How could megatrends present new challenges for sound management of chemicals and waste?

By Olga Speranskaya, IPEN Co-Chair

Global data and studies of dynamic trends in environmental contamination suggest rapidly growing environmental pressure. The problem cannot be addressed in one dimension; it is a multi-dimensional one.

Industrial production and use of chemicals is shifting to developing and transition countries. This shift is accompanied by increased use of pesticides, products and processes containing hazardous chemicals, including those that disrupt reproduction, cause birth defects and persist in the environment and human bodies causing irreversible damage. Poor national legislation, lack of new information on toxic chemicals' environmental and health effects, lack of funding, and poor technological and human resources in developing and transition economies make these countries stay unprotected and vulnerable, being disproportionally affected by toxic hazards.

While developed countries are investing a lot into strengthening their environmental and health legislation and technological developments on their territories, including waste management technologies, developing countries and those in transition still struggle with problems which are not considered an issue in the developed world any more. A good example is lead in paint which is strictly regulated in the US, Canada and the European Union, but still poses a threat to the health of people, mainly children, in the majority of developing and transition economies.

What to say about thousands of new chemicals that are introduced to the market annually? The majority of these chemicals are not regulated- not by the existing chemical conventions, nor by national legislations- however, harm caused by them can be just as serious as the harm caused by already known substances such as mercury or persistent organic pollutants.

Actually SAICM is the only international mechanism that addresses virtually all sources of toxic chemical exposure not covered by the chemicals conventions. As it is relevant for all countries and regions, it is of especial importance for developing and transition economies. The relevant government agencies and industries in these countries have often lacked information about the extreme harms associated with exposure to already known and new chemicals and they have also lacked information about policies, programs and techniques that can be put in place to minimize or eliminate these harms. SAICM, however, has provided a venue for sharing information about these harms and for promoting international cooperation to address them.

I would also like to mention the need for intensive education to promote environmentally responsible consumption in general and responsible consumption of goods with hazardous chemicals in particular. Initial steps along this path include banning sales of plastic bags, replacement of hazardous components in goods by safer substitutes or complete refusal of goods containing hazardous materials; for example, elimination of hazardous ingredients in household chemical products, paints and long-shelf-life food. In the same logic - personal consumption should be revisited as such for minimisation of waste generation and unintended purchases.

This path is fairly important and it should be pursued consistently - from education of small children to education of decision makers, and by influencing consumer markets through corrective advertising. These activities cannot be promoted without participation of NGOs.

The last thing I want to mention is the need to review technological practices. It is hard to believe that decades later, benzene chemistry forms the backbone of the industry. It is necessary to abandon completely some technologies that result in growing environmental hazards and generate similarly hazardous secondary products and waste that are unsuitable for further minimisation and elimination. First of all, such technologies include incineration of hazardous and unsegregated waste, including e-waste and plastic.

What technological developments could present new challenges and opportunities for sound management of chemicals and waste?

Currently all technological developments should concentrate on hazard reduction, resource efficiency and substitution with non-chemical alternatives in both industrial uses of chemicals and in agriculture by applying agroecology.

It is important that while developing its technological processes, the private sector assures hazard reduction and designs safer, non-toxic chemicals from the start. This has valuable links to occupational health and safety, pollution prevention, and precautionary measures, and provides a clear, proactive role for the private sector to reduce and eliminate the use or generation of hazardous substances in the design, manufacture and application of chemical products.

The green chemistry principle of designing safer chemicals should become a core of technological development to ensure safer alternative products and processes, including non-chemical alternatives cleaner production and informed substitution of chemicals of concern.

I would like to specifically focus on technologies of waste management, including hazardous wastes. Minimisation of waste at source, zero waste approach, and bio-destruction should play the key roles in waste management strategies, plans and technological developments. There should be a complete ban on waste incineration technologies as they are a source of toxic chemicals emissions and releases. It is especially serious for countries where waste segregation does not function properly or does not exist. These countries should be banned from construction of waste incineration of any type, noting that unsegregated waste burning result in the emission of mercury, dioxin and other toxic substances as well as in toxic fly ash. On top of that very often waste incineration facilities are constructed in already polluted areas hence adding an additional load on people and the environment. Emission monitoring is not carried out on a regular base and usually captures only some toxic chemicals.

It is important to review and introduce modern, environmentally sound technologies for chemical destruction of waste, and for waste recycling. Waste recycling should avoid recycling of waste containing persistent organic pollutants and other hazardous chemicals to avoid their appearance in new products. So far we do have evidences of persistent organic pollutants (brominated flame retardants) appearing in new products, including products for children, manufactured out of recycled materials with toxic chemicals still present.

Dumping of old technologies in developing and transition countries is completely unacceptable. However, there is a clear tendency to transfer outdated and polluting technologies to the developing world. Pesticides export is a good example of irresponsible technology transfer in agriculture when highly hazardous pesticides banned for use or significantly restricted in developed countries are exported to the developing world, and in turn wind up in dumps and pose a threat to people's health and the environment. Agricultural knowledge, science and technology should not pose threats to people; rather they should improve rural livelihoods, and facilitate equitable, environmentally, socially and economically sustainable development.

However, according to U.S. Customs records, between 2001-2003, the U.S. exported nearly 1.7 billion pounds of pesticide products - 32 tons per hour. A study by Carl Smith of the Foundation for Advancement in Science and Education, notes that these exports included "27 million pounds of pesticides whose use is forbidden in the U.S.," including "500,000 pounds of known or suspected carcinogens." Endocrine disrupting pesticides were sent overseas at the rate of 100 tons a day.

This problem is exacerbated by illegal pesticide trade, including counterfeit pesticides. The amount of illegal pesticide trade doubled in the period between 2007-2011, which is a gigantic problem and a global organized crime. For example, Ukraine imports 100 000 tons of pesticides each year, and about 25% of imported pesticides are counterfeit chemicals.

Under such circumstances it will be very problematic to implement SDG 2,which is all about food, and with a rising population, climate change, and an industrialized agricultural system that is harmful to the

environment, implementation of this Goal could be difficult. However, it will become possible if a major focus is made on agroecology which is the core of sustainable agriculture. Definitely more work should be done on highly hazardous pesticides and more actions are needed to help countries substitute them with non-chemicals alternatives.

Technology transfer is badly wanted in developing countries but it should not be old polluting technology that sets developing and transition countries even further back. When South Korea banned asbestos, the industry picked up all the machinery and moved it to Indonesia.

Finally I would like to highlight the importance of developing and introducing new standards and requirements strictly limiting the very entry of hazardous chemical waste as well as solid waste, such as plastic, into global oceans, including river deltas (for all types of vessels, coastal bases and maintenance facilities, economic activities in coastal areas, etc.). In parallel, it is necessary to develop and introduce universal technologies for surface, subsurface and seabed collection of the waste; for recycling of the waste collected.

According to the business projections figures of the plastic companies, it is predicted that the global quantity of plastic in the ocean will nearly double to 250 million tonnes by 2025, or one tonne of plastic for every three tonnes of fish. Marine plastics may be an important focus of exposure for many endocrine disrupting chemicals (EDCs) and POPs, either via dermal absorption or ingestion of contaminated marine animals. There is already scientific evidence of endocrine disruptor activity by the intake of microplastics via the filter-feeding mechanisms of animals like crabs or mussels, or via the magnifying effect of the food chain in top predators like the swordfish. The marine plastic should not be incinerated .The best way to resolve this tremendous problem is to request the private sector to:

- stop production and use of single-use plastics;
- implement free take-back of plastic containers and packaging;
- fund recycling infrastructure.

What are the options for joint actions to ensure a chemical safe future and sustainable development?

I believe that partnerships such as those that helped to establish the Global Alliance to Eliminate Lead Paint are a good model for joint actions to ensure chemical safety and the implementation of the 2030 Agenda on sustainable development. Like GAELP, successful partnerships should be inclusive, transparent, serve the implementation of internationally agreed goals, and be coherent with national law and priorities, as well as respect international law and progressive standards and approaches.

Actions related to chemical safety and toxic chemicals are either referenced or implied in many, if not all, of the SDGs. Partnerships on chemicals and wastes should help to achieve measurable progress in the implementation of these goals.

They should be in line with agreed principles and values; accountable; and ensure multistakeholder involvement, with clear roles outlined for the different partners, including the civil society. Partnerships should be based on transparency and should value human rights and a precautionary approach to environmental challenges. They should not redesign public policies according to private interests; rather, they should focus on public needs.

Partnerships on chemical safety and sustainable development should help to stop the epidemic burden of diseases caused by toxic chemicals exposure and should stay strong against human rights violations. They should support especially vulnerable populations including children, women, Indigenous Peoples, poor people, and those with chronic diseases.

It is necessary to continue to support an active international promotion of the need of mandatory involvement of NGOs into relevant national and intergovernmental programs and projects. Projects with clear multistakeholder involvement and partnership should be prioritized for funding by the GEF and other international donor institutions as well as private donors and donor countries.

NGOs are indispensable for continuous life-long environmental education, involvement of residents into local environmental safety projects, organisation and implementation of baseline monitoring surveys, analysis, public environmental assessments and control for identification and elimination of pollution hot spots, for promotion of success stories both locally and globally.

One minute take home statement

There is an inherent link between chemical safety and sustainable development.

Chemical safety can make contributions to achieving nearly all sustainable development goals with clear and measurable results. In addition, 5 new initiatives should be developed in support of Agenda 2030: zero waste, workplace right to know, agroecology, plastics, and women and chemical safety.

To achieve a good result, transparent, inclusive partnerships are needed that respect the right to information, to health and healthy environments, social, political and civil rights, and the rights of women, children and workers.

Industry is responsible to provide information about chemicals they produce and use. Information on health and environment cannot be confidential. No corporate interests could justify the need to keep information on toxic chemicals undisclosed.

Today, children are born "pre-polluted" with at least dozens, if not hundreds, of hazardous chemicals in their bodies. Governments and industry have a duty to prevent children from being exposed to toxic chemicals and pollution, including those substances whose risks are not well understood.

We need to rethink the approach to agriculture so that agroecology, community-based innovations and traditional people's knowledge are well recognized as part of effective collaboration.

It is important to retain the participatory approach of SAICM in the Beyond 2020 framework, in line with the right to meaningful participation of minorities, the poor, women, Indigenous Peoples, and others.

Extra questions

Which waste streams worry us the most TODAY?

E-waste would still have to be the fastest growing waste stream of 20 – 50 million tons per year. According to UNEP, up to 90% of the world's electronic waste, worth nearly US $19 billion, is illegally traded or dumped each year.

Toxic chemicals contained in e-waste such as lead, mercury, cadmium and brominated flame retardants pollute the environment and cause irreversible harm to people's health including the health of children and women exposed to illegal e-waste recycling.

E-waste contains valuable materials if extracted and collected safely. But special training and equipment are needed to avoid human health risks associated with toxic chemicals in e-waste.

In some regions such as, for example, the EECCA, the e-waste problem is significantly new; however, the amounts of e-waste are growing in all countries of the region. To avoid informal recycling it is important to educate people in advance and develop systems of waste segregation so that e-waste is collected separately and transported to the appropriate place for licensed recycle. The role of NGOs is very important here. According to our experience, NGOs organize mobile systems of e-waste collection from the general public, hold outreach campaigns, initiate regulations, and conduct inventories of e-waste.

Are we still on Pb, Cd in paint and car batteries?

Yes, we still have a problem with lead paint. The Global Alliance to Eliminate Lead Paint is successfully encouraging companies to stop manufacturing and selling lead paints, encouraging governments to enact regulatory controls, and providing tools to stakeholders to achieve actual change on the ground. Substantial measurable reductions in the manufacture and sales of lead paints have already been achieved and more can be anticipated. These primary prevention achievements translate easily into measurable reductions in lead exposures of future generations, and these, in turn, translate into reduced incidents of mental impairments, cardiovascular disease and other non-communicable diseases.

Key measurable objectives

1. By 2020, analytical data on lead in paint from 80 developing and transition countries is publicly available as a contribution to enable all countries to: 1) Establish effective legally-binding regulatory controls by 2022 on lead decorative paints and lead paints for other applications most likely to contribute to children lead exposure; and 2) Establish effective legally-binding regulatory controls by 2027 prohibiting the use of lead in paint, varnishes, stains, enamels, glazes, primers or other coatings.
2. By 2025, publicly available monitoring of lead content of paint on the market shows that no new decorative paint or paints for other applications most likely to contribute to childhood lead exposure.
3. By 2027, strategies and guidance on safe management of legacy lead paint have been developed and made publicly available.
4. By 2030 publicly available monitoring shows that no varnishes, lacquers, stains, enamels, glazes, primers or coatings produced, sold, exported, imported or used for any purpose contain lead.

What are the two key megatrends shaping the landscape for chemicals use/demand?

The exploding increase in production and numbers of chemical substances on the market with only a small number having comprehensive information is a megatrend that has a significant impact on our lives. Industry is responsible to provide information about chemicals they produce and use. Information on the effects of chemicals on our health and environment cannot be confidential. Corporate interests cannot justify the need to keep information on toxic chemicals undisclosed.

We witness epidemic burden of disease and disability associated with exposure to toxic chemicals in children before birth, which causes irreversible changes in the current generation and impacts the life of generations to come. Today, children are born “pre-polluted” with at least dozens, if not hundreds, of hazardous chemicals in their bodies. Many chemicals harm the developing brains and bodies of children with devastating lifelong and multi-generational consequences. According to WHO, lead exposure alone causes severe mental disabilities in 600,000 children annually. Governments and industry have a duty to prevent children from being exposed to toxic chemicals and pollution, including those substances whose risks are not well understood.

Increasing chronic diseases that, according to the International Assessment of Agricultural Knowledge, Science and Technology for Development, are partially consequences of poor nutrition, poor food quality and food safety is one more megatrend that we clearly face. We need to focus on agroecology and non-chemical alternatives to pesticides, especially to highly hazardous pesticides that cause irreversible damage to the life of people, jeopardizing the livelihood of the current and future generations. The need to rethink agricultural knowledge, science and technology is urgent so that community-based innovations and traditional people’s knowledge are well recognized as part of effective collaboration

What are the two or three technologies that may shape the way in which deal with waste?

The best technology to deal with waste *is not to create it*.

Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury

them. Implementing Zero Waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health.

1. The private sector should make products that are non-toxic; durable; reusable; easy to dismantle, repair and rebuild; minimally and appropriately packaged; recyclable and/or compostable.
2. Segregation of waste at source for reuse, recycling and composting should be implemented in all major cities.
3. Zero waste procurement practices including non-toxic, zero waste products, reusable shipping containers, reduced packaging, recycled and compostable products, remanufactured equipment, and leased, rented, or shared equipment should be adopted.
4. Free electronics take-back programs should be a part of extended producer responsibility measures.
5. Ban multi-layered, single use plastic packaging and products.
6. Complete shift to non-combustion methods for residual waste treatment.
7. Support to local communities, their municipalities and not-for-profit sectors to implement Zero Waste City models.
8. Facilitate circular economy/cradle-to-cradle systems without toxic chemical recycling.
9. Eliminate government subsidies for waste-to-energy incinerators and cement kilns

Are there any technologies that are truly making a difference?

Green chemistry (getting rid of hazards from the start); public awareness; and governmental regulations. Technology development should go in line with governmental regulations. For example: Private sector stops production and use of single-use plastics and implements free take-back of plastic containers and packaging and funds recycling infrastructure.

At the same time governments ban multi-layered, single use plastic packaging and products as well as the following plastic items: food wrappers, containers, straws, stirrers, shopping bags, take-out containers, and so on.

Chemicals / waste and global socioeconomic equality

The following issues contribute to socioeconomic inequality:

- Dumping waste in other countries
- Selling chemicals on the market and in products without comprehensive information on harm
- Externalizing the cost of chemical products onto governments and the public
- Double standards – toxic-free products for developed countries; the toxic ones for the developing world