Plastics and Chemicals Under the Stockholm Convention: Impact on the ground and potential synergies and gaps in relation to a future plastics treaty
Thitikorn BOONTONGMAI
Toxic Waste and Industrial Pollution Program Manager, EARTH Thailand

Niko URHO
Independent Consultant

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

Therese KARLSSON
Science and Technical Advisor, IPEN

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

Lee BELL
Mercury and POPs Policy Advisor, IPEN | Moderator
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
- Therese KARLSSON | Science and Technical Advisor, IPEN

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
- Niko URHO | Independent Consultant

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
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
- Therese KARLSSON | Science and Technical Advisor, IPEN

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
- Niko URHO | Independent Consultant

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
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
- Therese KARLSSON | Science and Technical Advisor, IPEN

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
- Niko URHO | Independent Consultant

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
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
  - Therese KARLSSON | Science and Technical Advisor, IPEN

- 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
  - Niko URHO | Independent Consultant

- 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
Environmental, Food, and Human Body Burden of Dechlorane Plus in a Waste Recycling Area in Thailand

No Room for Exemptions
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)
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

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>N</th>
<th>&gt; LOQ</th>
<th>min</th>
<th>max</th>
<th>median</th>
<th>mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dust</td>
<td>ng/g dry matter</td>
<td>22</td>
<td>95%</td>
<td>0.005</td>
<td>108</td>
<td>10.2</td>
<td>18.8</td>
</tr>
<tr>
<td>Soil</td>
<td>ng/g dry matter</td>
<td>9</td>
<td>56%</td>
<td>0.005</td>
<td>4.9</td>
<td>0.08</td>
<td>0.80</td>
</tr>
<tr>
<td>Sediment</td>
<td>ng/g dry matter</td>
<td>2</td>
<td>100%</td>
<td>0.24</td>
<td>15.4</td>
<td>7.8</td>
<td>7.8</td>
</tr>
<tr>
<td>Ash</td>
<td>ng/g dry matter</td>
<td>1</td>
<td>100%</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
</tr>
<tr>
<td>Waste</td>
<td>ng/g</td>
<td>2</td>
<td>0%</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>Rice</td>
<td>ng/g</td>
<td>1</td>
<td>0%</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>Fish¹</td>
<td>ng/g</td>
<td>7</td>
<td>86%</td>
<td>0.002</td>
<td>0.10</td>
<td>0.02</td>
<td>0.04</td>
</tr>
<tr>
<td>Snails²</td>
<td>ng/g</td>
<td>4</td>
<td>75%</td>
<td>0.002</td>
<td>0.03</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>Crabs³</td>
<td>ng/g</td>
<td>3</td>
<td>0%</td>
<td>0.002</td>
<td>0.002</td>
<td>0.002</td>
<td>0.002</td>
</tr>
<tr>
<td>Eggs</td>
<td>ng/g lipid</td>
<td>7</td>
<td>71%</td>
<td>0.15</td>
<td>12.6</td>
<td>0.97</td>
<td>3.9</td>
</tr>
<tr>
<td>Blood</td>
<td>ng/g lipid</td>
<td>40</td>
<td>85%</td>
<td>0.30</td>
<td>89.30</td>
<td>7.27</td>
<td>12.57</td>
</tr>
</tbody>
</table>

N – number of samples  
> LOQ – samples with concentrations above LOQ  
¹Climbing perch, climbing gourami (*Anabas testudineus*), Broadhead catfish (*Clarias macrocephalus*), Nile Tilapia (*Oreochromis niloticus*)  
²Apple snail (*Pomacea canaliculata*)  
³Thai rice field crab (the genus *Esantheplhua* 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
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
- Sediment: 7.8 ng/g d.w., <0.01 ng/g d.w.
- Blood: 12.5 ng/g lipid, <0.3 ng/g lipid
- 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.
- Crab: <0.003 ng/g
- Eggs: 1.7 ng/g lipid, <0.3 ng/g lipid
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/
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
- Therese KARLSSON | Science and Technical Advisor, IPEN

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
- Niko URHO | Independent Consultant

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

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
- Therese KARLSSON | Science and Technical Advisor, IPEN

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
- Niko URHO | Independent Consultant

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

Therese Karlsson, Ph.D.
Science and Technical Advisor IPEN
Plastics are transporting toxic chemicals into the food chain
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

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.
“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 currently under evaluation

<table>
<thead>
<tr>
<th></th>
<th>Used in plastics</th>
<th>Regrettable substitute for previous listings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methoxychlor</td>
<td></td>
<td>Replaced DDT</td>
</tr>
<tr>
<td>UV-328</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Dechlorane Plus</td>
<td>x</td>
<td>Replaced DecaBDE</td>
</tr>
<tr>
<td>Medium chained chlorinated paraffins</td>
<td>x</td>
<td>Replaced short chained chlorinated paraffins</td>
</tr>
<tr>
<td>Chlorpyrifos</td>
<td>(x)</td>
<td></td>
</tr>
<tr>
<td>Long-chained PFCAs</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

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.
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
- Therese KARLSSON | Science and Technical Advisor, IPEN

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
- Niko URHO | Independent Consultant

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
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
- Therese KARLSSON | Science and Technical Advisor, IPEN

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
- Niko URHO | Independent Consultant

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
Opportunities for restricting chemicals and polymers of concern in plastics
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)

Trade measures
- (Global instrument, domestic)

ESM of wastes
- (Waste hierarchy)

Meet WTO definition of ‘international standard’
Restrict domestic market based on sustainability criteria, develop market-based instruments
Basel Convention – proximity principle, trade

nordicreport2020.com
Number of chemicals used in plastics

Chemicals without hazard data found in regulatory databases analyzed
6000, 46%

Chemicals of potential concern unregulated globally
3076, 24%

Chemicals regulated globally
128, 1%

Chemicals of low concern based on available hazard data
3800, 29%

Stockholm Convention
100

Montreal Protocol
10

Minamata Convention
18
### Number of chemicals used in plastics

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>No hazard data</td>
<td>6000</td>
<td>46%</td>
</tr>
<tr>
<td>Regulated</td>
<td>128</td>
<td>1%</td>
</tr>
<tr>
<td>Unregulated</td>
<td>3076</td>
<td>24%</td>
</tr>
<tr>
<td>Low concern (based on existing hazard data)</td>
<td>3800</td>
<td>29%</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Stockholm Convention</th>
<th>Montreal Protocol</th>
<th>Minamata Convention</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Prohibits &amp;/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)</td>
<td>• Prohibits use of controlled substances (ODSs &amp; HFCs), including their use as blowing agents in production of extruded polystyrene &amp; polyurethane foams</td>
<td>• Restricts use of mercury &amp; mercury compounds in production of polyurethane using mercury-containing catalysts &amp; in vinyl chloride monomer production</td>
</tr>
<tr>
<td>• Restricts releases of unintentional POPs deriving, inter alia, from open burning of waste &amp; waste incinerators</td>
<td>• Provides exemption for use of controlled substances as process agents &amp; feedstocks</td>
<td></td>
</tr>
</tbody>
</table>
## Approaches for identifying and listing chemicals

<table>
<thead>
<tr>
<th>Negative (black) list “Stockholm Convention model”</th>
<th>Negative (black) list “Rotterdam Convention model” (adapted)</th>
<th>Positive (white) list “London Protocol model”</th>
<th>Hybrid approach</th>
</tr>
</thead>
</table>
| • 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 congenerers (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
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
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
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
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

ELIMINATION / MINIMIZATION

- **Non-toxicity**
  - Criteria for elimination of chemicals of concern in plastic
  - MEAs: ODS, HFCs, POPs and mercury

- **Reduction**
  - Criteria for elimination of problematic plastics
  - Basel Convention: Waste minimization (Art 4.2.a)

- **Stability (use)**
  - Criteria for minimization of releases of microplastics and chemicals of concern
  - Stockholm Convention: (Art 3.6)

PERFORMANCE

- **Longevity**
  - Criteria for reusability, repairability, minimized obsolescence, etc.

- **Recyclability**
  - Criteria for recyclability of plastics
  - Basel Convention: ESM, plastic waste guidelines, Annex XI Entry B3011
  - Stockholm Convention: ESM and Art 6.1.d.3
# International sustainability criteria - Filling the governance gaps

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

4) Establish a central knowledge hub to manage, store & help access data
   • develop & update prioritization & design criteria
   • provide recommendations for listing chemicals & polymers of concern

5) Establish a (or mandate an existing) scientific mechanism
Full report available at the BRS Conventions website
http://www.basel.int/tabid/8335

Dr Karen Raubenheimer  kraubenh@uow.edu.au
Niko Urho  niko.urho@gmail.com
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
- Therese KARLSSON | Science and Technical Advisor, IPEN

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
- Niko URHO | Independent Consultant

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
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
- Therese KARLSSON | Science and Technical Advisor, IPEN

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
- Niko URHO | Independent Consultant

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
Plastics and Chemicals Under the Stockholm Convention:
Impact on the ground and potential synergies and gaps
in relation to a future plastics treaty
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
- Therese KARLSSON | Science and Technical Advisor, IPEN

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
- Niko URHO | Independent Consultant

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
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
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
- Therese KARLSSON | Science and Technical Advisor, IPEN

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
- Niko URHO | Independent Consultant

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
THANK YOU!

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

Niko URHO
Independent Consultant

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

Therese KARLSSON
Science and Technical Advisor, IPEN

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

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