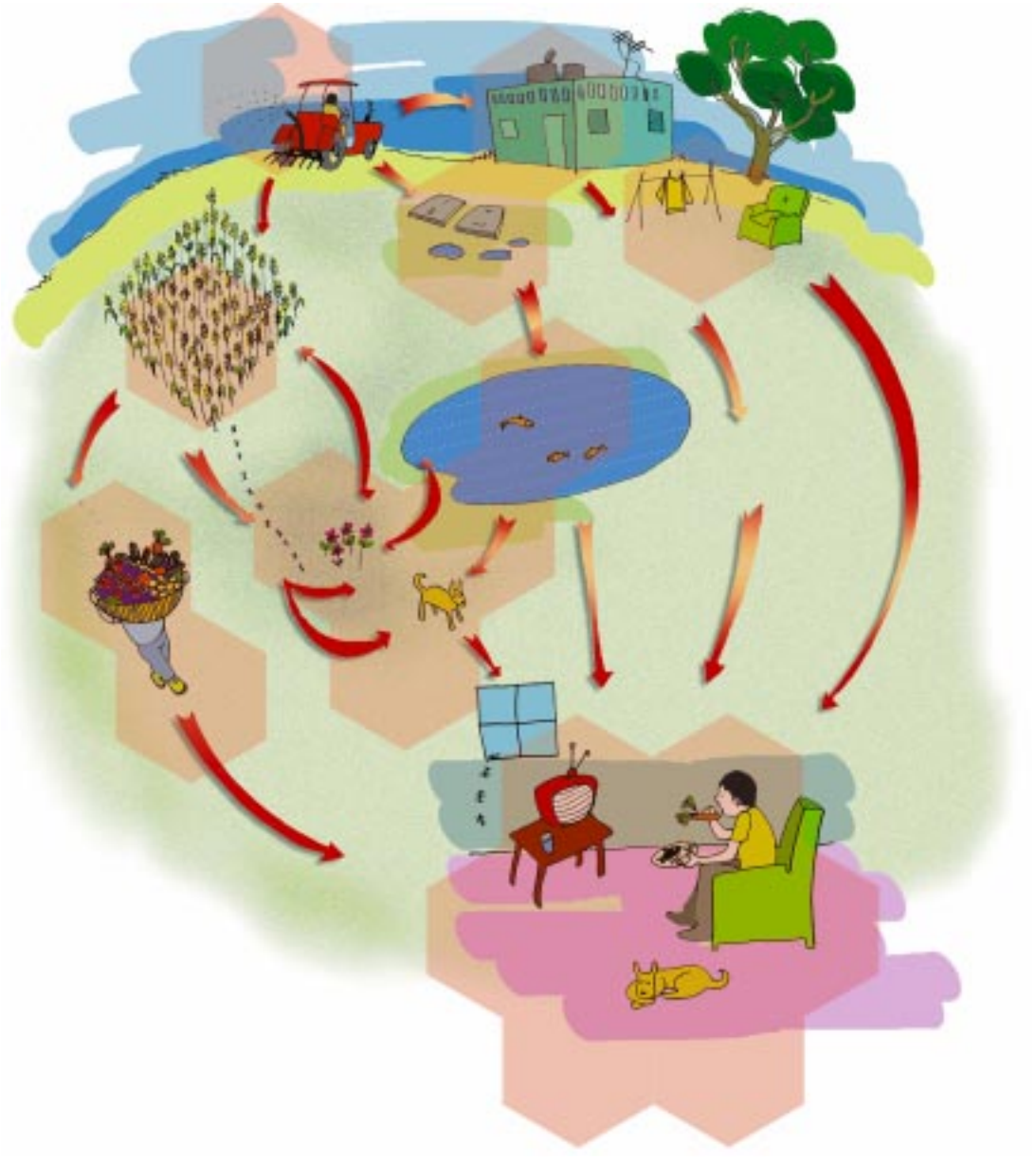
Toxics Link
for a toxics-free world

The Persistent Peril



The threat posed by Persistent Organic Pollutants to humans and to the planet as a whole make their elimination a critical and immediate need

Who We Are

Toxics Link is an environmental organization working on issues of chemical safety and waste. Its goal is to develop information exchange mechanisms through creating knowledge that will help direct policy decisions to be more responsive to the needs of the environment, the community and society.

> *"We are a group of people working together for environmental justice and freedom from toxics. We have taken it upon ourselves to collect and share both information about the sources and dangers of poisons in our environment and bodies, and information about clean and sustainable alternatives for India and rest of the world."*

We have been participating in POPs and related activities for many years. We followed and contributed to the UNEP negotiations, which led to the Stockholm treaty, besides hosting an international multi stakeholder workshop in New Delhi in September 2001. We have also published on the issue and try and raise the level of credible knowledge on it.

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Status of POPs

Mindful of the precautionary approach as set forth in Principle 15 of the Rio Declaration on Environment and Development, the objective of this Convention is the protection of human health from persistent organic pollutants.

Article 1, Stockholm Convention, 2000

The Stockholm Convention on Persistent Organic Pollutants (POPs) has helped classify a set of chemicals, which are especially toxic for the environment as well as human health. POPs are chemicals of concern globally because, though they may be locally manufactured and used, they impact the globe owing to their ability to travel long distances through a variety of media and pathways. Their impact has been recognised as deadly, since these chemicals accumulate in animal fat, magnify up the food chain and do not break down. They cause a variety of serious health effects in the short term as well as long term. Children and pregnant women are specially vulnerable to POPs. They may be unsafe even at unbelievably low contaminations, the timing of the exposure being as critical as its dosage. Recognising them as a global problem is the first step towards taking global action for their minimisation and ultimate elimination.

The classification of a category of chemicals for global action also marks the advent of chemical safety as an important issue requiring resources, multi-stakeholder participation as well as political will. Till date, chemicals have been dealt with locally and nationally. Often, credible data on their impacts, especially in developing countries, is insufficient. The South Asia Region (SAR) data on POPs does exist but it is scattered and scanty. The Convention also helps lever global resources in order to help governments in setting priorities for action through a National Implementation Plan (NIP) process and to shift towards cleaner development alternatives.

More importantly, the POPs Convention forms the basis of a newly emerging chemical safety regime which is growing internationally through instruments such as the Basel Convention on the Transboundary Movement of Hazardous Wastes, the Rotterdam Prior Informed Consent Convention (PIC) and several other regional treaties and agreements. Other new focuses are some heavy metals such as mercury. Also, with the upcoming Strategic Approach to International Chemicals Management (SAICM) being proposed by UNEP and the IFCS (Inter governmental Forum for Chemical Safety), there will clearly be a new way of dealing with chemicals from now on.

Status of POPs in the region

Of the 10 intentionally produced POPs listed in the Convention, toxaphene and mirex have never been manufactured or used in the region. The main pesticide chemicals used have been DDT, aldrin, dieldrin, heptachlor and endrin. Of these, DDT has been the most widely used, and continues to be the main POPs chemical being used to date in the region. This could be one reason why the data on DDT is most prevalent.

The agricultural usage of all POPs has been banned. Apart from an ongoing program involving DDT use for malaria control, the use of dieldrin for locust control has been allowed in India for a fixed time period. However, it is reportedly used for agricultural purposes illegally. India remains one of the world's three manufacturers of DDT. Toxaphene, HCB and mirex have never been registered in India, while the use of PCBs in electrical equipment has been banned in India since 1967.

The satus of the unintentionally produced POPs (PCBs, HCBs, dioxins and furans) is unclear. These POPs are not regulated and testing facilities for dioxins and furans do not exist as yet, though two may be upcoming.

The data on POPs is varied, and not systematically generated. Studies conducted at different institutes, and at different time periods, have varying objectives and are not comparable. This makes it diffficult to draw any conclusions about the trends in their usage or the levels of these chemicals in the environment and in various species.

On the other hand, despite the various problems associated with the data, POPs can be found in environmental samples indicating their continued presence in the region. Export of chlordane, aldrin and heptachlor has been reported from India even after the ban on their manufacture, import and export. Allegedly, endrin, dieldrin, heptachlor and DDT are being smuggled into Bangladesh.

The impact of POPs has been recognised as deadly, since they accumulate in animal fat, magnify up the food chain and do not break down. They cause a variety of serious short and lifelong health effects, especially effecting children and pregnant women.

Sources and uses of POPs in SAR

Various studies have been examined and it became clear that not only are there known sources of POPs in the region, but also those which are yet to be documented. DDT manufacturing facilities as well as the application of DDT for vector control are prime sources. The continued use of DDT appears to be both an issue of institutional mindsets as well as an inability to enter broader community based participatory approaches that involve bio-environmental techniques.

In the case of PCBs the situation is less clear. Though they have never been used or manufactured in India, they are reported in various studies showing that they did find their way into the country. This could be due to electrical equipment and transformer imports. New PCB sources include the massive shipbreaking activity at Alang (Gujarat, India) and at other places (Bangladesh and Pakistan) where 90 per cent of the world's thirty-years-or-older ships are broken down.

The unintentional releases of dioxins and furans, as well as HCBs and PCBs pose particular problems and challenges. For one, monitoring these is difficult and expensive. There are, for example, no known certified laboratories for testing dioxins and furans in the region as yet, even though some new ones such as the one at RRL Trivandrum (India) are gearing up to the issue. However, future releases will depend on technology choices for various processes.

There are contradictions as well. For example, while waste incineration has been identified as a major source for unintentional POPs internationally, government schemes in India are providing subsidies for their installation. Other major emitters such as the pulp and paper industry, coal based thermal power plants, cement kilns, etc have had no emission tests carried out. Many still use polluting processes. This portends to be an area of concern, especially since at no stage of a new project clearance or expansion is there any incentive to promote clean technologies.

Pathways and environmental contamination

Though some pathway studies do exist, there are major gaps in them. There is, for example, a complete absence of studies that deal with the behavior of POPs in the colder climes of India, say the Himalayas. This could be significant since POPs are transported to colder regions through convection currents where they persist for longer periods. The Himalayas, as a meteorological barrier could possibly be a major sink for POPs from where they could re-enter the ecosystem through rivers.

Similarly, very few studies have been done on understanding atmospheric pathways though a modeling scheme has been proposed by the ITRC. In the case of water studies, while there is data from the river-monitoring programs for the Ganga, Gomti, and Yamuna, it is difficult to interpret. The data reveals varying levels of POPs like DDT, aldrin and dieldrin during different seasons: there is often a marked increase after the monsoons, which suggests either a re-suspension of sediments, agricultural field runoffs or, possibly, a combination of both. Again, DDT appears widely as a contaminant, probably owing to its continuing widespread usage, but also because it is the focus of research compared to other POPs. Soil, sediments and marine sediments revealed the presence mainly of DDT and dieldrin and, in one case, of PCBs.

Food pathways also present a dismal picture. Indian dietary intake of DDT was found to be the highest in the world. Practices like the dermal application of DDT on cattle probably leads to its high levels in milk and dairy products. Surprisingly, dioxins were found in human breast milk in Chennai (despite the general belief that dioxins are more an industrialised country's problem) at levels higher than in other Asian countries. Very high levels of DDT (seven times) and aldrin (27 times) have also been detected.

Almost all the listed POPs have been detected in various foodstuffs in the region, including oils, spices and meat products. Aldrin, dieldrin, DDT and heptachlor continue to show up in food despite being banned or regulated. The only long-term monitoring program of the Government of India on pesticide residues (the All India Coordinated Research Project which conducts nationwide pesticide monitoring) has however reported falling DDT levels. This is not the case in other studies. Pakistan has recorded high levels of DDT and endrin in vegetables. In Bangladesh, dried fish samples showed high levels of DDT and revealed the dangerous practice of using DDT as a preservative for dried fish. DDT was also detected in baby food, honey and herbs from different parts of the region. Overall, the food showed a wide range of contamination with no confirmation of the levels were changing.

While waste incineration has been identified as a major source for unintentional POPs internationally, governmental schemes in India are providing subsidies for their installation. Other polluting industries have had no emissions testing carried out, and still use polluting processes.

Exposures

Exposure studies in wildlife showed concentrations of DDT as well as the presence of dioxins and furans in freshwater and coastal fish. River dolphins (in the Ganga) recorded very high levels of DDT which was also detected in zooplankton, a basic food for marine animals. As has also happened in the US, DDT was connected with eggshell thinning causing breeding failures in raptors in India.

Studies dealing with human exposures reveal widespread contamination. Breast milk, fat samples and human blood samples contaminated by DDT, HCB, aldrin, dieldrin, dioxin, furans and PCBs have been detected. DDT has been detected in the blood of people from Himachal Pradesh despite the fact it is not used there for malaria control, reemphasizing the need to study the colder climes from a POPs perspective and their illegal use in agriculture.

Health effects

Various studies have associated the levels of DDT with the rise in the blood pressure of mothers, intra-uterine growth retardation and placental transfers to the unborn foetus. In the case of animals, studies show that low levels of DDT have caused reduced oxygen consumption in fresh water fish, as well as mortality. Birds like the Sarus Crane have succumbed in large numbers to high dieldrin levels in their brain tissues while there is a suspected link between the recent decline of the vulture population and POPs-like chemicals.

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Emergent issues

1. *Lack of policy focus:*

Though there are a number of legislations dealing with hazardous chemicals in India, chemical safety in general and POPs in particular need a cross sectoral policy focus. The issues deal with sectors of the environment, health, agriculture, chemicals and industry, besides NGOs and the public at large. However, there is no such forum or an examination of the problem as a multi-stakeholder issue. Neither is there any particular policy addressing the issue. This is also reflected in the scattered nature of the research (and its quality) that has been carried out by various scientific institutes. Specific governmental or important user stakeholders interviewed had in some cases very little knowledge of the issue of POPs per se.

2. *Data availability*

Data from industry in particular is either not present or inaccessible. This reflects the fact that the industry or its associations have not put any special emphasis on this issue. In fact, the degree of awareness and participation of the industry on the issue seems to be poor.

1. Data and its reliability

The available data is scattered and scanty. It is difficult to analyse in terms of trends. Data pertaining to effects and exposures in the region is scarce. Doubts have also been cast on the reliability of the data and on the uniformity of methods used across studies.

The current data is also very disturbing. Though not systemic, almost all studies show the presence of POPs in media such as air, water, soil and food. Levels of POPs in mothers' milk, animal, birds and human exposures have also been recorded. Source studies outnumber pathway and impact studies, showing the lack of research in examining the issue from a health and environmental perspective.

2. Status of stockpiles

There is almost no data on stockpiles of old and unused POPs. This could imply that they are either non-existent or that that they are undocumented or even used up. This is a critical area for further investigation and research.

3. Monitoring and regulations capabilities

There is a paucity of testing facilities in the case of POPs such as dioxins and furans. Though many laboratories are now equipped to test for pesticide POPs, their calibration and quality control may need to be evaluated. A couple of laboratories in India have taken the initiative to develop capabilities to monitor dioxins and furans. However, they may need time to come up to the required quality requirements and develop in-house capacity and experience.

4. New technologies

Currently, no evaluation has been done to ensure the installation of new clean technologies in India, which do not produce POPs. The directives in the Convention meant to encourage the installation of clean non-POPs creating technologies are not reflected in many national programs. In fact, in some cases, POPs producing technologies such as waste incinerators have the same degree of incentives as other cleaner options.

5. Public health usages

The use of POPs for public health purposes and its alternatives needs urgent attention. The changeover is an issue, which deals with both the choice of the alternative method, as well as the capabilities of existing institutions to adapt to such new approaches. In the past, initiatives taken for promoting alternative non-chemical approaches such as through a World Bank funded project have not been adequately implemented or monitored.

6. Impacts of existing processes

The documentation of existing processes to evaluate their POPs generating potential and to suggest remedial action is a must. Areas like dye and dye intermediaries, textiles, pesticides and chemical process have been inadequately documented as sources of POPs.

7. Community participation, information access and awareness

There is a need to inform communities and catalyse their participation as a key driver to deal with the issue of POPs at the ground level. There is very little being done in this

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area and, as a result, public awareness of the issue is very low in the region.

The Convention, in Article 10, lays down specific and extensive requirements regarding public information, awareness and education. Amongst these are "provision to the public of all available information on persistent organic pollutants," especially to "women, children and the least educated" on health and environmental effects and their alternatives. The Article also encourages "public participation, including opportunities for providing inputs at the national level regarding implementation of the Convention."

There is recognition of the need to developing mechanisms like "pollutant release and transfer registers" for the collection and dissemination of information. Such registers have proved to be very effective as information sources and regulatory aids.

Conclusions

In the overall picture the data available shows reason for concern. The lack of focus on the environmental and health impacts of these chemicals stands out. Industry information is either not available or impossible to obtain. Governmental policy has also not addressed the issue substantially. Also, community awareness about POPs is very low. The general refrain in the scientific community is that research in the area is waning and needs to be stimulated in a systematic and coordinated fashion.

Though the POPs treaty has thrown up a new focus and has provided an opportunity for the region to proceed towards a chemically safe regime, there seems to be little activity on the ground. The Indian industry is resisting the ratifying of the POPs treaty by India on the grounds that it will harm their interests. The participation of NGOs and communities in this area has also not been encouraged. The public is not informed about the issue. Clearly, there needs to be an all-round stimulus for infusing fresh energy into this critical issue.

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Action points

For Civil Society Groups

Awareness, training and monitoring

- Build knowledge about the POPs issue and their impact on public health
- Civil society groups working on the issue should create awareness about and help build capacity of other groups so that they can actively participate in the National Implementation Plan (NIP) process
- Educate government officials about the requirements for implementing legislation
- Be in touch with government officials to assure that they are aware of key elements of the POPs issue
- Monitor the creation of 'implementing' legislation and activities and NGOs role in 'implementing' activities
- Include itself on available list-serves, mailing lists or other notifications, thereby facilitating access to relevant information and being informed about meetings and actions under the PIC and POPs conventions
- Document, monitor and play a watchdog role of processes and actions taken on the ground

Advocate for policy changes

- Take part in the National Implementation Process for implementation of some activities to address the POPs issues through GEF funding by informing the designated authority about the interest in participating
- Inform Secretariats for each convention about the NGOs' desire to participate in the Conference of Parties internal meetings for PIC and POPs
- Database should be created on existing stockpiles and policy developed and implemented so that they are disposed off using processes that do not produce POPs

Industry Responsibility

- The industry should phase out manufacture of POPs and go in for safer alternatives
- As a next step, the industry should start preparing for phasing out the manufacture of Persistent Toxic Substances (PTS) mentioned in the Stockholm Convention
- The industry should adopt a strategy that promotes the use of cleaner and more efficient processes, products and services to reduce unintentional production of POPs at their source
- The industry should bear the responsibility for safe disposal of unused stockpiles of POPs produced unintentionally

[1] *GEF is the "interim financial mechanism" for the Stockholm Convention. Following Convention guidance, GEF will provide funding to developing and transition countries for the implementation of some activities to address POPs. GEF will initially help countries strengthen their capacity to prepare National Implementation Plans (NIPs). This activity is known in the GEF as "enabling activities." The NIP will help countries identify and prioritize capacity building, policy and regulatory reforms, and investments needed to address the issue of POPs.*

The industry should phase-out the manufacture of Persistant Toxic Substances (PTS) mentioned in the Stockholm Convention. The industry should also adopt a strategy that promotes the use of cleaner and more efficient processes to reduce unintentional production of POPs.

For Government

- The government should develop sound and feasible National Implementation Plans with well defined goals, activities, implementation mechanisms and indicators of success
- While developing action plans the government should have a multi-stakeholder approach, involving representatives from various government ministries as well as concerned parties outside of government like civil society groups
- The implementation plans should have an integrated approach which addresses all stages of the chemical life cycle and emphasises the multi-disciplinary nature of POPs and waste management
- The government should develop practices for minimizing risk, phaseout of the use of a particular POP or of a process that generates POP, pollution prevention strategies, substitute use of POPs in vector control, and possible other interim measures
- Government pesticides policy should eliminate POPs in pesticides. There are many widely-used pesticides which contain, so-called "micro-contaminants", substances banned by the POPs treaty, including DDT, dioxins, furans and hexachlorobenzene
- Government policies should be so directed as to prohibit new POPs sources, for example dioxins and furans from new incinerators or industrial facilities.
- Capacity building and skills-sharing training workshops should be conducted to strengthen institutional and human resource capacity in the area of project planning for specific priority topics of POPs management.
- The government should promote the use of cleaner and more efficient processes, products and services to reduce unintentional production of POPs at the source
- Government should also bear the onus of creating awareness about the issue and building capacity of civil society groups so that they can actively participate in the NIP process

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Important Conventions on chemicals

Because of the global risks posed by the long range transport of POPs, the issue can not be addressed in isolation. The international community is calling for global action to reduce and eliminate the releases of these chemicals. Two very important chemical conventions have been agreed by various governments – the Rotterdam Convention on Prior Informed Consent (PIC Convention) and Stockholm Convention (POPs Convention). The Conventions cannot enter into force unless ratified by 50 countries.

Rotterdam (PIC Convention)

Realising that toxic pesticides and other hazardous chemicals affect human and animal health and contaminate the natural environment, governments started addressing this problem in the 1980s by establishing a voluntary Prior Informed Consent procedure. PIC requires exporters trading in a list of hazardous substances to obtain the prior informed consent of importers before proceeding with the trade.

In 1998, governments decided to strengthen the procedure by adopting the Rotterdam Convention, which makes PIC legally binding. The Convention establishes a first line of defense by giving importing countries the tools and information they need to identify potential hazards and exclude chemicals they cannot manage safely. If a country agrees to import chemicals, the Convention promotes their safe use through labeling standards, technical assistance, and other forms of support. It also ensures that exporters comply with the requirements. Via shared information, it allows individual countries to impose import/export requirements on listed pesticides included in the Convention.

Detailed information available at http://www.pic.int

PIC Ratifications as on September 2003

▲ Austria ▲ Belgium ▲ Bulgaria ▲ Burkina Faso ▲ Cameroon ▲ Canada ▲ Czech Republic ▲ El Salvador ▲ Equatorial Guinea ▲ Ethiopia ▲ European Community ▲ Gambia ▲ Germany ▲ Ghana ▲ Guinea ▲ Hungary ▲ Italy ▲ Jamaica ▲ Jordan ▲ Kyrgyzstan ▲ Latvia ▲ Libyan Arab Jamahiriya ▲ Luxembourg ▲ Malaysia ▲ Mali ▲ Marshall Islands ▲ Mauritania ▲ Mongolia ▲ Netherlands ▲ New Zealand ▲ Nigeria ▲ Norway ▲ Oman ▲ Panama ▲ Paraguay ▲ Republic of Korea ▲ Romania ▲ Samoa ▲ Saudi Arabia ▲ Senegal ▲ Slovenia ▲ South Africa ▲ Surinam ▲ Sweden ▲ Syrian Arab Republic ▲ Switzerland ▲ Thailand ▲ Ukraine ▲ United Arab Emirates ▲ United Republic of Tanzania ▲ Uruguay

Stockholm (POPs) Convention

The Stockholm Convention is a global treaty to protect human health and the environment from persistent organic pollutants (POPs). It aims to eliminate the production of POPs as by-products until their ultimate elimination. It promotes the environmentally sound management and disposal of POPs waste including stockpiles, articles in use, and materials containing/contaminated with POPs.

Detailed information available at http://www.pops.int/

POPs Ratifications as on September 2003

▲ Antigua and Barbuda ▲ Austria ▲ Bolivia ▲ Botswana ▲ Canada ▲ Czezh Republic ▲ Democratic People's Republic of Korea ▲ Dominica ▲ Egypt ▲ Ethiopia ▲ Fiji ▲ Finland ▲ Germany ▲ Ghana ▲ Iceland ▲ Japan ▲ Lebanon ▲ Lesotho ▲ Liberia ▲ Luxembourg ▲ Mali ▲ Marshall Islands ▲ Mexico ▲ Nauru ▲ Netherlands ▲ Norway ▲ Panama ▲ Papua New Guinea ▲ Rwanda ▲ Saint Lucia ▲ Samoa ▲ Senegal ▲ Sierra Leone ▲ Slovakia ▲ South Africa ▲ Sweden ▲ Switzerland ▲ Trinidad and Tobago ▲ United Arab Emirates ▲ Vietnam

Related Chemical Treaty awaiting ratification

The Basel Convention and the Basel Ban

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted in Basel, Switzerland on March 22, 1989. The Convention was initiated in response to numerous international scandals regarding hazardous waste trafficking that began to occur in the late 1980s. The Convention entered into force on May 5, 1992 and today has its Secretariat in Geneva, Switzerland. In 1995, in response to criticism that the Convention failed to adequately prevent the dumping of hazardous wastes, the Basal Ban was created. The Ban Amendment prohibits all forms of hazardous waste exports from Organisation for Economic Cooperation and Development (OECD) countries to non-OECD countries. The Ban requires 62 ratifications to come into force. As of September 2003, 37 States have ratified the Ban Amendment.

Detailed information available at http:// www.basel.int

Important networks directly or indirectly involved in the elimination of POPs

The International POPs Elimination Network (IPEN)

IPEN is a global network of public interest non-governmental organisations united in support of a common POPs Elimination Platform. The mission of IPEN, achieved through its participating organisations, is to work for the global elimination of persistent organic pollutants, on an expedited yet socially equitable basis.

http://ipen.ecn.cz/handbook/html/index.html

Global Anti-Incinerator Alliance and a Global Alliance for Incinerator Alternatives (GAIA)

GAIA is an expanding international alliance of individuals, non-governmental organisations, community-based organisations, academics and others working to end the incineration of all forms of waste and to promote sustainable waste prevention and discard management practices. Since GAIA members are committed to ending incineration and to promoting alternative safe, economical and just discard management systems, the name GAIA represents both a Global Anti-Incinerator Alliance and a Global Alliance for Incinerator Alternatives.

gaia@no-burn.org

Waste Not Asia

Environmental activists from 12 Asia-Pacific nations launched Waste Not Asia – the region's first alliance to oppose the expansion of waste incineration technologies and promote ecological methods of waste management. Their alliance members strive to put in place a sustainable society that will constantly endeavor to achieve a goal of zero waste through an evolving program of clean production. The alliance's work is based on principles that emphasise materials recovery over materials destruction; solutions that are democratically derived and socially just; systems that are community-based and emphasise local jobs creation involving small businesses as opposed to capital-intensive corporate led interventions.

http://www.unep.or.jp/ietc/Focus/Waste_Not_Asia.doc

The Community Health Environmental Survey Skillshare (CHESS)

For a long time now, pollution has been regarded as unacceptable as it poses a threat to the environment. Greenpeace decided to take the issue further by exploring the effect of toxic pollution as a cause for the degenerating health of a community. Greenpeace created a common platform for all groups, individuals, institutions, academicians, health and legal professionals to come together to voice their concerns. The Community Health Environmental Survey Skillshare (CHESS) was created with the intention of generalising individual problems, exchanging knowledge and expertise and strengthening their participation for collective action.

Community Action For Pesticide Elimination (CAPE)

The coalition is a recently formed collective of pesticide impacted communities, public interest doctors, scientists and voluntary groups. CAPE has been launched to wage a national campaign geared towards stopping and reversing the entry into India of agro chemical MNCs and their new poisons. Other objectives are to eliminate the use and sale of synthetic pesticides and promoting organic agriculture. Cape aims at identifying health problems, assessing the damage and communicating the issues to the policy makers. The coalition intends to look into the gaps in the earlier struggles against pesticides, to address the lacunae and build up a collective movement.

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Standards of pesticide residue limits

Name of Pesticide	Food	Tolerance limit mg/kg (ppm)		
		India	Codex	America
Aldrin, dieldrin	Foodgrains	0.01	0.02	0.02
	Milk	0.15 (on a fat basis)	0.15 (on a fat basis)	
	0.006	0.006 (in whole milk)	(in whole milk)	
	Milk products	0.15 (on a fat basis)		
	Pulses		0.05	
	Fruits and vegetables	0.1	0.05–0.1	0.02–0.1
	Meat	0.2	0.2	
	Poultry	–	0.2	–
	Eggs (on a shell free basis)	0.1	0.1	–
Chlordane	Food grains	0.02	0.02	–
	Milk	0.05	0.05 (on a fat basis)	
Fruits and vegetables	0.1-0.3	0.02-0.05	0.02-0.1	
	Meat	–	0.02	–
	Soya bean oil, cotton seed oil, linseed oil	–	0.05	–
	Soya bean oil refined	–	0.02	–
	Eggs	–	0.02	–
	Almonds, Hazelnuts, Pecan, Walnuts	–	0.02	–
DDT	Food grains	–	0.1	0.5
	Milk and milk products (on a fat basis)	1.25	1.25	–
	Fruits and vegetables	3.5	1	–
	Meat, poultry and fish	7.0	5	–
	Meat from mammals	–	5	–
	Eggs	0.5	0.1	–
Endrin	Poultry Meat	–	0.1	–
	Vegetables	–	0.05	–
Heptachlor	Food grains	0.01	0.02	–
	Carrots		0.2	–
	Fruits and vegetables	0.05	0.02-0.05	–
	Citrus fruits		0.01	–
	Meat		0.2	–
	Poultry meat		0.2	–
	Milk	0.15	0.15	–
	Eggs		0.05	–
	Soya bean oil (crude)		0.5	–
Hexachlorobenzene	No MRLs mentioned			
Toxaphene	No MRLs allocated			
PCBs	Food and food products	–	0.05-2	–
	Fish and shell fish	–	2	–
	Packaging materials for food	–	10	–

Source: 1. The Prevention of Food Adultration Act, 1954 and Rules 1955
2. http://appsl.fao.org/servlet/org.fao.waicent.codex.PesticideServlet
3. Joint FAO/WHO Food Standards Programme Codex Alimentarius Commission 1993
4. Source Joint FAO/WHO Food Standards Programme Codex Alimentarius Commission 1998
5. Communication with Dr. Keith Bentley, consultant WHO

Special Monitoring Parameters (Only in cases of need apprehensions)

Parameters	Requirement for Waters of Class (ìg/l)		
	A: Excellent	B: Desirable	C: Acceptable
Organo Chlorine Pesticides	<0.05	<0.1	<0.2
PCB	<0.01	<0.01	<0.02

Source: Water Quality Criteria and goals, CPCB, February 2002

Drinking Water Quality

Chemical	Provisional Tolerable Daily Intake (PTDI)	Guideline value for drinking water (ìg/l)
Aldrin and Dieldrin	0.1 (ìg/Kg) of body weight (Combined total for aldrin and dieldrin)	0.03
Chlordane	0.5 (ìg/Kg) of body weight	0.2
DDT and its derivatives	0.01 (mg/Kg) of body weight	1
Endrin	0.2 (ìg/Kg) of body weight	0.6
Heptachlor	0.1 (ìg/Kg) of body weight	0.03

Source: Guidelines for drinking water quality, Third edition, Geneva, WHO, 2003

EPA, National Recommended Water Quality Criteria for Priority Toxic Pollutants

Pollutant	Fresh Water		Salt Water		Human Health For Consumption of:	
	CMC (ìg/l)	CCC (ìg/l)	CMC (ìg/l)	CCC (ìg/l)	Water + Organism (ìg/l)	Organism Only (ìg/l)
Aldrin	3	–	1.3	–	0.000052	0.000054
Dieldrin	0.24	0.056	0.24	0.056	0.000049	0.000050
Chlordane	2.4	0.0043	0.09	0.004	0.00080	0.00081
DDT	1.1	0.001	0.13	0.001	0.00022	0.00022
Dioxin	–	–	–	–	5	5.1
Endrin	0.086	0.036	0.036	0.037	0.76	0.81
Heptachlor	0.52	0.0038	0.0038	0.053	0.000079	0.000079
PCBs	–	0.014	–	0.03	0.000064	0.000064
Toxaphene	0.73	0.0002	0.21	0.0002	0.00028	0.00028

Criteria Maximum Concentration (CMC) is an estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed briefly without resulting in an unacceptable effect.

Criterion Continuous Concentration (CCC) is an estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect.

Source: EPA, National Recommended Water Quality Criteria: 2002

Health-based Standards for POPs exposure

ATSDR: The U.S Centers for Diseases Control and Prevention's Agency for Toxic Substances and Diseases Registry defines a Minimal Risk Level (MRL) as the dose below which they anticipate no ill effects.

EPA: The U.S Environmental Protection Agency defines a Reference Dose (RfD) as the dose below which they anticipate no ill effects.

WHO: The World Health Organisation defines an acceptable Daily Intake (ADI) as the dose below which they anticipate no ill effects

POP Chemical	ATSDR MRL (mg/day)	EPA RfD (mg/day)	WHO ADI (mg/day)*
Aldrin	Adult – 2.1 *Chronic exposure, oral* Adult – 42 Child – 12 *Acute exposure, oral* Adult – 70 Child – 20	Not available	Adult – 7.0 Adult – 35 Child – 20
Dieldrin	*Chronic exposure* Adult – 3.5 Child – 1.0 *Acutre exposure* Adult – 4.9 Child – 1.4	Adult – 3.5 Child – 1.0 Adult – 70	Child – 2.0 (combined total with Aldrin)
Endrin	*Chronic Exposure* Adult – 700 Child – 200 *Acutre exposure* Adult – 140 Child – 40	Not available	Adult – 14 Child –14
Chlordane	*Chronic Exposure* Adult – 1.4 Child – 0.4 *Acutre exposure* Adult – 14 Child – 4		
Heptachlor/ Heptachlor epoxide	Not Available	Adult – 0.7 Child – 0.2	Adult – 7.0 Child – 2.0
DDT	Adult – 35 Child – 10	Adult – 35 Child – 10	Adult – 1400 Child – 400
Toxaphene	*Acute Exposure* Adult –70 Child – 20		
Mirex	Adult – 560 Child – 160	Not Available	Not Available
PCBs	*Immediate Exposure* Adult – 70 Child – 20	Not Available	Not Available
HCBs	*Chronic Exposure* Adult – 700 Child – 200 *Acute Exposure* Adult – 560 Child – 160	Adult – 560 Child – 160	Adult – 42 Child – 12
Dioxin	Adult – 70 picogram Child – 20 picogram	Adult – 0.70 picogram Child – 0.20 picogram	Adult: 70-280 picogram Child – 20-80 picogram

***micrograms of chemicals per day for 154 pound adult (70 kg), and 44 pound child (20 kg)*

Source: www.panna.org

Resources

Websites, books, reports and journals that might be accessed for detailed information on POPs and conventions related to them

- Pesticide Research Journal
- Pesticide Safety News
- Pesticide Research Journal
- AICRP 1999: Pesticide safety evaluation and monitoring. 1999. AICRP on pesticide residues. Division of Agricultural Chemicals. IARI.
- Journal of Environmental Biology
- ICMR Bulletin
- Down To Earth
- Environment Internationl
- CERC 1994: Testiting of Pesticide Residues in Food- A report researched by NIN, Hyderabad, Published by CERC Ahmedabad 1994
- CERC 1999: Pilot survey work on evaluation of pesticide sprayers. Project funded by UNDP.
- Consumers Forum 1993: Proceedings of the National Workshop on Women and Pesticides. November 24 - 26, 1993. Organised by Consumers Forum.
- CPCB 1995: Groundwater Quality in Flood Affected Areas of Delhi. Grounwater Quality. CPCB, MoEF
- CPCB 1995a: Groundwater qualities in problem areas: A Status Report. 1995. CPCB. Groundwater quality series: GWQ/2/1995-96
- CPCB 2000: Water Quality Status of Yamuna River. Assessment and Development of River Basin. CPCB, MoEF: April, 2000
- Indian Journal of Malariology
- Environment Contamination. Toxicology
- Europe 2002: Europe Regional Report. 2002. United Nations Environment Programme; Chemicals. Regionally based assessment of Persistent Toxic Substances. GEF
- Handbook 1989: Toxicity Data Handbook. 1989. Industrial Toxicology Research Center. Vlome III, Pesticides
- ICMR 1993: Surveillance of food contaminants in India. 1993. Report of an ICMR task force study (part 1). ICMR, New Delhi
- Indian Ocean 2002: Indian Ocean Regional Report. 2002. United Nations Environment Programme; Chemicals. Regionally based assessment of Persistent Toxic Substances. GEF
- Insight
- Environment International
- Indian Journal of Environmental Toxicology
- Toxicological and Environmental Chemictry
- Environmental science and Technology
- Indian J. Environ. & Toxicol
- Archives of Environmental Health
- Environmental Pollution
- Trends in Pollution and Toxicology.
- Journal of Physiology
- Environ. Science and Technology
- Jr. of Industrial Control
- Indian Journal of Occupational and Environmental Medicine
- Environment and Ecology
- Aquatic Ecosystem Health and Management
- Journal of Environmental Biology
- Labunska 1999: Labunska I, Stephenson A, Brigden K, Stringer R, Santillo D, Johnston PA, Ashton JM. 1999. Toxic Hotspots: A Greenpeace Investigation of Hindustan Insecticides Ltd, Udyogamandalam Industrial Estate, Kerala. Technical Note 06/99, Greenpeace Research Laboratories
- Chemical Engineering World
- Mecon 2001: Mecon Limited. 2001. Assessment of pollution potential from ship breaking activities. Mecon Limited, Ranchi. Project commissioned by CPCB.
- Mehrotra 1990: Mehrotra NK, Kumar Sushil, Shukla Yogeshwar. 1990. Carcinogenic Effects Of Pesticides. Industrial Toxicology Research Center
- Jr. Industrial Pollution control
- Environmental Pollution Control Journal
- Environ. Contam. Toxicol
- Journal of Environment and Pollution
- Environ. Contam. Toxicol.
- Human and Experimental Toxicology
- The Science of the Total Environment.
- Naoroji 1999: Naoroji Rishad. 1999. Status of diurnal raptors of Corbett national park with notes on their ecology and conservation. Journal, Bombay Natural History Society
- Needs Report 2002: Status Report and Needs Assessment: Stockholm Convention on Persistent Organic Pollutants (POPs) Implementation in India. 2002. The World Bank
- Parivesh 2001: Polychlorinated Biphenyls (PCBs): Persistant Pollutants. CPCB, MoEF. Parivesh: December 2001.
- Fishery Technology.
- Sanctuary Asia.
- Pesticide Safety News
- S. Knight 1996: Merz Knight Sinclair. 1996. Management of PCBs – India. World Bank. October 1996
- Indian Journal on Ecology
- Toxicological and environmental Chemistry
- Current Science
- Estuarine Coastal and Shelf Science
- Marine Environmental Research
- Human and Experimental Toxicology
- Arch. Occup. Environ. Health
- Singh 1992: Singh KP. 1992. Measurement of Ganga River Quality with particular reference to heavy metals and pesticides. NRCD Funded Project conducted by ITRC
- Singh 1997: Singh KP. 1997. Assessment of the impact of wastewater contaminants (metals and pesticides) on environmental, health and agricultural quality of the receiving areas near Kanpur and Varanasi. NRCD Funded Project conducted by ITRC
- Journal of Environmental Pathology, Toxicology and Oncology
- Journal of Environmental Biology
- Tannan 2001: Tannan SK. 2001. Export potential of Indian agrochemical industry. Chemical Business June 2001
- Indian Journal of Medical Science
- Toxic Legacies 1998: Hernandez Von, Jayaraman

Nityanand. 1998. Toxic Legacies; Poisoned Futures: Persistant Organic Pollutants in Asia. Greenpeace International, Amsterdam

▲ Trojan Horses – Persistent Organic Pollutants in India. 2000. Srishti–Toxics Link Report

▲ UNEP 1999 - UNEP: Regionally based assessment of Persistent Toxic Substances – Workshop reports from a Global Environmental Facility project. 1999. UNEP Chemicals.

▲ Journal of Environment and Pollution

▲ WHO 2001: DGHS, Ministry of Health and Family Welfare, Government of India. 2001. Report on Survey of Pesticide Residues in Food Commodities. WHO Country Project (IND-FOS-001 – Quality of Essential Foods)

▲ www.chem.unep.ch
▲ www.pops.int
▲ www.pic.int
▲ www.pesticideinfo.org
▲ www.basel.int
▲ www.ipen.org
▲ www.worldwildlife.org/
▲ www.worldbank.org
▲ www.epa.gov
▲ www.panna.org
▲ www.greenpeaceweb.org
▲ www.unido.org
▲ www.who.int

Places which can be accessed for information on POPs

Libraries, Research Centres, Institutes, Universities and Ministries

▲ Indian Agriculture Research Institute (IARI)
▲ National Medical Library (NML)
▲ INSDOC
▲ Centre for Science and Environment (CSE)
▲ Ministry of Environment and Forests (MoEF)
▲ The Education Resources Institute (TERI)
▲ All India Institute of Medical Sciences (AIIMS)
▲ Industrial Toxicology Research Centre (ITRC)
▲ National Institute of Occupational Health (NIOH)
▲ Jawalhar Nehru University (JNU)
▲ Confederation of Indian Industries (CII)
▲ Indian Institute of Technology (IIT Delhi Mumbai)
▲ The Central Pulp and Paper Research Institute (CPPRI)
▲ National Institute of Oceanography (NIO)
▲ Bombay Natural History Society (BNHS)
▲ Consumer Education and Research Centre (CERC)
▲ National Environmental Engineering Research Institute, Nagpur (NEERI)
▲ Regional Research Laboratories
▲ Bhaba Atomic Research Centre (BARC)
▲ Indian Institute of Toxicology (INTOX)
▲ Indian Council of Agricultural Research (ICAR)
▲ Indian Council of Medical Research (ICMR)
▲ Central Electricity Authority (CEA)
▲ Bose Institute
▲ Wild Life Institute Dehradun (WLI)
▲ Central Pollution Control Board (CPCB)
▲ Salim Ali Centre for Ornithology and Natural History (SACON)
▲ Center for Study of Man & Environment, Kolkata (CSME)
▲ Malaria Research Center (MRC)

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