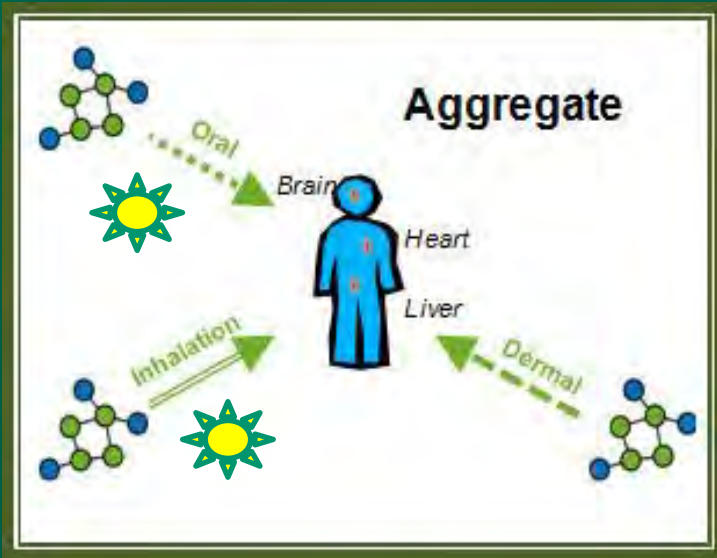
**Habilitation**

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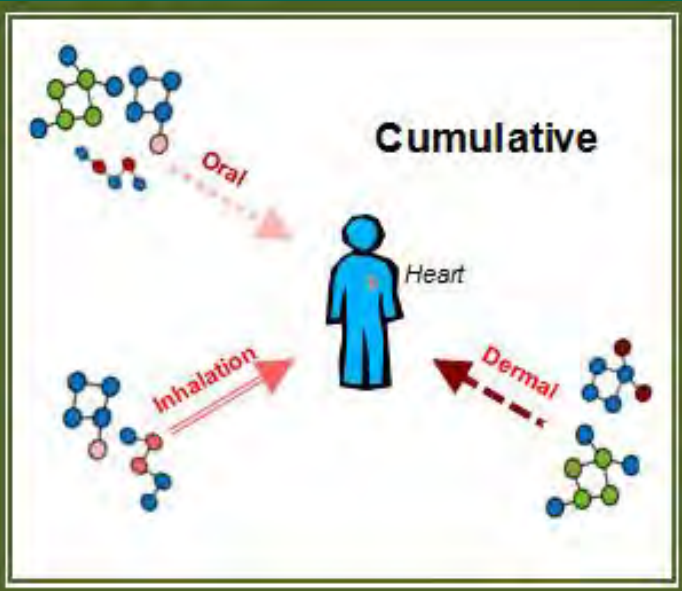
**Spring Water**



**Air Particles**



**Sediments**



(mg/kg)	Mn	As	Hg	Pb
MINERAL	217	21	2586	9
CALCINE 1	250	633	13	8
CALCINE 2	236	683	8	9
CALCINE 3	200	678	7	9
CALCINE 4	205	509	5	9



**PAHs + HCB**



## ACCIDENTS



## CHILD LABOR

## THREATS

- Poverty
- Medical Services
- Education
- Unemployment

**Table 1. Mercury Levels in Environmental Samples in Plazuela (mg/kg)**

<b>Grupo</b>	<b>Domestic Soil</b>	<b>Sediments</b>	<b>Contaminated Area*</b>
<b>N</b>	7	5	4
<b>Mean</b>	791	9,004	5,231
<b>Minimum</b>	29	107	3,979
<b>Percentil 25</b>	79	166	4,103
<b>Median</b>	256	1,239	4,541
<b>Percentil 75</b>	915	21,724	7,050
<b>Maximum</b>	3,493	33,589	7,864

**\*Contaminated Area is the area where the rotary kylv used to be. Mexican Guideline for Residential Areas: 23.0 mg/kg**



**Table 2. Urinary Mercury Levels in Individuals Living in Plazuela ( $\mu\text{g/g Cr}$ )**

<b>Group</b>	<b>Miners</b>
<b>N</b>	8
<b>Mean</b>	54
<b>Minimum</b>	11
<b>Percentil 25</b>	17
<b>Median</b>	53
<b>Percentil 75</b>	70
<b>Maximum</b>	144
<b>Action Level</b>	25
<b>Risk Level</b>	35



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**UNIVERSITIES**



**CHEH MEXICAN NETWORK**



**TECHNICAL  
GROUPS**



**LABs**

**MINERS**



**WOMEN**



**COMMUNITY  
GROUPS**



**ADOLESCENTS**



**LICENCIATURA EN  
CIENCIAS AMBIENTALES  
Y SALUD**



**ENFERMERAS  
ARCOIRIS**



**COMUNIDAD**



**NEW HEALTH PROFESSIONAL**

**E – HEALTH  
PROGRAM**

**e-TOX**



**COMMUNITY CENTER  
FOR CHILDREN ENVIRONMENTAL  
HEALTH PROGRAMS  
“LA CASITA”**



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**CAPACITY-BUILDING**



**RISK COMMUNICATION**



**POTABLE WATER**



**632**

**ENVIRONMENTAL SURVEILLANCE**

## ENVIRONMENTALLY FRIENDLY TECHNOLOGIES





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# NATIONAL ACTION PLAN

# MINAMATA CONVENTION

**UNEP**  
Division of Technology, Industry and Economics  
Chemicals Branch  
International Environment House 1  
Chemin des Anémones, 11-15  
CH-1219 Châtenay, Geneva  
Switzerland  
Tel: +41 (0)22 917 12 35  
Fax: +41 (0)22 797 85 85  
Email: [unep@unep.org](mailto:unep@unep.org)  
Web: [www.unep.org/chemicals](http://www.unep.org/chemicals)

# MERCURY

# ACTING NOW!

[www.unep.org](http://www.unep.org)  
United Nations Environment Programme  
P.O. Box 95528 • 20090 Nairobi, Kenya  
Tel: +254 20 762 1229  
Fax: +254 20 762 1927  
Email: [unep@unep.org](mailto:unep@unep.org)  
[www.unep.org](http://www.unep.org)



Job Number: DTI/12/1012



SALUD TOXICOLÓGICA PARA OCUPACIONES PRECARIAS

**Community-Based**

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**Development**

# TECHNOLOGY

**Au,  
Hg,  
etc**

**MINING**

**FORMAL  
SECTOR**

**environmentally sound**

~~TECHNOLOGY~~

**Au,  
Hg,  
etc**

**MINING**

**FORMAL  
SECTOR**

**INFORMAL  
SECTOR**

**POVERTY**

**LOW TECH**



**OCCUPATIONAL  
RISKS**

**ENVIRONMENTAL  
POLLUTION**

**CHILD LABOR**

**CHILD SETTINGS**

~~TECHNOLOGY~~

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**EXPOSURE**

**HEALTH EFFECTS**



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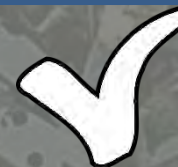
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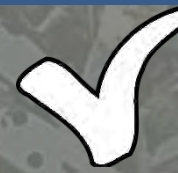
**CUMULATIVE**

**HEALTH EFFECTS**

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**TECHNOLOGY**



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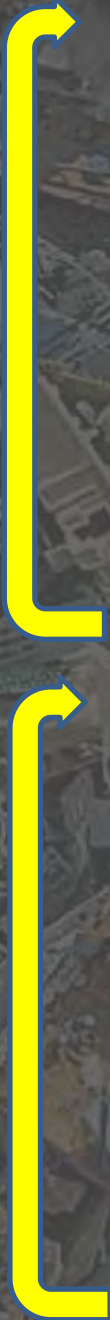
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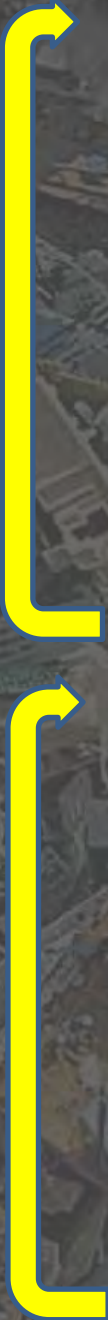
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# Conference on Compatible Mining

Latin American Conference on Compatible Mining: Protecting Vulnerable Populations and the Surrounding Environment  
San Luis Potosi, Mexico on September 8-10, 2014



**COMMUNITIES**

**HUMAN  
DEVELOPMENT**

**BIOTA**

**PROTECTION**



**MINERIA COMPATIBLE**

**MINING**

**MORE FORMAL**

**ENVIRONMENT**

**SURVEILLANCE**

**THEY NEED NEW ALTERNATIVES  
2015 MINAMATA 2030**





## NATURAL RESOURCES



## BIODIVERSITY



## NEURODEVELOPMENT



## FOOD SECURITY

[fdia@uaslp.mx](mailto:fdia@uaslp.mx)



Frida Kahlo. El Abrazo de Amor del Universo, la Tierra (México)

**FERNANDO**

**STOP**

**STOP**

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