

Understanding the impact of Persistent Organic Pollutants on Women and the Environment



HUMAN RIGHTS AND ENVIRONMENTAL HEALTH

An environment that has become toxic to humans violates fundamental human rights in several ways.

- An environment that causes illness deprives people of their fundamental right to the highest attainable standard of physical and mental health.
- Toxic chemicals in the air, water and the food can irreparably harm our reproductive systems and affect our right to reproductive health and to found a family.
- The right to live fully in harmony with nature and to enjoy its wonders is violated by contaminated streams and poisoned air.
- The right to develop as human beings to the fullest capacities is violated if chemicals, acting as fetal contaminants, alter the way in which our children will experience joy, human connection and community.

This article is designed to give information about the nature and extent of the chemical contamination of our common environment and its potential effects on our health.

LIVING IN A CHEMICAL WORLD

Today an unregulated and undefined chemical soup permeates the globe. Studies have not yet documented the full magnitude of

this chemical contamination. We do not fully understand its composition, quantity, and range of effects, nor where it is most intensely concentrated. We do know that every person alive today carries approximately 250 chemicals within her or his body, chemicals that did not exist prior to 1945. This concentration of chemicals within every human being on the face of the earth is called the “body burden,” and it is our common legacy from the processes of development and industrialisation.

World War II was a catalyst for the transformation from a carbohydrate-based economy to a petrochemical-based economy, as chemical substitutes began to be invented for goods restricted or made unavailable during the war.

The economic boom that followed World War II supported the parallel boom in the invention and use of chemicals, many of which are associated with the convenience and flexibility of modern living. Environmental health advocates remind us that pesticides and herbicides have increased crop and livestock production, new drugs have curtailed or ameliorated many diseases, and plastics have found many uses within households around the world.

All told, about 100,000 chemicals have

entered into the market since 1945, and it is estimated that 75,000 of them remain in commercial use. The United States alone has increased its volume of synthetic chemicals one thousand-fold over the last 60 years.

These synthetic chemicals find their way everywhere, circulating through soil, air, water and food. They are in the tissues of plants, animals and people.

A startling fact about this increase of synthetic chemicals is that most remain untested for their safety on humans and other species. Today, only about 1.5 percent to 3 percent (about 1,200 to 1,500 chemicals) have been tested for carcinogenicity. No one knows about the risks of cancer carried by the rest. Anecdotal evidence suggests a high correlation between untested chemicals and cancer, as well

ORDINARY FOOD SUPPLIES IN MOST REGIONS OF THE WORLD, ESPECIALLY FISH, MEAT AND DAIRY PRODUCTS, TEND TO BE CONTAMINATED BY POPs.



as with many other health problems such as immune system dysfunction, reproductive failure, neurological and behavioral problems.

Moreover, chemical testing tends to study one chemical at a time, whereas real-life exposure is, in fact, to a broad spectrum of chemicals that may interact or have additive effects.

Furthermore, most chemical testing is based on the idea that, while damage will occur after a certain level of exposure has been reached, exposure below these levels will cause no harm. Exposure studies therefore often start at elevated levels close to the point where cancer or DNA damage is expected, and measurements are done on adult laboratory animals. Risk assessment has to do with the likelihood of exposure for human populations who, because of their work, living situation or diet, risk exposure. Yet the most recent scientific evidence indicates that (1) foetal contamination, for example, can occur at very low levels below those levels which affect adults and which are currently not being tested, and that (2) the timing of exposure may also play a critical role

in terms of possible effects.

However, the information on toxicity for some synthetic chemicals has been of sufficient concern to encourage a number of governments to ban or severely restrict their use. Many of these are pesticides or herbicides, or byproducts or components of industrial processes.

Among these are chemicals called persistent organic pollutants or POPs, which many governments have already eliminated or severely restricted on a national level.

Since particular chemicals are clearly a global problem due to their ability to persist in the environment, to bioaccumulate in the food chain, and to travel long distances across national boundaries, the time is ripe for reaching an international agreement. POPs are a global problem that requires a global solution.

WHAT ARE PERSISTENT ORGANIC POLLUTANTS?

Persistent organic pollutants are toxic substances composed of organic (carbon-based) chemical compounds and mixtures. They are products and byproducts of human industry that are of relatively recent origin. In the early decades of this century, pollutants with these harmful properties were virtually nonexistent in the environment and in food.

Now, ordinary food supplies in most regions of the world, especially fish, meat and dairy products, tend to be contaminated by POPs. Both people and wildlife, everywhere in the world, carry body burdens of POPs at or near levels that can—and often do—cause injury to human health and to entire ecosystems.

What distinguishes POPs from other such substances is that they can travel in the environment to regions far from their original source, and then can concentrate in flora and fauna to levels with the potential to injure human health and/or the environment.

POP's are persistent in the environment. This means that they are substances that resist photolytic, chemical and biological degradation. They are generally semivolatile. Persistent substances with this property tend to enter the air, travel long distances on air currents and then return to earth. They are able to migrate from warmer to colder regions.

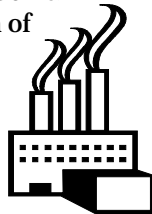
Because they generally are not very soluble in water but very soluble in lipids or fat, they tend to accumulate in fatty tissues of living organisms. In the environment, concentrations of these substances can magnify many

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thousands of times as they move up the food chain.

POPs are also highly toxic, having the potential to injure human health and the environment at very low concentrations. In some cases, POPs at concentrations of only one or a few molecules can attach to intercellular receptor sites and trigger a cascade of potentially harmful effects.

The combination of industrial development, the exponential growth of human settlements and the ever-increasing use of synthetic organic substances is having a seriously adverse impact on freshwater bodies. Many surface and groundwaters are now contaminated.



INJURY FROM POPs

Damage caused to humans and other species by POPs is well-documented. This includes the pathologies of cancer and tumors at multiple sites, reproductive disorders, neurobehavioral impairment including learning disorders, immune system dysfunction, lack of development in various body systems such as the reproductive system, immune system, endocrine system, and neurological systems, adverse effects to the adrenal glands, the liver and the kidneys, heart disease, cerebrovascular disease, still-births, and behavioral changes such as fatigue, depression, personality changes, tremors, convulsions and hyperexcitability.

Some of the effects may be caused by the fact that many POPs can act as endocrine disrupters. Endocrine disrupters are chemicals that can act as false hormones within the body. Hormones are the substances that turn on or off various mechanisms that trigger development. Since bodies cannot recognise the difference between natural hormones and false or “xenohormones,” these chemicals can alter the functioning of a human body or the bodies of other species in alarming ways.

The greatest damage can occur during

pregnancy, when these chemicals mimic or block the miraculously delicate signals that are sent by the mother’s and foetus’ hormonal systems to the developing foetus to guide its development. According to some recent scientific studies by Colborn (1996), DeVito (1995) Jacobson and the EPA (1994), as the child develops, endocrine disruption in the womb and through breast milk may result in cancer, endometriosis, learning disorders, behavioral disorders, immune and neurological disorders and a wide range of other problematic conditions like low sperm count, low IQ, genital malformations and infertility.

The more scientists learn about endocrine-disrupting chemicals, the more troubled they have become.

- There appears to be no minimum dose at which these chemicals are safe for a developing foetus.

- Many of these endocrine-disrupting chemicals have different effects on the developing foetus at different “developmental windows” and at different dosages.

- The impact of many of these endocrine-disrupting chemicals appears in many instances to be additive or even synergistic. To properly evaluate their effects, scientists would have to test for all the mixtures that developing foetuses are actually exposed to at all the different times they might have been exposed.

- People are already carrying loads of many of these chemicals, at levels at which there are known health effects in either chemicals or humans. People do not have “room” for additional exposures.

SPECIAL IMPACTS ON WOMEN

POPs have been associated with particular impacts on women and their ability to bear children, capable of developing into healthy adults.

Breast Cancer: A series of studies have analysed the linkages between several POPs and breast cancer. Surveys over three decades in many parts of the world have shown that DDT or DDE is detectable in almost all samples of adipose tissue of the fat of human breast milk. Eleven studies have analysed various organochlorine compounds including DDE, polychlorinated biphenyls (PCBs) and other pesticides and breast cancer. These include studies by Franck Falck, Mary Wolff and others that have compared blood samples of women with breast cancer and found

that DDE (a metabolite of DDT) levels were 35 percent higher in women with cancer.

While these studies are controversial, they do indicate the need for continued investigation. Studies done in Long Island, New York, show a significant association between residence near chemical plants and risk of contracting breast cancer. Furthermore, the closer a woman lives to one of these plants, the greater chance of developing breast cancer.

Lactation: PCBs, which are electrical insulating compounds, have been classified as contaminants of human milk since 1996. Studies by Walter Rogan and others show that the presence of DDT and PCBs in breast milk can decrease the ability to breast-feed, with a 40 percent decrease in lactation time reported among women with the highest levels of DDT and PCBs in their breast milk.

Endometriosis: Statistics on the incidence of this disease worldwide are still lacking. But endometriosis appears to be on the rise in the U.S., where it afflicts 10 to 20 percent of women of childbearing age. Prior to 1921, there were only 20 reports of the disease in the worldwide medical literature. German researchers report that women with endometriosis have higher levels of PCBs in their blood than women who do not suffer from the disease. Animal studies indicate that endometriosis is closely linked with exposure to dioxin.

FOETAL CONTAMINATION AND WOMEN'S ABILITY TO BEAR CHILDREN

Miscarriage: Animal studies indicate that exposure to certain synthetic chemicals, such as PCBs, increase the risk of miscarriage. Similar studies implicate chemical exposure with tubal pregnancies.

Intellectual Development: Studies done by Sarah and Joseph Jacobson on the intellectual impairment of children exposed before birth to PCBs indicate that these children suffer from lower fill-scale and verbal IQ scores, with strongest effects being reported on memory and attention. The most highly exposed children are twice as likely to be at least two years behind in reading comprehension. What is of concern is that these effects are seen in children exposed to PCB concentrations only slightly higher than those found in the general population.

Dichlorodiphenyltrichloroethane (DDT): a white crystalline, water-insoluble solid, $C_{14}H_9Cl_5$, usually derived from chloral by reacting with chlorobenzene in the presence of fuming sulfuric acid: used as an insecticide and as scabicide and pediculicide: agricultural use prohibited in the U.S. since 1973.

Dichlorodiphenyldichloroethylene (DDE): a metabolite of DDT; structurally-related to DDT and present as contaminants of technical-grade DDT; it is non-biodegradable and produced slowly in the environment.

Sperm Count: Carlson et al. and others have determined that sperm counts are dropping, especially in industrialised countries. Among study participants, the more recently a male was born, the lower the average sperm numbers and the greater the number of sperm abnormalities. The hypothesis is that foetal contamination may be responsible for these lower sperm counts, since studies of other species indicate that lowered sperm count is closely associated with before-birth exposure to chemicals. Lowered sperm count is also related to other disorders like testicular cancer, cryptorchidism (undescended testicles), and hypospadias (malformed penis).

Immune System Dysfunctioning: The contamination of breast milk has been particularly severe among indigenous peoples in the high Arctic, where many people eat the wild food from land and sea. Here, babies take in seven times more PCBs than other infants. Recent studies indicate that these children do not produce the necessary antibodies when they receive vaccination for smallpox, measles, polio and other diseases.

Temperament Change: Darville and others have studied children born to mothers who ate contaminated fish from Lake Ontario. These fish were contaminated with a wide range of POPs like PCBs, dioxin, dieldrin, chlordane, and mirex. The children appear to be over-reactive to stimulation, demonstrate a greater number of abnormal reflexes, and do not smile or seem to experience joy as much as do children whose mothers did not eat contaminated fish.

WHAT WOMEN CAN DO

Local Action: Women's groups need to become informed and share information about POPs and their sources.



In most Northern countries, production and intentional use of the dirty dozen POPs (pesticides: hexachlorobenzene, mirex, chlordane, DDT, endrin, toxaphene, heptachlor, aldrin and dieldrin; industrial chemicals: polychlorinated biphenyls (PCBs), hexachlorobenzene; unintentional products: dioxins, furans) are already banned or severely restricted. But POPs are still present in ordinary food and can enter the environment from sources such as old electrical equipment and contaminated sites. POPs are also created as unwanted wastes by many processes, especially combustion or incineration or chlorine-containing wastes such as PVC (vinyl) plastic, bleached paper and spent solvents.

POPs DO NOT REPRESENT A “RISK.” RATHER, THEY REPRESENT A CURRENT SOURCE OF SIGNIFICANT INJURY TO THE BIOSPHERE—TO HUMANS, TO WILDLIFE AND TO ENTIRE ECOSYSTEMS ALL OVER THE WORLD.

Production and intentional use of POPs are still common in many Southern countries and contamination from conventional sources and combustion processes can be even greater than in the North.

Women should monitor in their communities the kind of pathologies associated with contamination by POPs and use this information to demand clean-up and prevention.

Women have the right to know what is in their water. Tell your water officials you are interested in whether they have tested for chemical contamination, especially for the herbicides atrazine and dachtal. The presence of these chemicals often indicates the presence of other chemicals.

Women have the right to know what is in their food. You have the right to know what chemicals may be in your soils and what chemicals have been used to grow the food you might purchase. Tell your agriculture officials that you are interested in whether they are testing for chemical contamination.

Women have a right to know what is in the air. Tell your government that you support high air-quality standards and that you want to know what emissions are being released by companies

located within your country, and what chemicals are in the products these companies manufacture.

International action: Women’s groups can become active in ensuring that the process of negotiating international agreements on POPs fulfils the desired objectives.

Chemical industry representatives and some others want to define the goal of a global POPs convention as the “better management of risks associated with POPs.” This language is unfortunate and points in a bad direction.

POPs do not represent a “risk.” Rather, they represent a current source of significant injury to the biosphere—to humans, to wildlife and to entire ecosystems all over the world. Nor is the better management of POP-related risks an appropriate goal of a global convention, since POPs, by their very nature, are unmanageable substances.

The goal of a POPs convention must be the establishment of a systematic and sustained program of action to eliminate POPs and their sources. This is the only course of action that can, over time, eliminate the injury that they cause. (A POPs management regime should be pursued as interim measures under circumstances where POPs elimination requires an extended phase-out period.)

Women should join and support coalitions of organisations such as Greenpeace and the Intergovernmental Negotiating Committee (INC) to establish a legally-binding Global Program of Action designed to eliminate persistent organic pollutants and their sources based on the following principles:

- It should be understood that the POPs Program of Action established under a global, legally binding agreement will primarily entail a solutions-oriented regime. It should be acknowledged that many important countries lack the capacity, on their own, to eliminate POPs and their man-made sources without significant external assistance. A meaningful POPs Elimination Agreement must include significant commitments for shared responsibility including external assistance as well as technical and other aid in capacity enhancement. This regime must actively encourage the establishment of cost-effective and efficient means to achieve desired outcomes.
- No country or region will be asked or required to take action under a POPs Agreement

that is substantively harmful to the health or to the well-being of its people. Special consideration should be given to infectious disease control, necessary food production and other significant, economic, social or health-related matters. Assistance will often be required to help countries identify and make available cost-effective alternatives to POPs and their sources, including nonchemical alternatives. A



proposed alternative to POPs should not be considered appropriate or acceptable if it poses a real local or regional health or environmental threat because of acute toxicity or other properties—even if that alternative is not itself a POP.

- It should be understood that the elimination of POPs is primarily a qualitative, not quantitative undertaking. Once a substance has been listed as a POP for purposes of the agreement, the goal of elimination should become operative. A listed POP has no acceptable emission limit value; no acceptable daily intake, etc. (except as needed on an interim basis with clear sunset deadlines). Once a substance is listed as a POP, it is inappropriate to accept its continued generation and release into perpetuity. We should reject the claim that emissions and releases of POPs can be effectively and safely managed and controlled forever.

- For those POPs already identified as UNEP action targets—dioxins, furans, polychlorinated biphenyls (PCBs), DDT, chlordane, heptachlor, toxaphene, hexachlorobenzene, aldrin, dieldrin, endrin, and mirex—the agreement should mandate a rapid, but orderly and responsible global program of action that, taking into account points 1 to 3, will:

- For those POPs intentionally produced, phase out and then ban all intentional production and intentional use and also end all imports, exports, transfers and sales.

- For those POPs that are generated as unwanted contaminants, byproducts and combustion products, we must identify and phase out significant man-made sources. In identifying sources, consideration should be given to industrial processes, waste disposal technologies and man-made products and materials routinely associated with the generation of POPs during their ordinary life cycle.

- For obsolete POP stocks and environmental POPs reservoirs, we must identify, collect and destroy the chemicals by means that do not

themselves cause hazards, generate POPs, or otherwise threaten or injure health and/or the environment.

- Reasonable criteria as well as a workable and transparent procedure should be established for identifying new POPs beyond the original 12 as targets for the Global Program of Action. Once new POPs have met the established criteria according to the established procedure, then they too should be subjected to elimination as described above.

- The elimination of POPs should proceed through a transition regime that is rapid, orderly and just. Phase-out transitions should proceed through a planned and orderly regime designed to keep economic and social costs to a minimum and to avoid disruptions and dislocations. In some cases, there will be need for transition assistance and/or other aid to specific groups of workers or communities that currently depend for their livelihood on production or use of POPs, on technologies that generate POPs during their ordinary life cycle. When there are economic benefits as well as economic costs associated with a POPs phase-out regime, these should be equitably distributed among affected groups.

Further information:

The **UNEP/Chemicals Clearinghouse** Website: <<http://irptc.unep.ch/irptc/>> provides information on chemicals mandates, major activities and functions related to the management of chemicals. Website: <<http://irptc.unep.ch.pops>> gives updates on POPs negotiations and information on progress made by countries to initiate action to reduce or eliminate POPs.

The **Multinational Resource Center**, Washington D.C., Website:<<http://essential.org>> provides information about industry track records regarding their use of chemicals. It can also inform you about individual chemicals and what their toxic effects might be. E-mail specific inquiries to Marcia Carroll at <mrc@essential.org> or call her at (1-202) 387-8030.

Health Care Without Harm Campaign at <<http://www.sustain.org/hcwch>>, P.O. Box 6806, Falls Church, VA 22040, U.S.A.

WEDO's Action For Cancer Prevention Campaign at <<http://www.wedo.org>> or contact Pamela Ransom at (1-212) 973-0325 for specific information. 355 Lexington Avenue, New York, NY 10017, U.S.A.

You can reach **Greenpeace U.S.** at (1-202) 462-1177 or at its site at <<http://www.Greenpeace.org>>, 1436 U Street, N.W., Washington DC 20009, U.S.A.