



Global Chemicals Outlook

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**Rachel Massey
Massachusetts Toxics Use Reduction Institute
University of Massachusetts Lowell**



Overview

- **Global Chemicals Outlook: Project description**
- **Topics and Preliminary Findings**
 - Pillar I. Trends and Indicators**
 - Trends in Chemical Production, Use, and Disposal
 - Consequences for Human Health and the Environment
 - Pillar II. Economic Consequences**
 - Pillar III. Instruments and Approaches**



Global Chemicals Outlook Project

- **Steering Committee**

- 12 members from government, academia, industry, and NGOs;
- IGO representatives.

- **Preliminary research**

- Conducted by 3 task forces and synthesized in a Preliminary Global Outlook;
- Final report will provide insight into the relationship between sound chemicals management and broader sustainable development goals.



Pillar I. Trends and Indicators

- Trends in Chemical Production, Use, and Disposal/Recycling
 - Industrial Chemicals
 - Toxic Metals
 - Pesticides
 - Nanomaterials
 - Products containing toxic chemicals



Trends in Production of Industrial Chemicals

- Majority of global production is in OECD countries; however,
- Increasing percentage is shifting to BRICs (Brazil, Russia, India, and China) as well as other countries with economies in transition.



Trends in Production of Industrial Chemicals

- Petrochemicals:

- Previously concentrated in US, Western Europe, and Japan.
- Increased production in oil/gas producing countries and in East & Southeast Asia
- Fastest growing markets are in China, Latin America, and the Middle East

Source: SRI Consulting



Trends in Production of Industrial Chemicals

- Specialty Chemicals

- Examples: Electronic chemicals; Construction chemicals; Coatings; Inks; Adhesives and Sealants; Textile chemicals.
- Trends: Increasing investment in production in India and China.

Trends in Toxic Metals: Lead

- Principal uses (approximately 80% of total) is in batteries for vehicles and power generators. Lead paint also continues to be a significant source of exposure.
- Global consumption has increased around 2.5%/year since 2000. However, the increase has not been uniformly distributed.
 -  17%/year in China
 -  14%/year in other transitional economies
 -  1%/year in developed countries.



Trends in Toxic Metals: Mercury

- Artisanal gold mining; vinyl chloride monomer production; battery production; & chlor-alkali processes
- Coal-fired power plants
- East and Southeast Asia account for about half of global mercury demand, with the European Union and South Asia the next largest users.



Products Containing Toxic Chemicals

- Exposure during use
- Exposure during disposal/recycling
 - Electronic waste
- Difficulties compounded by lack of information





Chemical trends: summary

- Increasing production of, and demand for, chemicals in countries with economies in transition;
- Continuing disposal/recycling of products containing hazardous chemicals in developing and transition countries

Environmental Consequences

- Atmosphere
- Water
- Soil
- Biodiversity



Example: Fisheries

- Important source of protein & economic value
- Accumulation of persistent organic pollutants
- Fish kills from industrial & agricultural run-off
- Disease in fish populations, including cancers & increased vulnerability to infectious agents.



Example: Soil Resources

- Atmospheric deposition, waste dumping, spills, contaminated water, pesticides
- Plants may concentrate toxic substances
- Crops irrigated with wastewater can contain high levels of heavy metals.
- Agricultural chemicals can deplete soil resources
 - Loss of beneficial micro-organisms





Human Health Consequences

- Acute poisonings
- Neurodevelopmental disorders
- Reproductive/developmental disorders
- Birth defects
- Cancer



Acute poisonings

- Estimates include:
 - 1 - 5 million cases of pesticide poisoning per year, with several thousand fatalities
 - Up to 25 million agricultural workers may suffer some form of occupational pesticide poisoning each year.
 - Around 300,000 suicide deaths/year from pesticide ingestion.
- A significant source of illness and death in developing and transition countries.
- In some countries, acute pesticide poisoning may be as serious a public health concern as are communicable diseases.



Human Health Consequences

■ **Neurodevelopmental disorders**

- Examples: IQ deficits, psychomotor retardation, gait & movement disorders, neurobehavioral disorders.
- Neurotoxicants include lead, mercury, PCBs, manganese, brominated flame retardants, toluene, certain pesticides, & others.

■ **Reproductive/developmental disorders**

- Examples: Effects of phthalates on sperm count & motility; male sterility associated with DBCP exposure

■ **Birth defects**

- Examples: oral cleft, heart & central nervous system defects linked to solvent exposures

Chemical Links to Cancer: Examples

Hazardous Material	Cancer Links
Arsenic	<i>Strong:</i> Bladder; Kidney; Lung; Skin; Soft- tissue sarcoma. <i>Suspect:</i> Brain/; Liver, Biliary; Prostate.
Beryllium	<i>Strong:</i> Lung
Cadmium	<i>Strong:</i> Lung. <i>Suspect:</i> Pancreatic.
Chromium	<i>Strong:</i> Lung, Nasal, Nasopharyngeal
Nickel	<i>Strong:</i> Lung, Nasal, Nasopharyngeal. <i>Suspect:</i> Laryngeal, Stomach, Pancreatic.
Metalworking fluids & mineral oils	<i>Strong:</i> Bladder. <i>Suspect:</i> Esophageal.
Asbestos (dust)	<i>Strong:</i> Laryngeal, Lung, Mesothelioma, Stomach
Silica (dust)	<i>Strong:</i> Lung
Talc (dust)	<i>Strong:</i> Lung. <i>Suspect:</i> Ovarian.
Formaldehyde	<i>Strong:</i> Nasal, Nasopharyngeal. <i>Suspect:</i> Leukemia.
Vinyl chloride	<i>Strong:</i> Liver and Biliary, Soft-tissue Sarcoma,
Benzene	<i>Strong:</i> Leukemia, NHL. <i>Suspect:</i> Brain/, Lung, Nasal, Multiple Myeloma.



Pillar II: Economic Implications

- **Costs of Inaction**

- Loss of ecosystem services
- Public health impacts

- **Economic Benefits of Sound Chemicals Management**

- Economic benefits of pollution prevention activities
- Economic benefits from sustainable agriculture
- Benefits of sound chemicals management for risk liability



Pillar III: Instruments & Approaches for Sound Chemicals Management

- Review of policy options
- Costs of implementing policy options are counterbalanced by the economic costs of inaction.
- Support for Sound Chemicals Management strategies can be integrated with economic development assistance.
- Sound Chemicals Management can also be funded through cost internalization schemes.



Thank you

Contact information:

Rachel Massey

Massachusetts Toxics Use Reduction Institute

University of Massachusetts Lowell

Tel. 978-934-3125

Email: rachel_massey@uml.edu





Trends in Toxic Metals: Cadmium

- Primarily used in nickel-cadmium (NiCd) batteries (over 80% percent of demand).
- Major geographic shift
 - Over the period 1995 to 2005, primary production of cadmium increased dramatically in Asia and decreased correspondingly in Europe. Primary production in Asia is now five times the level in Europe.



Trends in Pesticides

- Global pesticide market grew more than 50% from 2003 to 2008.
- Europe is the largest user of pesticides, followed by Asia, with use in Latin America rising rapidly.