IPEN

for a toxics-free future

BRS COP - IPEN Side Event

Plastics and Chemicals Under the Stockholm Convention:

Impact on the ground and potential synergies and gaps in relation to a future plastics treaty

SPEAKERS

With the support of the GENEVA ENVIRONMENT NETWORK

IPEN for a toxics-free future

Thitikorn BOONTONGMAI

Toxic Waste and Industrial Pollution Program Manager, EARTH Thailand

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Niko URHO

Independent Consultant

Karen RAUBENHEIMER

Lecturer, Australian National Centre for Ocean Resources and Security (ANCORS), University of Wollongong

Sverre Thomas JAHRE

Senior Advisor, Department for Marine Management and Pollution Control, Ministry of Climate and Environment, Norway

Lee BELL

Mercury and POPs Policy Advisor, IPEN | Moderator

PLASTICS AND CHEMICALS UNDER THE STOCKHOLM CONVENTION: Impact on the ground and potential synergies and gaps in relation to a future plastics treaty

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Lessons Learnt from 25 years of Working with the Stockholm Convention & Plastics

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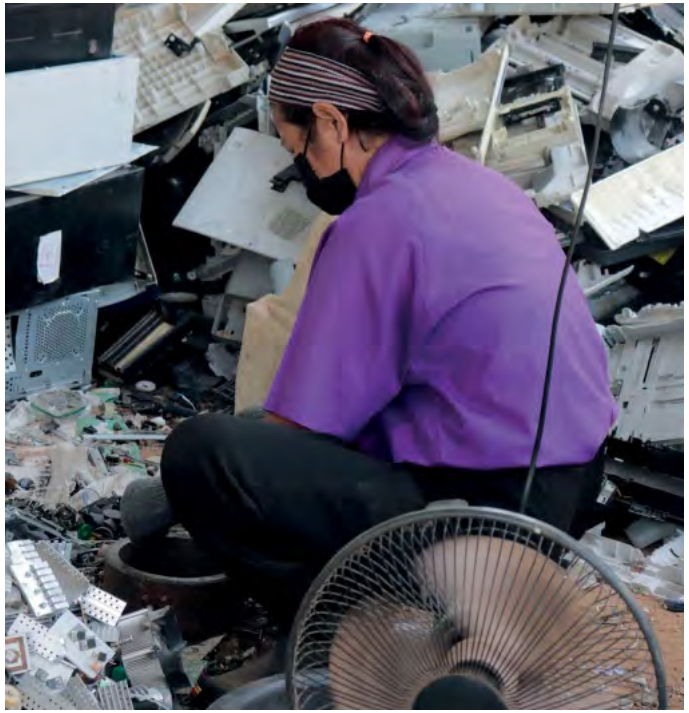

Environmental, Food, and Human Body Burden of Dechlorane Plus in a Waste Recycling Area in Thailand No Room for Exemptions

ALICE DVORSKÁ, JITKA STRAKOVÁ, SARA BROSCHÉ, JINDŘICH PETRLÍK, THITIKORN BOONTONGMAI, NICHCHAWAN BUBPHACHAT, CHUTIMON THOWSAKUL, AKARAPON TEEBTHAISONG, PENCHOM SAETANG, PUNYATHORN JEUNGSMARN

Dechlorane Plus

- a polychlorinated flame retardant
- Used in electrical wire and cable coatings, plastic roofing materials, connectors in TV and computer monitors, and non-plasticizing flame retardant in polymeric systems, such as nylon and polypropylene plastic
- Regrettable substitution for Polybrominated Diphenyl Ethers (esp. DecaBDE) since its listing for global elimination

Dechlorane Plus

- Adverse effects on environment, animals and human health
- Oxidative damage, indications of neurodevelopmental toxicity, potential endocrine disruptor
- Bioaccumulates, and have long range transportation potential
- **Therefore, POPRC recommended its listing in Annex A of the Stockholm Convention this year**
- **But with exemptions for use and production, potentially lasting till 2044**

Materials and Methods

- Samples collected at various stages of e-waste processing

1. **Dismantling of e-waste** in workshops
2. **Sorting and grinding** of waste plastic in shredding workshops
3. **Transportation** of non-utilizable leftovers to a **dumpsite** to be **burned**
4. **Ash** from dumpsite brought back to workshop and processed (again)

E-waste Site in Thailand


EARTH
www.EarthThailand.org
Photo by Karnt Thassanaphak


EARTH
www.EARTHthailand.org
Photo by KARNT Thassanaphak


EARTH
www.EarthThailand.org
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Samples Collected

1. Dust
2. Soil
3. Sediment
4. Ash
5. Waste (shredded plastic pieces)
6. Rice
7. Fish
8. Snail
9. Crab
10. Eggs
11. Blood serum

Control Site

- Environmental samples and foodstuff collected from organic farm with **no e-waste activity** nearby
- Blood samples collected from farmers working in or living in the same village as the farm – **none has done e-waste recycling**
- Control eggs bought from supermarkets in another area

Results

	Unit	N	> LOQ	min	max	median	mean
Dust	ng/g dry matter	22	95 %	0.005	108	10.2	18.8
Soil	ng/g dry matter	9	56 %	0.005	4.9	0.08	0.80
Sediment	ng/g dry matter	2	100 %	0.24	15.4	7.8	7.8
Ash	ng/g dry matter	1	100 %	1.7	1.7	1.7	1.7
Waste	ng/g	2	0 %	0.005	0.005	0.005	0.005
Rice	ng/g	1	0 %	0.005	0.005	0.005	0.005
Fish[1]	ng/g	7	86 %	0.002	0.10	0.02	0.04
Snails[2]	ng/g	4	75 %	0.002	0.03	0.01	0.02
Crabs[3]	ng/g	3	0 %	0.002	0.002	0.002	0.002
Eggs	ng/g lipid	7	71 %	0.15	12.6	0.97	3.9
Blood	ng/g lipid	40	85 %	0.30	89.30	7.27	12.57

N – number of samples

> LOQ – samples with concentrations above LOQ

[1]Climbing perch, climbing gourami (*Anabas testudineus*), Broadhead catfish (*Clarias macrocephalus*), Nile Tilapia (*Oreochromis niloticus*)

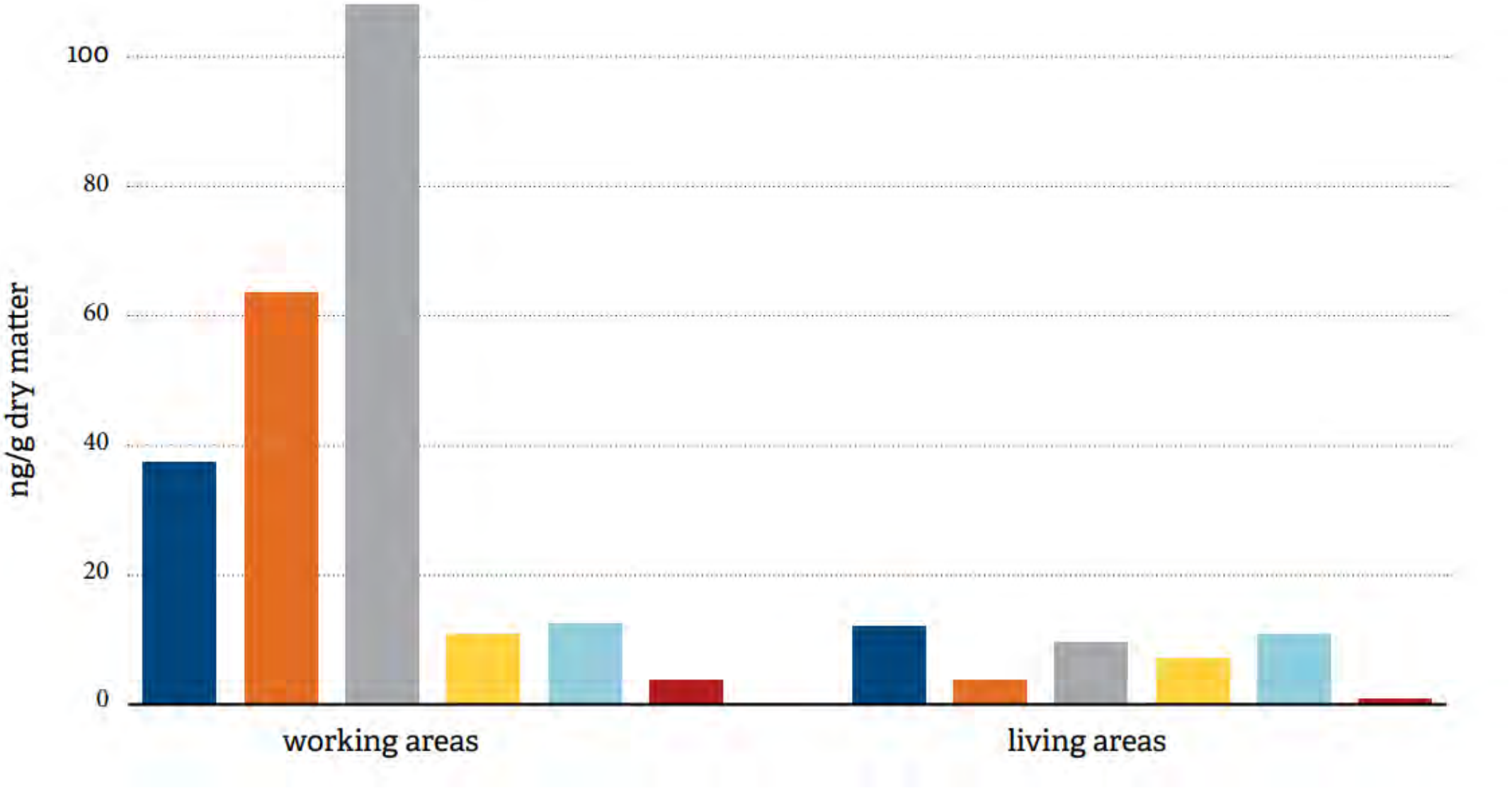
[2]Apple snail (*Pomacea canaliculata*)

[3]Thai rice field crab (the genus *Esanthelphusa* could be identified)

Environmental Samples

- **E-waste dismantling/ recycling** are a source of Dechlorane Plus in household dust
- Dechlorane Plus was detected in the dust of a workshop that stopped e-waste operations 10 years ago

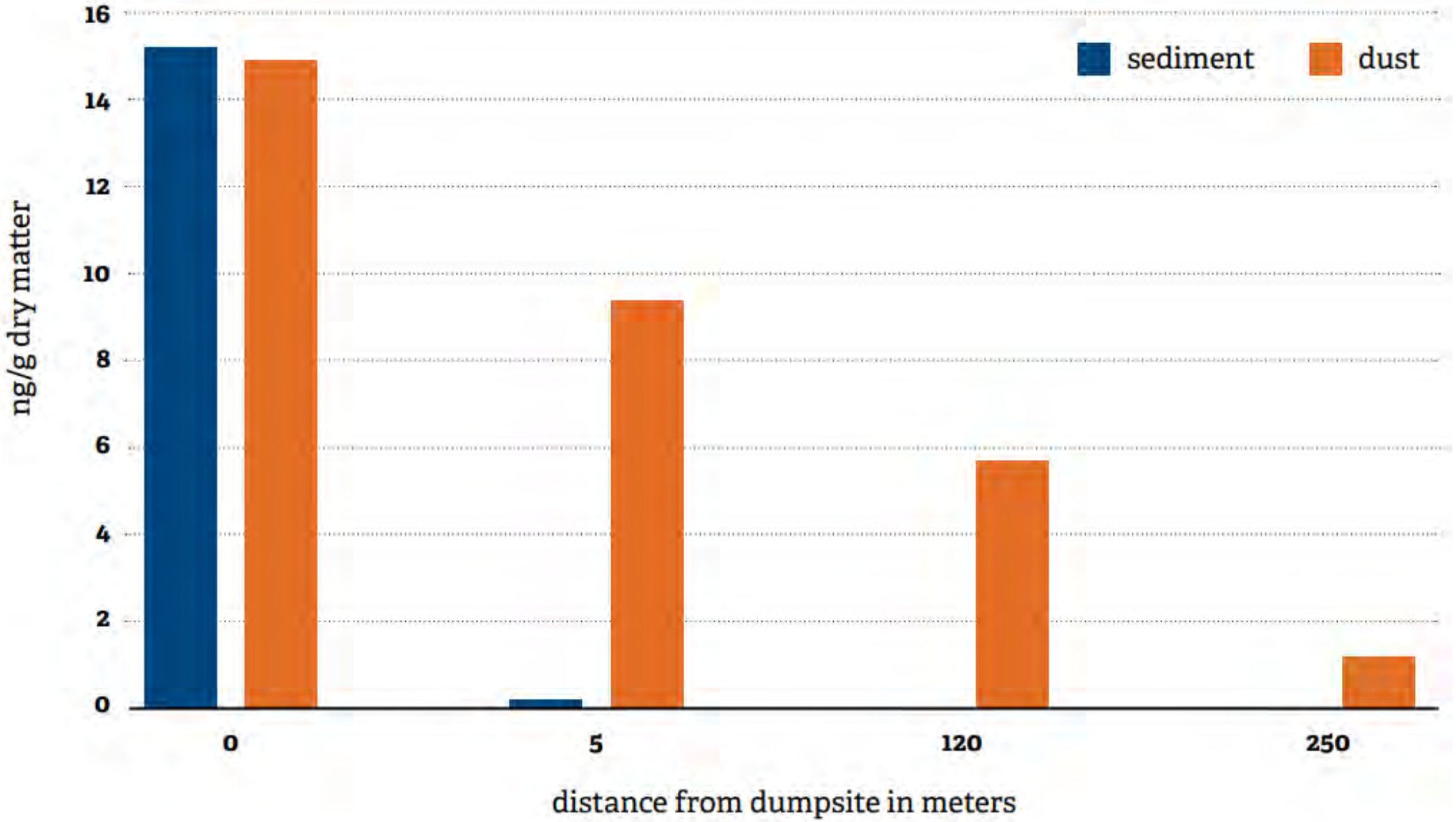
Difference in concentration of Dechlorane Plus in dust of working areas and living areas of e-waste workers



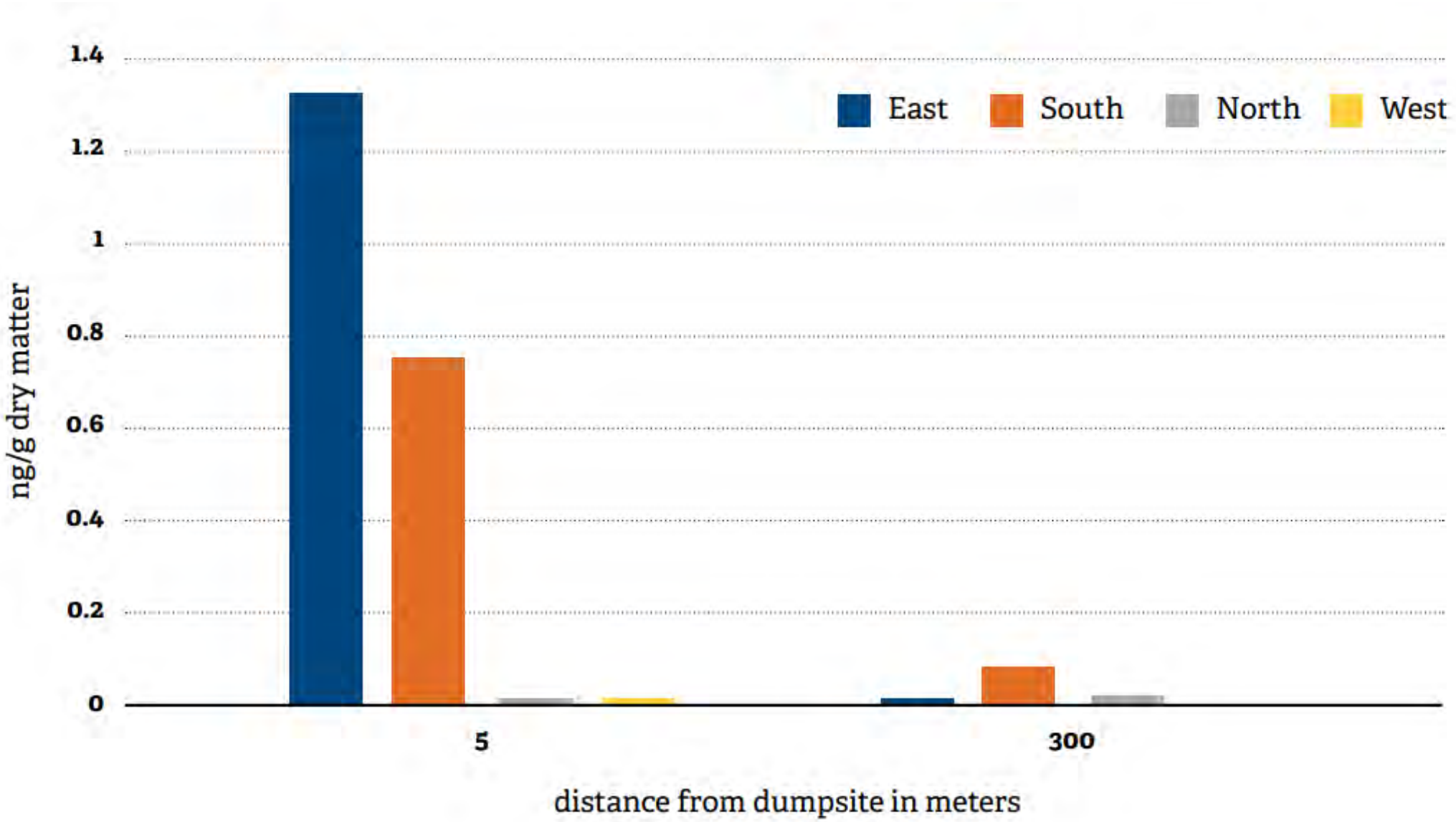
Environmental Samples

- Transport, storage, and shredding of various types of **plastic residues** is a source of Dechlorane Plus contamination of the outdoor environment
- The **dumpsite and the traffic of waste** associated with it is a source of contamination of Dechlorane Plus in the surrounding environment

Reduction in concentration of Dechlorane Plus in sediment and dust as distance from dumpsite increases



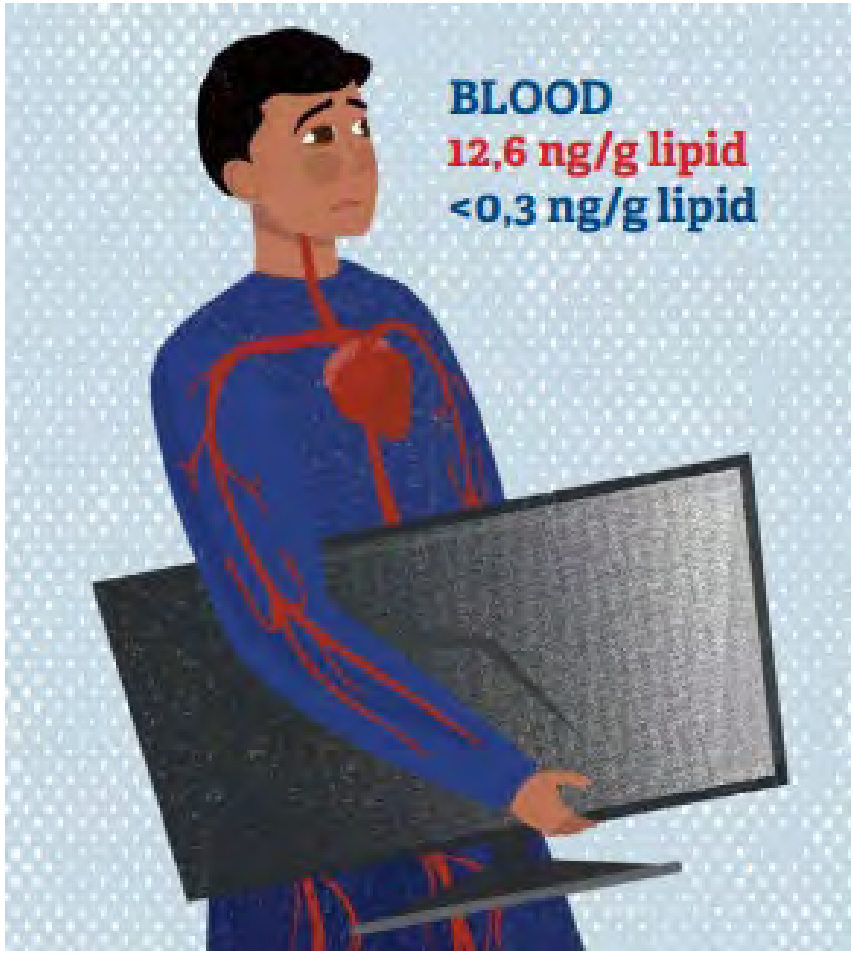
Reduction in concentration of Dechlorane Plus in sediment and dust as distance from dumpsite increases



Foodstuff

- The dumpsite might be a source of contamination of foodstuff in surrounding areas, i.e., snail and fish
- E-waste and End-of-Life-Vehicles recycling are a source of dechlorane plus contamination in chicken eggs

Worker's Blood



- Control group: 1 out of 26 has Dechlorane Plus in blood serum exceeding LOQ
- **E-waste workers: 34 out of 40 (85%) has Dechlorane Plus in blood serum exceeding LOQ**
- **The results of our study clearly link Dechlorane Plus levels in Thai e-waste workers with recycling activities in their communities**

Sources and levels of Dechlorane Plus exposure to workers in the recycling sector in northeastern Thailand compared to background concentrations

APPLE SNAIL
0,02 ng/g
<0,01 ng/g

FISH
0,04 ng/g
<0,01 ng/g

SOIL
0,8 ng/g d.w.
<0,01 ng/g d.w.

RICE
<0,01 ng/g
<0,01 ng/g

BLOOD
12,6 ng/g lipid
<0,3 ng/g lipid

SEDIMENT
7,8 ng/g d.w.
<0,01 ng/g d.w.

ASH
1,7 ng/g d.w.
<0,01 ng/g d.w.

DUST
18,8 ng/g d.w.
<0,01 ng/g d.w.

EGGS
1,7 ng/g lipid
<0,3 ng/g lipid

CRAB
<0,003 ng/g

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ARNIKA

Conclusion

- Continued use of Dechlorane Plus will continue the exposure of e-waste workers in Thailand and other places to this dangerous chemical
- It is time to list Dechlorane Plus in Annex A with no exemptions
- Labeling of products that contain Dechlorane Plus so that Parties can identify these substances in products and wastes and fulfill requirements under Article 6

Thank You

www.earththailand.org/en/
facebook.com/EarthEcoAlertEn

https://ipen.org/
facebook.com/ToxicsFree

facebook.com/arnikaEN
arnika.org/en/

PLASTICS AND CHEMICALS UNDER THE STOCKHOLM CONVENTION: Impact on the ground and potential synergies and gaps in relation to a future plastics treaty

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Lessons learnt from 25 years of working with the Stockholm Convention and Plastics

Therese Karlsson, Ph.D.

Science and Technical Advisor IPEN

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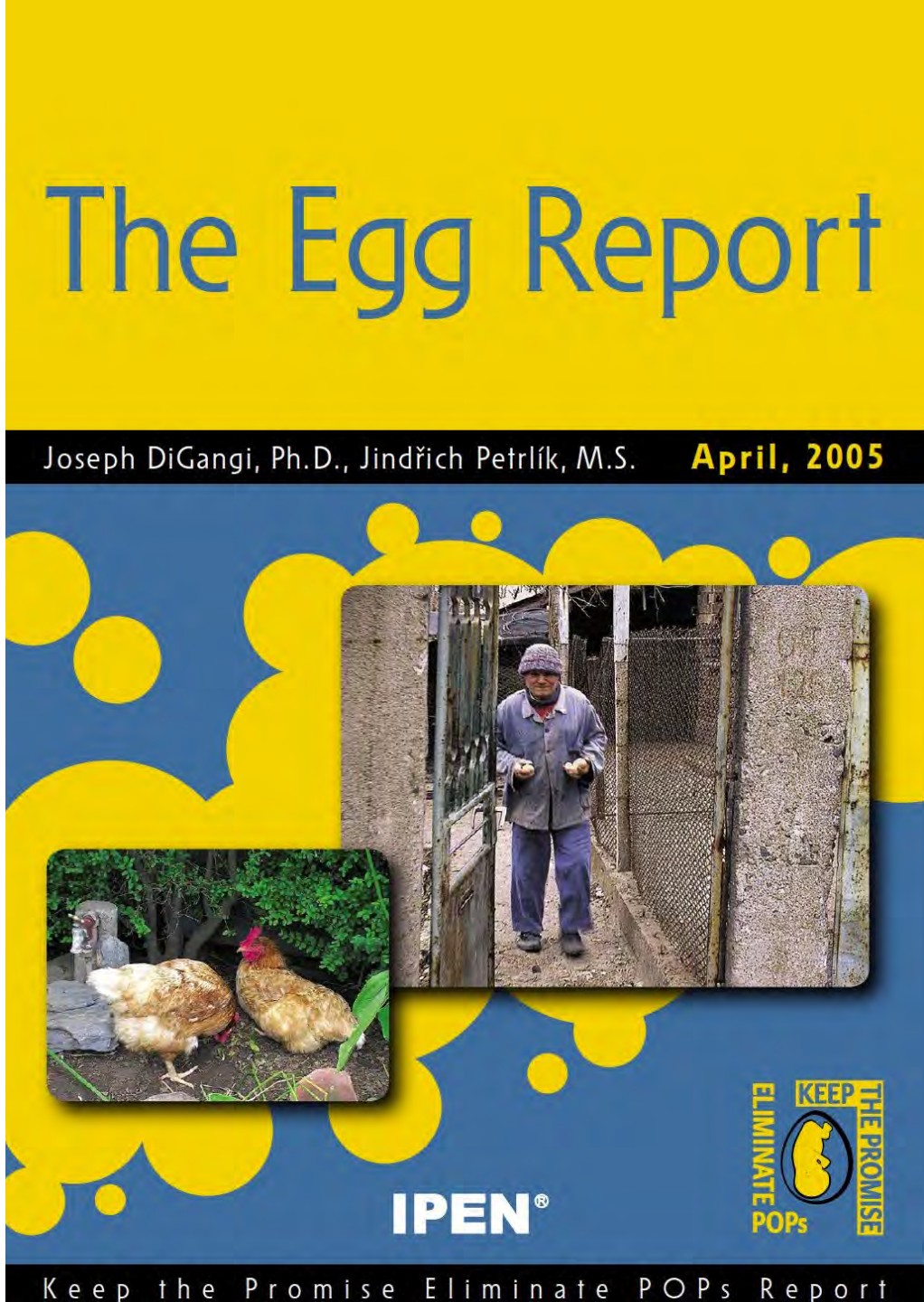
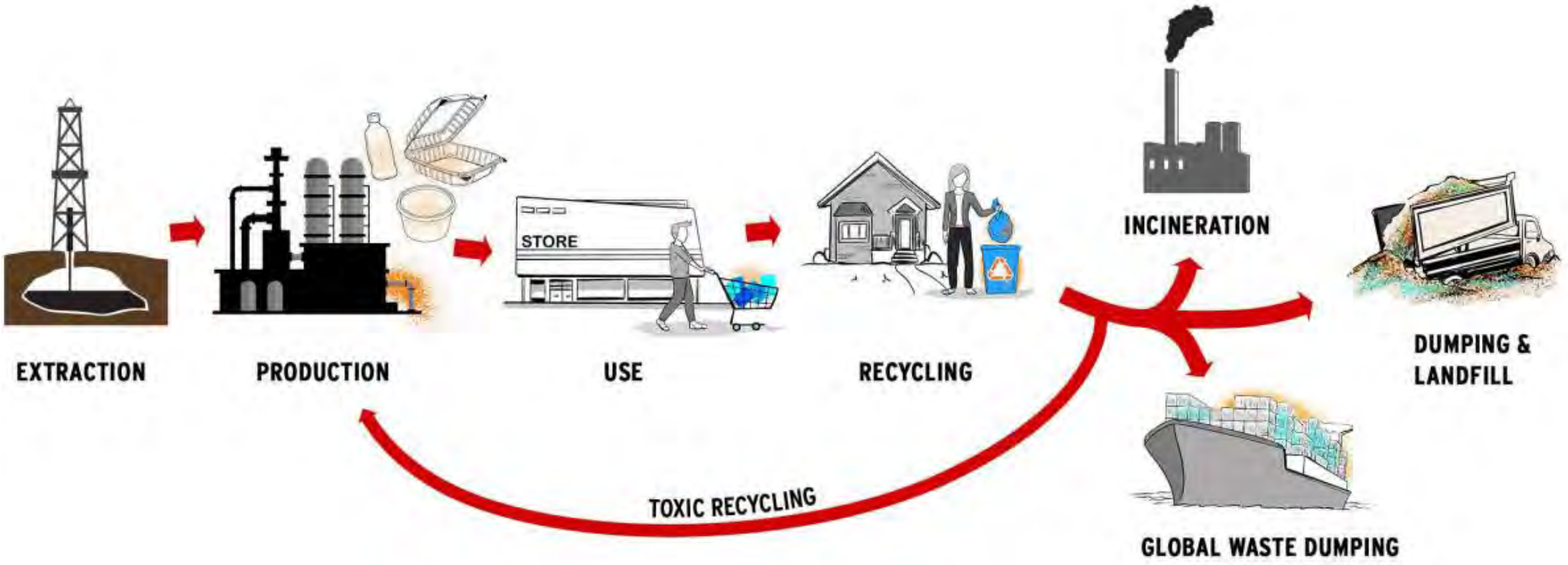
Plastics are transporting toxic chemicals into the food chain




STORE
EXTRACTION
PRODUCTION
USE
RECYCLING
INCINERATION
DUMPING &
LANDFILL
TOXIC RECYCLING
GLOBAL WASTE DUMPING

Plastic pellets from all sampled locations contained PCBs and UV-328

Plastics are transporting toxic chemicals globally – even before the plastics becomes plastic products.

78% of all samples contained Bisphenol A (BPA)

14/23 products labelled BPA-Free contained BPA

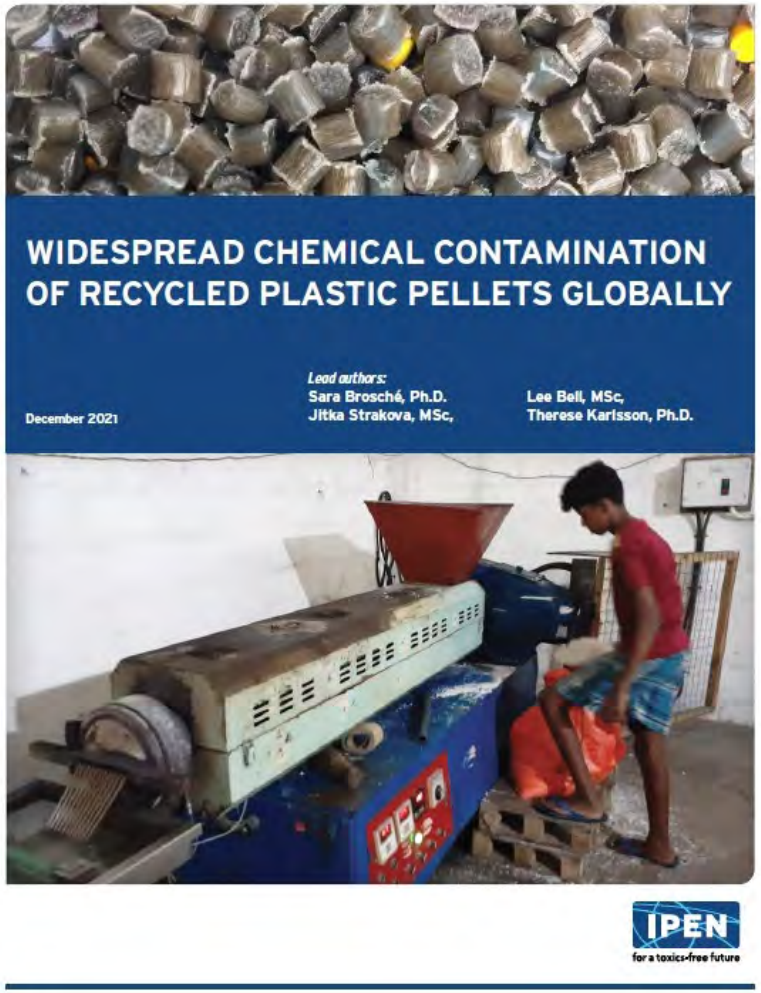
Bisphenol A leaching from polycarbonate baby bottles into baby food causes potential health issues

Author information ▶ Article notes ▶ Copyright and License information ▶

Ga Won Jeon, MD, PhD

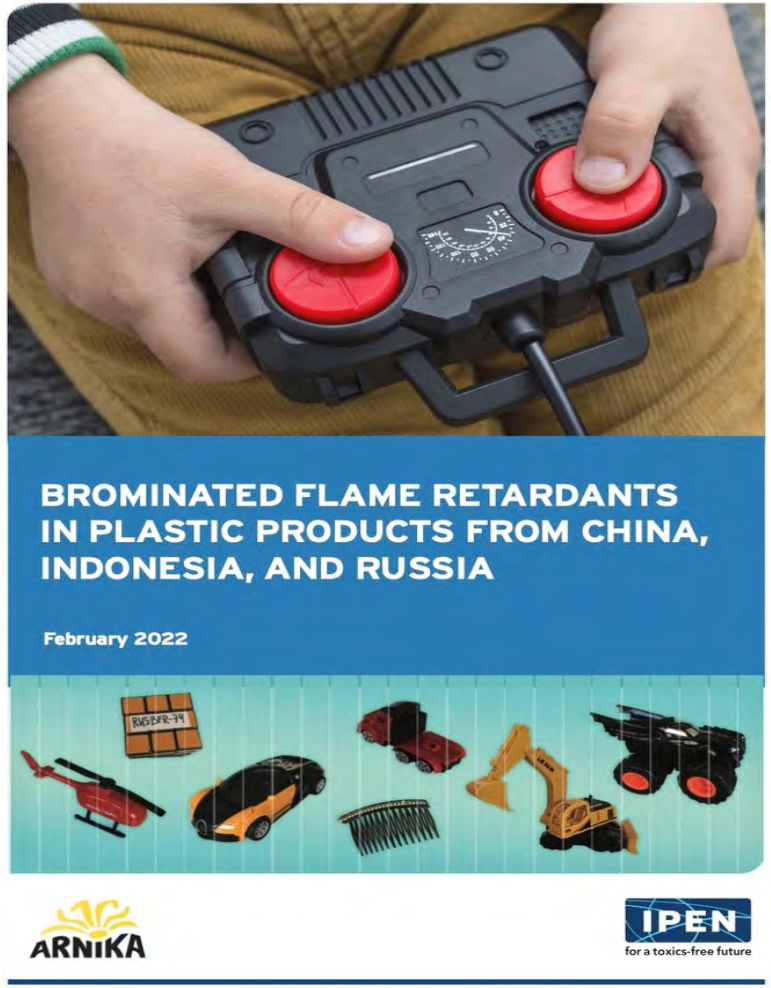
Clinical and Experimental Pediatrics 2022;65(9):450-452.
Published online: July 25, 2022
DOI: https://doi.org/10.3345/cep.2022.00661

Plastics are transporting toxic chemicals into our homes and our bodies with very limited controls and no transparency



Of 24 samples: 22 had Brominated flame retardants

22 had BPA, 24 had benzotriazole UV stabilizers (17 had UV-328)



All analyzed toys contained Brominated flame retardants. 72/73 contained DecaBDE


When plastics that contain toxic chemicals are recycled they are transporting those chemicals into new products

Original Article | Published: 20 July 2021

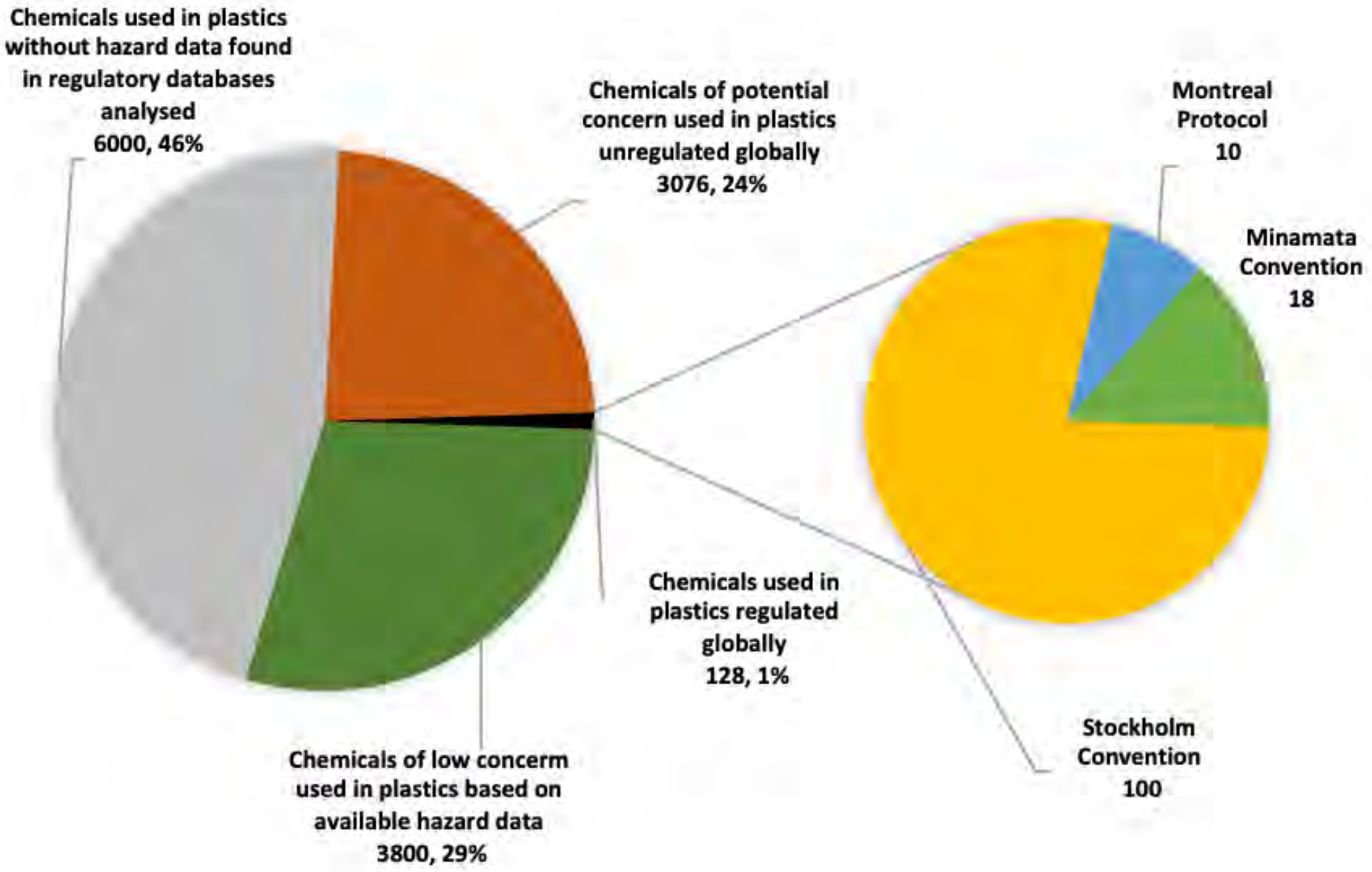
Worker health risk of heavy metals in pellets of recycled plastic: a skin exposure model

Guozhong Huang, Jiaying Xie ✉, Tao Li & Peipei Zhang

International Archives of Occupational and Environmental Health **94**, 1581–1589 (2021) | Cite this article

“found clear exposure-risk associations between heavy metals (lead, cadmium, chromium, arsenic) and worker health. Particularly, we found workers exposed to As and Cr were more likely to incur cancer.”

Plastics are transporting toxic chemicals into the environment, into our food and into us.


Chemicals used in plastics without hazard data found in regulatory databases analysed 6000, 46%
Chemicals of potential concern used in plastics unregulated globally 3076, 24%
Chemicals used in plastics regulated globally 128, 1%
Chemicals of low concerm used in plastics based on available hazard data 3800, 29%
Montreal Protocol 10
Minamata Convention 18
Stockholm Convention 100


GLOBAL GOVERNANCE OF PLASTICS AND ASSOCIATED CHEMICALS
2023
SECRETARIAT OF THE BASEL, ROTTERDAM AND STOCKHOLM CONVENTIONS
UN environment programme

Chemicals currently under evaluation

	Used in plastics	Regrettable substitute for previous listings
Methoxychlor		Replaced DDT
UV-328	x	
Dechlorane Plus	x	Replaced DecaBDE
Medium chained chlorinated paraffins	x	Replaced short chained chlorinated paraffins
Chlorpyrifos	(x)	
Long-chained PFCAs	x	

1st May: Got listed with no exemptions!

Examples of chemical groups that could be prioritized

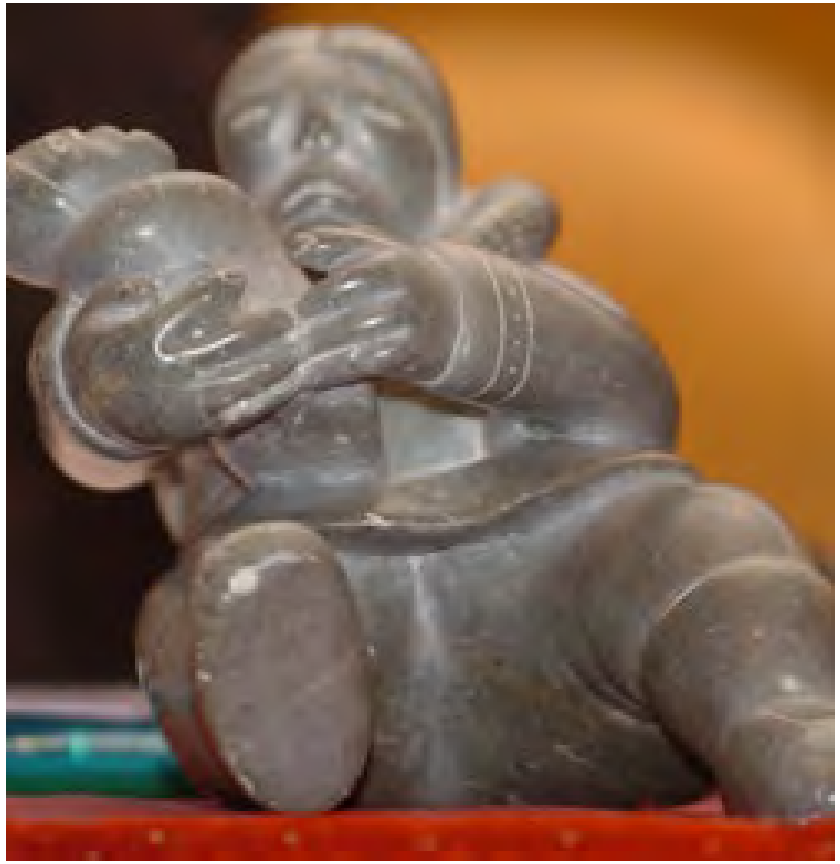
- Chlorinated paraffins
- PFAS
- Bisphenols
- Brominated flame retardants
- Dioxins
- Phtalates
- Benzotriazole UV-stabilizers
- And more…

Key Elements of the Stockholm Convention

- Global, legally binding mechanism to eliminate the world's most dangerous chemicals
- Focus is on elimination rather than managing risk
- Provisions for addition of new chemicals beyond initial list of twelve
- Identification and inventory of contaminated sites for clean up
- Effectiveness evaluation
- Based on the precautionary principle

The Language of the Stockholm Convention

- "Aware of the health concerns…in particular **impacts upon women and children and, through them, upon future generations."**
- "Conscious of the need for **global action**…"
- "Acknowledging that **precaution underlies the concerns of all the Parties and is embedded within this Convention…" protect human health and the environment…"**
- "Determined to
- "Acknowledging that the **Arctic ecosystems and Indigenous communities are particularly at risk…**"



The protection of human health and the environment should be reflected **throughout** the control measures of the Plastics Treaty

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Opportunities for restricting chemicals and polymers of concern in plastics

IPEN side event | BRS COPs | Geneva | 4th May 2023

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AUSTRALIA

Restricting chemicals and polymers of concern

- Underlying mechanisms
- Number of chemicals and polymers in plastics
- Identifying and listing chemicals of concern
- Existing criteria for prioritization
- Grouping of chemicals approach
- Hazard- or risk-based approach
- Transparency
- Scientific mechanism
- International sustainability criteria

Underlying mechanism of the agreement

International sustainability criteria

Hazard criteria for chemicals and polymers

(Global instrument, annexes, guidelines)

nordicreport2020.com

Meet WTO definition of ‘international standard’

Trade measures

(Global instrument, domestic)

Restrict domestic market based on sustainability criteria, develop market-based instruments

ESM of wastes

(Waste hierarchy)

Basel Convention – proximity principle, trade

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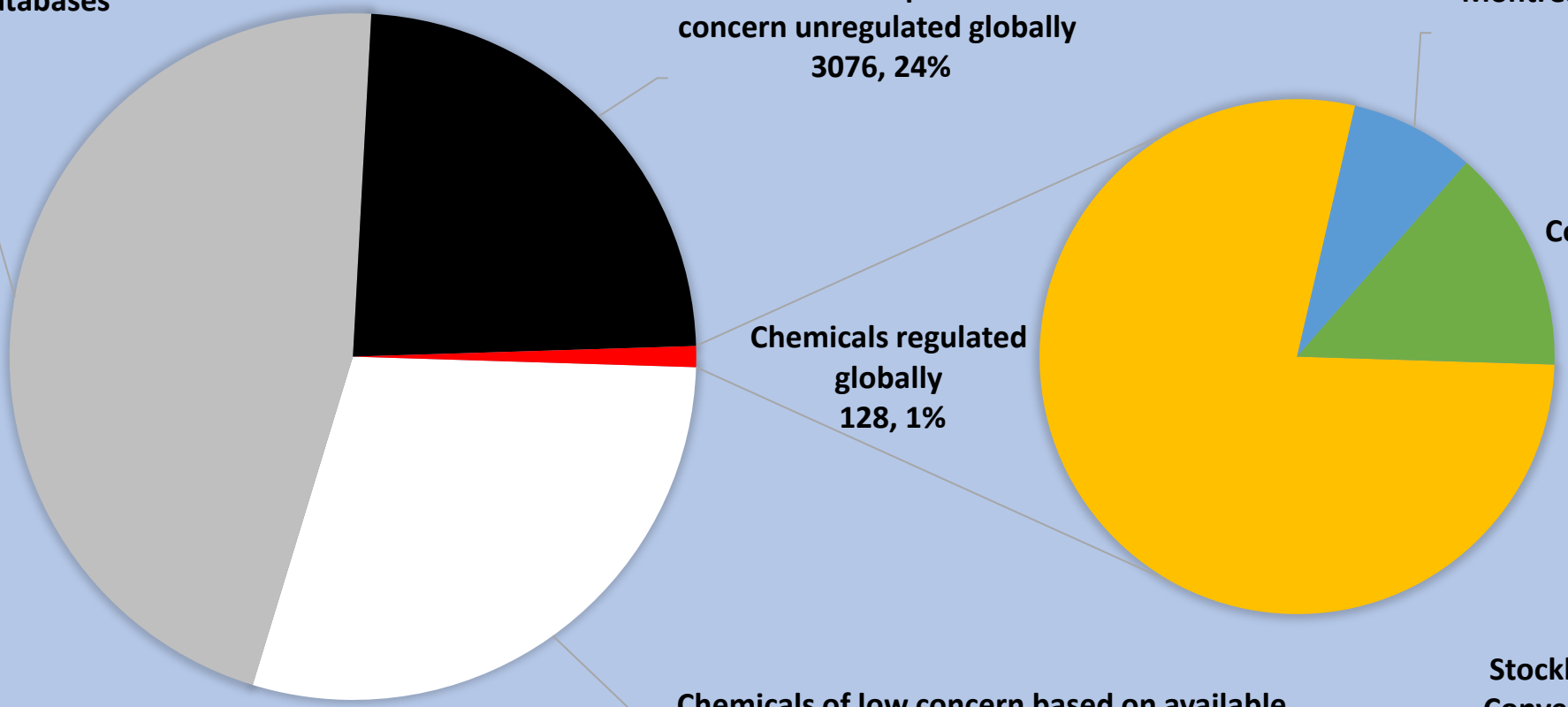
Number of chemicals used in plastics



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Number of chemicals used in plastics

Category	Number	Share
No hazard data	6000	46%
Regulated	128	1%
Unregulated	3076	24%
Low concern (based on existing hazard data)	3800	29%

Number of polymers of concern

- The number of polymers of concern has not been properly assessed
- According to one estimate:
  - there could be 200,000 polymers used in plastics
  - from which 30,000 could be hazardous (many not used in plastics)
- Lack of information on polymer identities hinders their hazard assessment

MEAs with control measures to restrict production and use of plastics-related chemicals

Stockholm Convention	Montreal Protocol	Minamata Convention
• Prohibits &/or restricts use of listed POPs, some of which are used, among others, as additives in plastics (e.g., as flame retardants, plasticizers, or surfactants) • Restricts releases of unintentional POPs deriving, inter alia, from open burning of waste & waste incinerators	• Prohibits use of controlled substances (ODSs & HFCs), including their use as blowing agents in production of extruded polystyrene & polyurethane foams • Provides exemption for use of controlled substances as process agents & feedstocks	• Restricts use of mercury & mercury compounds in production of polyurethane using mercury-containing catalysts & in vinyl chloride monomer production

Approaches for identifying and listing chemicals

Negative (black) list "Stockholm Convention model"	**Negative (black) list** "Rotterdam Convention model" (adapted)	**Positive (white) list** "London Protocol model"	**Hybrid approach**
• Hazard and risk criteria are used by a scientific committee to provide recommendations for listing by the COP	• Presence of a chemical in regulatory lists from two UN regions could trigger listing • Large portion of chemicals would directly qualify for listing • Moderate workload	• The use of safe chemicals is allowed if approved by a scientific body and listed in a positive list • Could be narrowed to specific applications (e.g. food contact materials and toys)	• Could include a black, and white list, and even a gray list • Mechanism is needed for needed for moving chemicals from one list to another
• Data on exposure is scarce • Could lead to duplication of work or undermine the work of existing scientific bodies	• Countries and regions with limited data on chemicals could be underrepresented • Ad hoc nature of listing problematic	• May lead to regrettable substitution as it is not commonly based on groups of chemicals • High risk for white listing of hazardous chemicals	

Overview of existing criteria for prioritization

Chemicals of concern (MEAs)

- Persistent organic pollutants (POPs)
- Mercury & mercury compounds
- Ozone depleting substances (ODSs)
- Hydrofluorocarbons (HFCs)

Chemicals of concern (SAICM)

- Persistent, bioaccumulative and toxic substances (PBTs)
- Very persistent & very bioaccumulative (vPvB) substances
- Chemicals that are carcinogens or mutagens or that adversely affect, among other things, the reproductive, endocrine, immune or nervous systems
- Persistent organic pollutants (POPs)
- Mercury & other chemicals of global concern chemicals
- Produced or used in high volumes
- Those subject to wide dispersive uses
- Other chemicals of concern at the national level

Polymers of concern (OECD)

- Molecular weight
- Oligomer content
- Reactive functional groups
- Metal content
- Extractivity/solubility in water
- Cationic charge density
- Stability/degradability
- Chemical structure classes
- Hazard classifications
- Fluorinated polymers
- Water absorption
- Unreacted monomers
- Surface activity
- Lipophilicity
- Particle size/respirability
- Production volume
- Intended uses

Moving towards a grouping of chemicals approach

- Stockholm Convention - example of grouping based on “negative list”:
  - Grouping of congeners (e.g. PCBs, PCDD/PCDFs)
  - Grouping of precursors & transformation end products (e.g. PFOA)
- Chemical simplification
  - implies use of “positive list” for limited number of substances known to be safe
  - facilitates grouping
- Could start with groups of chemicals for which there is scientific consensus of harm caused by plastic-related exposure
  - High (bisphenols, flame retardants and phthalates)
  - Medium (PFAS)
- Example of ECHA:
  - assessed group of 148 bisphenols & recommended restriction for over 30 bisphenols

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Adopting a hazard- or risk-based approach?

Hazard-based approach

- Focuses on intrinsic ecotoxicological properties of chemicals, such as
  - PMTs (persistent, mobile & toxic substances)
  - vPvB (very persistent and very bioaccumulative)
  - PBT (persistence, bioaccumulation & toxicity)
  - CMR (carcinogenicity, mutagenicity, or reproductive toxicity)
  - EDC (endocrine-disrupting chemicals)
- Aligns with the precautionary approach

Risk-based approach

- Combines hazards of chemical with likelihood & extent of exposure
- Considers
  - Volume
  - frequency of use
  - potential routes of exposure
  - sensitivity of the exposed population, etc.
- Scarcity of exposure data problematic
  - allows continued use of numerous known chemicals of concern until risk evaluation completed

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Transparency for chemicals safety

- Is about the need to strengthen the right-to-know
  - Aarhus Convention
  - Escazú Agreement
- Why do we need it:
  - To inform consumers to help drive informed consumer choices
  - To facilitate detection of chemicals of concern in customs control
  - To enable a safe circularity of plastics
- Provision of publicly available information on chemical content of plastics
  - Labelling of products
  - Provision of safety data sheets
  - Use of modern digital tools
  - Use of HS codes
- Collection and dissemination of information through inventories
- Sharing of hazard and risk assessment data between countries

-> Agreement on global transparency criteria

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What is the current level of transparency?

- Transparency across the value chain of plastics is limited
- Stockholm Convention
  - Mandatory labelling for some POPs, specific exemptions for uses in plastics
- Rotterdam Convention
  - Information on the trade of particular chemicals, some have uses in plastics
- Basel Convention
  - Transboundary movement of plastic wastes must be accompanied by a movement document specifying hazardous characteristic of the waste or that its management requires special consideration
- SAICM (voluntary)
  - General requirement to provide information on chemicals throughout their life cycle, including chemicals in products

The role of a scientific mechanism

- Develop and maintain sustainability criteria, including track updates and compatibility with relevant MEAs
- Assess new chemicals of concern and provide recommendations for listing
- Review and aggregate science on environment and human health effects
- Determine financial needs for developing countries to meet obligations to transition to safer chemicals and polymers

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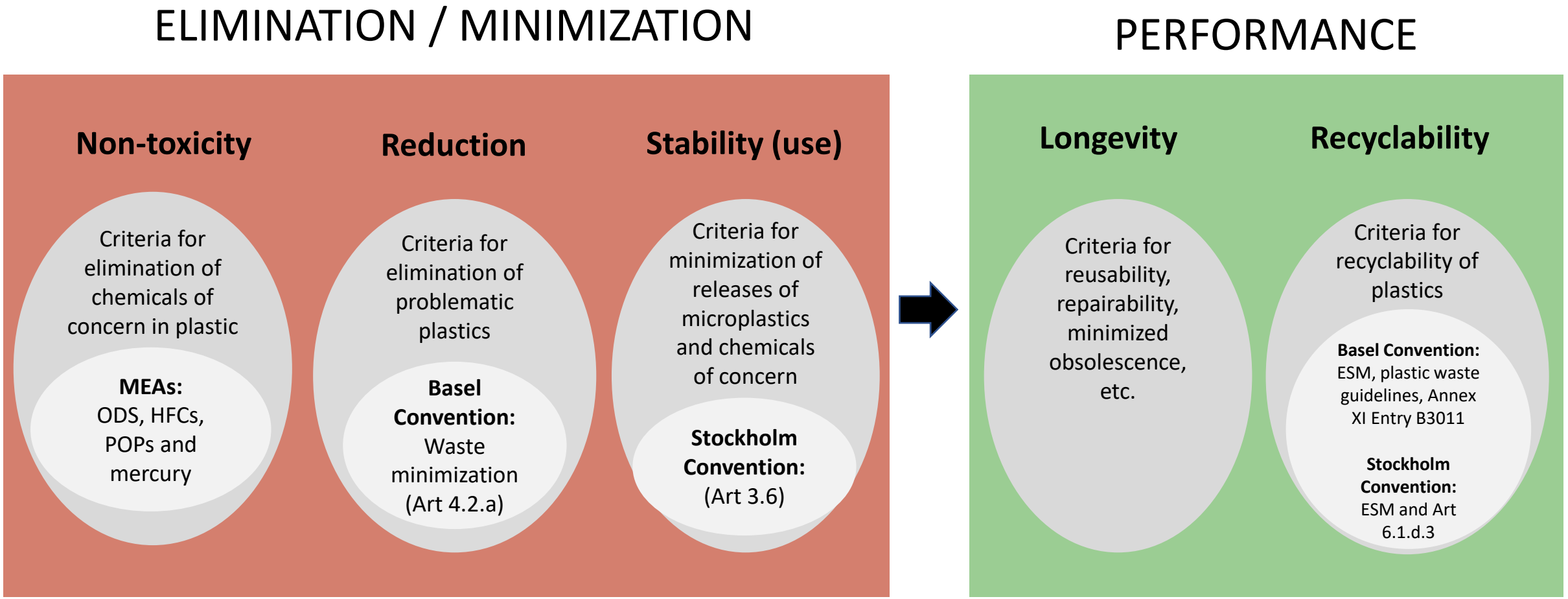
International sustainability criteria

- Develop international sustainability criteria for plastics
  - recommended to fill in governance gaps in the chemicals and material phases
- Principles to guide the development of the criteria focusing on performance outcomes:
  - non-toxicity, longevity, stability, recyclability and reduction/minimization
- Supported by transparency criteria across the life cycle of plastics
- Start with phased approach
  - Outline high-level sustainability criteria in the text of the agreement (INC)
  - Develop detailed criteria in possible annexes to the agreement (COP)

International sustainability criteria – opportunities for synergies



International sustainability criteria - Filling the governance gaps

Categories	Chemicals & polymers	Materials & products	Plastic waste
Elimination / minimization (for items to be removed from the economy)	• Stockholm Convention (POPs) • Minamata Convention (mercury) • Montreal Protocol (ODSs & HFCs) **Criteria for elimination of other chemicals of concern in plastics**	**Criteria for minimization of releases of chemicals of concern and microplastics** **Criteria for elimination of problematic plastics**	• Basel Convention (generation and trade of plastic waste) • MARPOL Annex V (all plastic waste) • London Protocol (whitelist)
Performance (for items to stay in the economy)		**Criteria for reusability, repairability, etc.**	**Criteria for recyclability of plastics**
Transparency (information that needs to be disclosed in items to slaty in the economy)	• ILO-170 (labelling & safety sheets) • Rotterdam Convention (PIC) • Stockholm Convention (information exchange)	• Stockholm Convention (labelling under specific exemptions) **Criteria for transparency of plastics**	• Basel Convention (PIC) • London Protocol (information exchange)

Key recommendations for consideration

1) Develop criteria for sustainable design of plastics
   - performance
   - transparency

2) Develop prioritization criteria to create global negative / positive / hybrid lists using a grouping approach
   - chemicals of concern
   - polymers of concern

3) Develop trade controls
   - Between Parties, Non-Parties

4) Establish a central knowledge hub to manage, store & help access data
   - hazard
   - occurrence
   - identities of chemicals & polymers of concern

5) Establish a (or mandate an existing) scientific mechanism
   - develop & update prioritization & design criteria
   - provide recommendations for listing chemicals & polymers of concern

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Full report available at the BRS Conventions website

http://www.basel.int/tabid/8335

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PLASTICS AND CHEMICALS UNDER THE STOCKHOLM CONVENTION: Impact on the ground and potential synergies and gaps in relation to a future plastics treaty

BRS COPs 2023 - IPEN SIDE EVENT

AGENDA

Welcome and Introduction

- Lee BELL | Mercury and POPs Policy Advisor, IPEN | Moderator

Presentations

Environmental, Food, and Human Body Burden of Dechlorane Plus in a Waste Recycling Area in Thailand: No Room for Exemption

- Thitikorn BOONTONGMAI | Toxic Waste and Industrial Pollution Program Manager, EARTH Thailand

Lessons Learnt from 25 years of Working with the Stockholm Convention & Plastics

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Opportunities for Restricting Chemicals and Polymers of Concern in Plastics

- Karen RAUBENHEIMER | Lecturer, Australian National Centre for Ocean Resources and Security (ANCORS), University of Wollongong
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Regulating Chemicals in Plastics under the Stockholm Convention and the New Plastics Treaty

- Sverre Thomas JAHRE | Senior Advisor, Department for Marine Management and Pollution Control, Ministry of Climate and Environment, Norway

Q&A

Closing Remarks

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