



# Mercury pollution in India: Emissions, current data and future plans

September 10, 2013

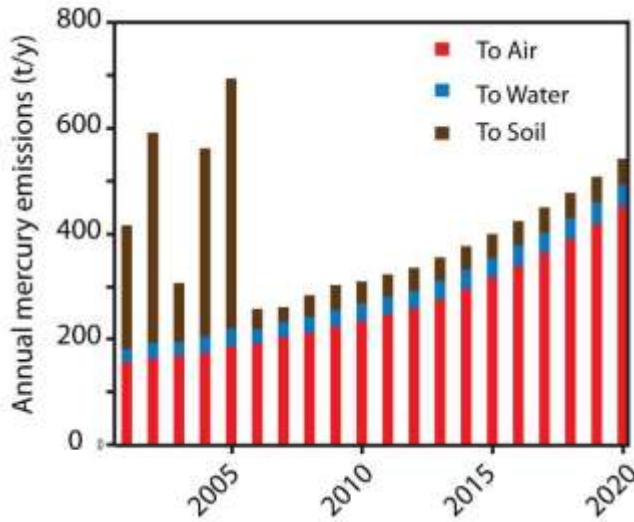
Asif Qureshi,

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## India

- Major mercury emitter
  - Increased energy demands. = more coal
  - Increased metal production
  - Consumer products: health care, personal, household and electronic goods

## Emissions projections



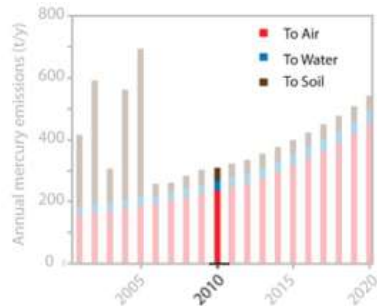
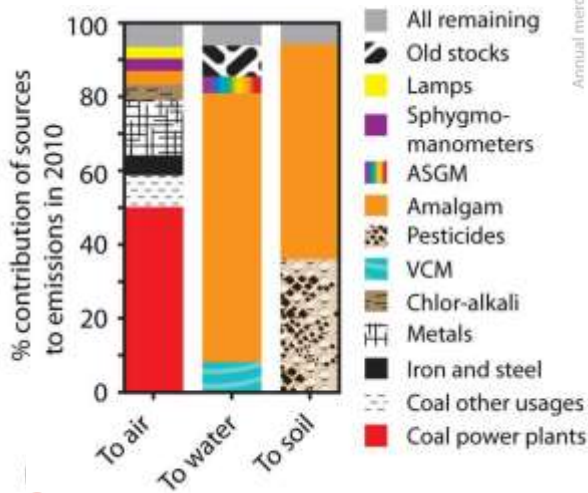
(estimates from a material flow analysis)



Chakraborty et al. (2013) *Environ. Sci. Technol.*, 47,8105-8113.

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## Major sources



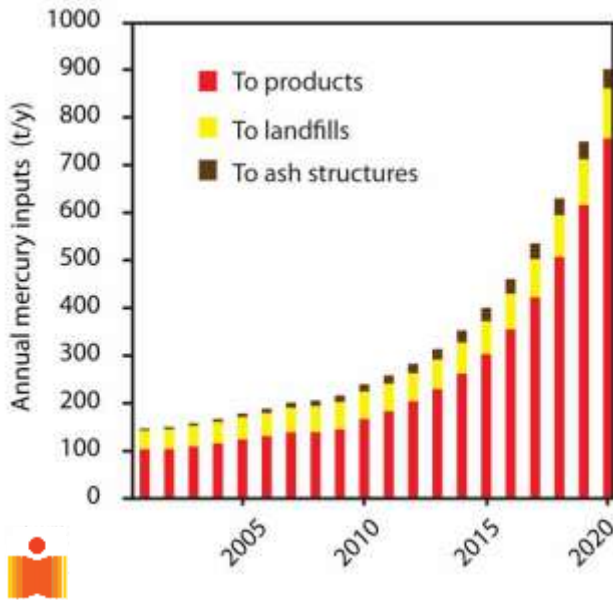
**Note: large uncertainties exist**



Chakraborty et al. (2013) *Environ. Sci. Technol.*, 47,8105-8113.

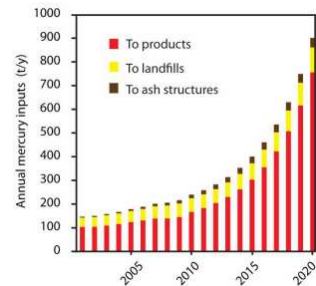
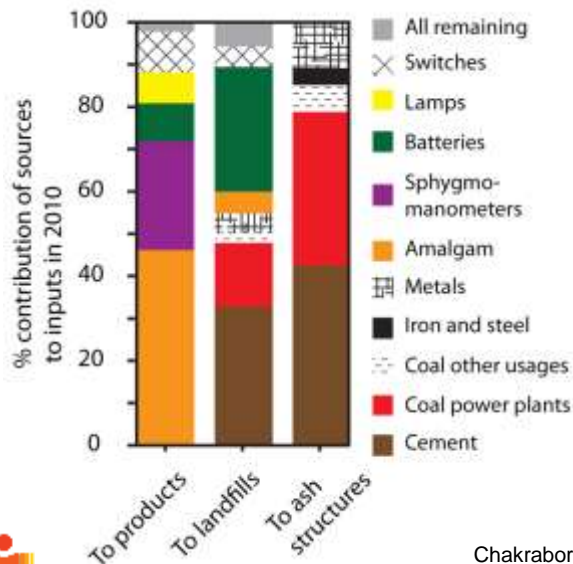
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## Mercury in stocks



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## Mercury in stocks



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## Possible mercury emission locations

Thermal plants



<http://www.mapsofindia.com/maps/india/thermalpowerplants.htm>

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## Possible mercury emission locations

Zinc mines



[www.portal.gsi.gov.in](http://www.portal.gsi.gov.in); <http://www.steelonthenet.com/maps.html>

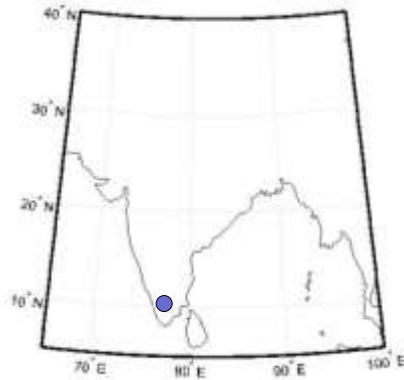
Steel plants



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## Mercury in environmental media: current

- Air:
  - Appears one site only (GMOS) ●

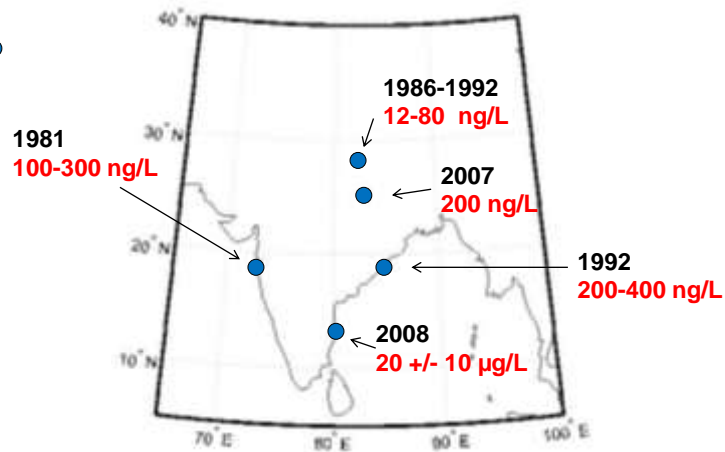


www.gmos.eu

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## Mercury in environmental media: current

- Air:
- Water ●



Zingde and Desai, 1981; Sinha et al 2007; Panda et al 1992; Satpathy et al 2008

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## Mercury in environmental media: current

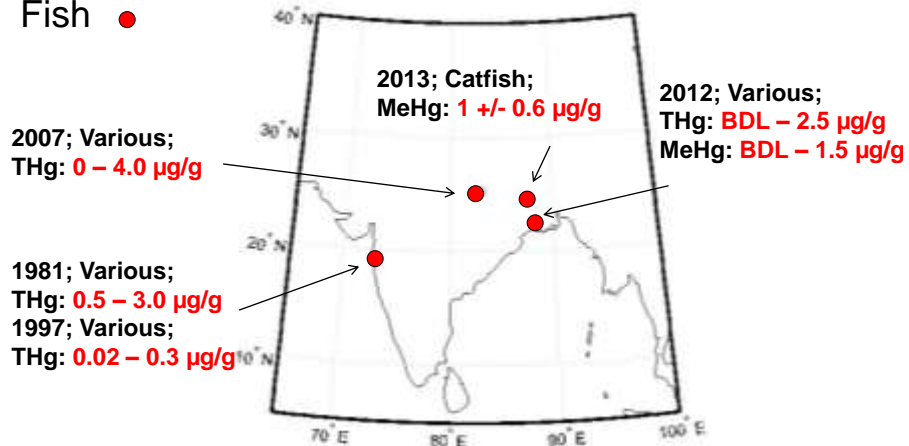
- Air
- Water
- Fish ●

Prevention of Food Adulteration Act (1954)

THg: 0.5  $\mu\text{g/g}$  ww

MeHg: 0.25  $\mu\text{g/g}$  ww

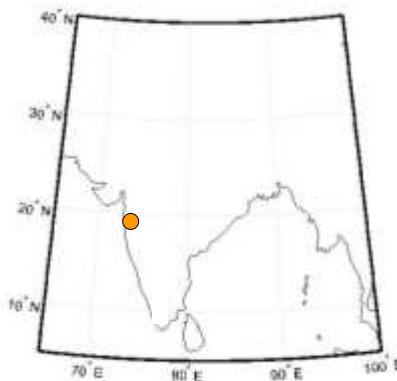
USEPA: 0.3  $\mu\text{g/g}$  alarming



Zingde & Desai, 1981; Sinha et al 2007; Pandit et al 1997; Pal & Ghosh, 2012; Pal et al 2013

## Mercury in humans

- Air:
- Water
- Fish
- Human ●



❖ 6-12 fish meals per week

❖ THg in Hair: 5 - 9  $\mu\text{g/g}$  on average

❖ 20-30% people in some areas have > 10  $\mu\text{g/g}$



## Next: Measure and Model

- Air monitoring: urban & rural ● TGM only
- Biota: coastal ●
- Human ●
  - Priority groups
- Environment: soil, sediments, water ●
- Obtain system understanding



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## Thank you

- VEA, EPAT, USEPA
- Audience