



GLOBAL ENVIRONMENT FACILITY  
INVESTING IN OUR PLANET



# Cleaning Up

RIDDING THE WORLD OF DANGEROUS CHEMICALS

# Foreword





**Monique Barbut**  
CEO and Chairperson  
Global Environment Facility

Many chemicals are dangerous to human and ecosystem health. Among the worst is a range of synthetic organic compounds that persist in the environment for long periods of time.

GEF's involvement in tackling the threats posed by these persistent organic pollutants — or POPs — dates back to 1995, with the introduction of the International Waters Operational Strategy and its component to reduce pollution from chemicals and pesticides. In the late 1990s, GEF began to develop a portfolio of strategically designed projects, including regional assessments and pilot demonstrations that addressed a number of pressing POP issues. These initial activities allowed the GEF to quickly respond to requests for support from the negotiators of the Stockholm Convention for implementing the Convention. This in turn led to the adoption of guidelines by the GEF Council for POPs-enabling activities in May 2001, the same month the Convention was adopted.

In the ensuing years, the GEF has committed US\$ 360 million to projects in the POPs focal area. This cumulative GEF POPs allocation by late 2008 had leveraged some US\$ 440 million in co-financing to bring the total value of the GEF POPs portfolio to US\$ 800 million.

The GEF is investing these funds in a range of programs and activities outlined in this publication to rid the world of dangerous chemicals now and forever. The dividends from these investments will mean a cleaner, safer and sustainable environment for future generations.

I encourage you to use this information and to join us in this essential and critical task.

INTENTIONAL



Danger !

A PERSISTENT AND

## International Challenge

### DDT, HCB, PCB.

Three letters often hide the long and dangerous names for a number of chemicals now banned by the international community. *dichloro-diphenyl-trichloroethane* (DDT), *hexachlorobenzene* (HCB), and *polychlorinated biphenyl* (PCB) are part of the 'dirty dozen' of persistent organic pollutants, referred to simply as POPs.

Of all the pollutants released into the environment every year by human activity, POPs are among the most dangerous. Highly toxic, they can cause an array of adverse effects, including disease, birth defects among humans and animals, and death. In addition to minor irritations such as allergies, POPs can create much more severe health impacts, including cancer, damage to the central and peripheral nervous systems, reproductive disorders, and disruption of the immune system.

These impacts do not respect international borders, and are often intergenerational, affecting both adults and their children (see box "*Human Health Impacts of POPs*").

Arctic food chains, for example, are severely affected by POPs, as these chemicals degrade even more slowly in cold environments. Because POPs concentrate in fatty tissues, they can affect the health and well being of the indigenous people that rely on fat-rich foods of Arctic mammals.

The World Health Organization estimates that pesticides may cause 250,000 unintentional deaths a year and that nearly three million people may suffer specific and nonspecific acute and chronic effects, mostly in developing countries. Many of these chemicals, particularly POPs, affect people and wildlife even at very low doses.

*“Today’s children are born with a body burden of synthetic, persistent organic pollutants—the consequences of which will not be known for another 50 years or so.”*

**The Health of Canada’s Children,**  
published by the Canadian Institute of Child Health, 2000.

The serious environmental and human health hazards created by these chemicals particularly affect developing countries where systems and technology for monitoring, tracking and disposing of these chemicals can be weak or non-existent. Across Africa, for example, at least 50,000 tons of obsolete pesticides are contaminating soil, water, air, and food sources.

These pesticides are often located near people and their livelihoods, particularly poor communities. Children often face heightened exposure and are at higher risk than adults. Most African countries have poor recording systems and many farming communities have no access to medical care, thus incidents of pesticide poisoning are underreported and inadequately treated.

### **The Stockholm Convention**

Recognizing the dangers of POPs, many countries began limiting or banning their production, use, and release. These efforts culminated in the Stockholm Convention on Persistent Organic Pollutants that was adopted in 2001 and entered into force in 2004. More than 160 countries Parties to the Convention agree to eliminate or reduce the release of POPs into the environment (see box *“The Stockholm Convention on Persistent Organic Pollutants”*).

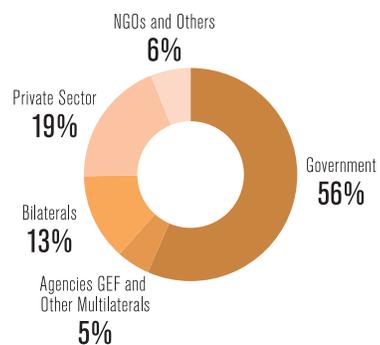


# The GEF's Leading Role

The GEF is the lead institution providing technical and financial assistance to support the efforts of developing countries and countries with economies in transition to implement the Stockholm Convention. The GEF is helping countries create national inventories of POPs and working with these nations to reduce or eliminate the chemicals' use and release into the environment. The GEF also helps facilitate safe disposal and supports the development of environmentally sound alternative products, practices, and techniques.

Since adoption of the Stockholm Convention in May 2001, the GEF has committed US\$ 360 million to projects in the POPs focal area and leveraged some US\$ 440 million in co-financing, bringing the total value of the GEF POPs portfolio to US\$ 800 million.

## SOURCES OF CO-FINANCING



## Strategy

There is a limited capacity to deal with POPs in developing countries, often because these countries lack basic capacities to manage chemicals. The GEF strategy has been to help countries prepare National Implementation Plans (NIPs), assessing and prioritizing POPs issues, and to support their implementation. A large number of countries have now developed their initial plans and the demand for GEF funding for new projects is growing.

There are three strategic GEF programs for the period 2006-2010:

- *Strengthen capacity of countries to implement the Stockholm Convention*

About 40% of funding is directed to this program, and includes strengthening regulatory frameworks and assistance to countries that lag farthest behind to establish basic institutional and regulatory capacities to safely manage chemicals.

- *Invest in partnerships needed to carry out National Implementation Plans to achieve POPs reduction and elimination impacts*

Approximately 45% of funding is directed to this program to phase out and dispose of PCBs, support non-POPs alternative products and practices, and destroy pesticides wastes.

- *Create partnerships to demonstrate innovative technologies and best practices to reduce POPs or create safe substitutes to their use*

About 15% of resources are directed at the identification of alternative products or practices for DDT or POPs termiticides, demonstration of destruction technologies, and demonstration of best available techniques and best environmental practices.



## WHAT ARE POPS?

Persistent organic pollutants (POPs) are pesticides, industrial chemicals, or unwanted by-products of industrial processes that have been used for decades but have more recently been found to share a number of disturbing characteristics, including:

- **Persistence** — they resist degradation in air, water, and sediments;
- **Bio-accumulation** — they accumulate in living tissues at concentrations higher than those in the surrounding environment; and
- **Long-range transport** — they can travel great distances from the source of release through air, water, and migratory animals, often contaminating areas thousands of kilometers away from any known source.

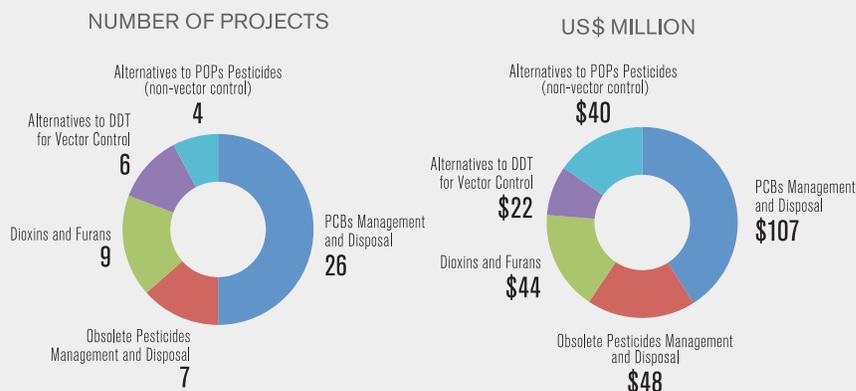
The Stockholm Convention currently focuses on 12 POPs of immediate concern—often referred to as “the dirty dozen”—pesticides, industrial chemicals, and unintentional byproducts. The pesticides are aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene

(HCB), mirex, and toxaphene; the industrial chemicals are polychlorinated biphenyls (PCBs) and HCB (also mentioned under “pesticides”); and the unintentional byproducts are dioxin and furans (as well as PCBs and HCB). Unintentional chemical by-products result from combustion and industrial processes and are among the most potent cancer-causing chemicals known.

These synthetic chemicals move everywhere, even through the placental barrier and into the womb, exposing the unborn during the most vulnerable stages of development.

Most recently, the parties in May 2009 took the historic decisions to add 9 new chemicals to the list of controlled substances under the Convention: alpha- and beta hexachlorocyclohexane (by-products); lindane and chlordane (pesticides); tetra- and hexabromodiphenyl ether, hexabromobiphenyl, pentachlorobenzene, perfluorooctane sulfonic acid and perfluorooctane sulfonyl fluoride (industrial chemicals).

### GEF INVESTMENTS IN POPS BY “ISSUES”



## THE STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS

The Stockholm Convention focuses on POPs pesticides, industrial chemicals, and unintentional byproducts, of immediate concern.

The Stockholm Convention’s objectives include the following:

- Eliminate the production and use of specific POPs;
- Restrict the production and use of DDT only to disease vector control under WHO guidelines;
- Restrict exports of POPs;
- Develop strategies for identifying stockpiles of POPs and products containing POPs;
- Take measures to ensure that POPs wastes are managed and disposed of in an environmentally sound manner;
- Develop strategies for identifying sites contaminated by POPs;
- Ensure that PCBs are managed in an environmentally sound manner and, by 2025, take action to remove PCBs from use;
- Develop and implement action plans to identify the sources and reduce the releases of POPs byproducts; and
- Identify other chemicals with POPs characteristics and bring them under the control of the Convention.



## HUMAN HEALTH IMPACTS OF POPS

Evidence links human exposure to specific POPs or classes of POPs with health effects, including:

- Cancers and tumors;
- Neurobehavioral impairment, including learning disorders and reduced performance on standardized tests;
- Immune system changes;
- Reproductive deficits and sex-linked disorders;
- Shortened period of lactation in nursing mothers; and
- Diseases, including increased incidence of diabetes.

The evidence suggests that women, infants, and children are especially vulnerable to certain effects of POPs. Mothers transfer POPs from their own body, through the placenta, into the fetus at vulnerable stages of development. This can harm the developing infant. The harm caused, however, is often not easily recognized. Learning and behavior disorders in children and adolescents have

been linked to pre-natal POPs exposure. Exposure to POPs before birth also contributes to immune system disruptions, reproductive and sex-linked disorders, and other diseases and deficits that are triggered later in life.

Dioxins in particular are considered among the most toxic substances known to science. Exposure to dioxins associated with health impacts is measured in parts per trillion (12 zeros) or even smaller amounts.

Dioxin exposure has also been associated with diabetes, defects in permanent teeth, adverse effects on thyroid hormones, and increased respiratory infections. Studies have shown that workers at waste incinerator plants may have higher exposure to dioxins and a higher likelihood of multiple types of cancer, decreased liver functioning, cardiac problems, allergies, chlo-racne and skin ailments.

## CLEANING UP IN CUBA

Even small projects targeting local communities can make a difference. At the Isleta Sur community in Cuba, a nearby waste dump was receiving an average of 150 tons of solid waste daily, which was burnt without any safeguards. Open burning of organic waste is an important source of dioxins and furans formation and release in developing countries. According to the Ministry of Science, Technology and Environment, this burning

accounted for 6% of the dioxins and furans emissions into the atmosphere, which can greatly impact the health of local communities throughout the province (see box: "Health Impacts of POPS").

The Centro Ecológico de Procesamiento de Residuos Urbanos initiated a project to separate wastes and find economic uses, including the composting of organic matter.

The result was improved quality of life for nearly 566 community members. The project won the nomination of a United Nations Development Programme Administrator Award for Innovation and Creativity in 2006, and was later featured in the international media outlet CNN. The project is now being replicated in Jamaica.



# Engaging Civil Society

In many countries, the public is often unaware of the serious health problems and environmental harm that persistent organic pollutants (POPs) and other chemical pollutants can cause. Without the full participation of civil society, including non-governmental organizations (NGOs) and the media, significant progress on reducing and eliminating dangerous chemicals and protecting public health and the environment will be increasingly difficult.

NGOs play an important role by helping local communities understand POPs, their sources, the extent of harm they can cause, and the kinds of measures needed to reduce and eliminate exposure. NGOs can also provide valuable contributions to government policy, and build public support to reduce and eliminate POPs.

To assist NGOs, the GEF supported the *International POPs Elimination Project* or IPEP. Together with the International POPs Elimination Network (IPEN), IPEP enabled more than 350 NGOs in 65 developing countries and countries with economies in transition to engage in more than 290 distinct project activities within their countries. The website (<http://www.ipen.org>) offers further details of project activities which include:

- POPs country situation reports
- POPs hotspot reports
- Policy briefs
- Public awareness and educational activities

These activities explored a variety of issues, e.g.: a highly contaminated DDT pesticide dump in Tanzania; dioxin analysis of fish in Egypt; PCBs monitoring and inventories in Russia and Armenia; and a 17-country project that involved sampling eggs for dioxins, furans, PCBs, HCB, and lindane.

## Cleaning Up

### NATIONAL IMPLEMENTATION PLANS

Less than five years after the Stockholm Convention went into force, the GEF is assisting more than 135 countries to inventory their POPs and develop priority interventions to reduce or eliminate releases of these chemicals to the environment and risks to human health. These efforts have also raised awareness and built the capacity of institutions to consider and plan for eliminating, not only POPs, but other chemicals as well. Through these activities, intra-governmental coordination, stakeholder engagement, and open information have been advanced, particularly towards industry and the private sector.



At the end of 2008, the GEF had funded or was funding the preparation of such an initial National Implementation Plan (NIP) in 135 countries. More than one hundred countries are now at the stage where their plan has been endorsed and submitted, or is at the stage of final review and endorsement. Sixty-six of these countries have already submitted their National Implementation Plans to the Convention.

GEF efforts at developing National Implementation Plans help countries:

- Determine how the process will be coordinated and organized;
- Establish a POPs inventory and assess national infrastructure and capacity;
- Set priorities and objectives;
- Formulate a National Implementation Plan, and specific action plans on POPs; and
- Win endorsement of plans by stakeholders.

Recognizing that POPs management must be grounded in a foundation for chemicals management more broadly, the GEF guidelines recommend that countries develop or update their national profile for chemicals management with an additional POPs-specific focus as an early activity.

## Cleaning Up

### AFRICA

Residents of Muziva in Zambézia Province, Mozambique believed they had found a treasure when they threw handfuls of soil from a small pit into nearby lagoons. In just minutes a good catch of dead fish would float to the surface, which they quickly sold at the local market.

The “treasure,” however, was deadly contaminated soil from a private company that disposed of its obsolete pesticide stocks in the pit during the early 1980s. This experience is not uncommon among many African countries where obsolete pesticides are silent killers.

Throughout Africa, more than 50,000 tons of obsolete pesticides have accumulated, often stored in leaky drums, contaminating the soil, water, air, and food and poisoning people and wildlife. Passing militias have even used drums for target practice. In Morocco alone, for example, it is estimated that there are some 700 tons of obsolete pesticides at 225 sites throughout the country.

Improper management of obsolete pesticide stocks can adversely affect human health and contaminate the environment with lasting effects. In Africa, most countries lack the technical, institutional, and financial infrastructure to implement sound pest management policies and practices.

In the absence of corrective actions, the adverse impact on human health and the environment will increase over time, as will remediation costs. This has already been demonstrated in countries of the Sahel and North Africa affected by locusts, where significant new stocks of obsolete pesticides are accumulating due to a range of technical and political factors.



The *Africa Stockpiles Programme (ASP)* was launched in September 2005 with the goal to clear all obsolete pesticide stocks from Africa, and establish measures to help prevent their recurrence. Projects under the program are also designed to train and strengthen institutions on important chemicals-related issues, create opportunities to address broader hazardous waste management issues, and evaluate new cleaner disposal technologies.

To address the breadth of the problem, the ASP is designed as a 12–15 year program of multiple phases. The total cost of the program is estimated at \$250 million, of which the GEF will contribute up to \$80 million.

In Tunisia, one of the first ASP projects, 1,200 tons of obsolete stocks were identified at a large number of containment sites. In addition to removing and disposing of these stocks and to cleaning up the related sites, the program aims to: strengthen existing regulatory systems for pesticide control; promote ongoing Integrated Pest Management (IPM) efforts, particularly with small-scale farmers; promote certified organic agricultural production; develop a communications campaign to raise awareness about pesticide impact and opportunities created by IPM; and upgrade storage facilities.

In Morocco, the Africa Stockpiles Program is helping to prevent future stockpiling by strengthening the regulatory, legal and management framework for managing pesticides; undertaking public communications campaigns disseminating information on pesticide risks; and refurbishing pesticide storage facilities. The capacity of the Centre for Poison Control of Morocco will also be strengthened, a direct contribution to the objectives of the Strategic Approach to International Chemicals Management (SAICM).

Similar efforts are planned or underway in other countries and regions, including in Syria, in Belarus and Moldova, in the Caucasus and Central Asia, in China and Vietnam, in Nicaragua, and an expansion of the ASP to Egypt, Eritrea, Mozambique, and other states.

## Cleaning Up

### POLYCHLORINATED BIPHENYLS (PCBS)

Polychlorinated biphenyls (PCBs) are a class of synthetic organic chemicals that have been used extensively for more than 60 years, including in electrical equipment, such as transformers and capacitors, and as additives in paint, copy paper, plastics, etc.

They are also one of the most widespread substances known to be carcinogenic and are toxic to humans and wildlife generally. PCBs are linked to reproductive failure and suppression of the immune system in seals, mink, and other wild animals. Human exposure to PCBs through contaminated foods may cause health problems. In humans and animals, PCBs accumulate in the fatty tissues and can cause developmental and behavioral disorders in children, and disruption of endocrine and immune systems.

Hundreds of thousands of tons of PCBs were manufactured prior to being banned by the Stockholm Convention, with annual world production peaking in the late 1960s at close to 60,000 tons per year. Now found in the air, water, soil, and food, PCBs have created a serious global environmental and health challenge.



Although they are now banned under the Stockholm Convention, PCBs continue to pose a risk to human health and the environment because of the wide array of PCB-containing electrical equipment still in service. Tons of wastes containing or contaminated by PCBs are also being held at temporary storage sites, particularly in developing countries. The Stockholm Convention requires governments to phase out in-place equipment containing PCBs by 2025, as long as the equipment containing PCBs is maintained to prevent leaks.

The GEF has been working to help countries locate and safely destroy PCBs while promoting effective management through training, public awareness and institutional development. Some early projects have successfully addressed PCB pollution. In many former Soviet republics, for example, governments have the responsibility to dispose of large volumes of abandoned electrical equipment. In one of those republics, Moldova, the GEF has helped export 900 tons of such equipment, while 370 tons of obsolete pesticides have already been exported for final disposal in Western Europe.

To recycle metal components while minimizing international disposal costs, GEF projects also emphasize opportunities to undertake all or part of operations on a national or sub-regional basis. In Morocco, for example, the GEF is working to build capacity and infrastructure to allow cost-effective local treatment of high volume/low PCB-contaminated transformer oils, and for recycling and valorization of contaminated material.

#### TUNISIA

Tunisia's National Implementation Plan helped the government identify the sound management of PCBs as one of its top priorities. The Government chose a programmatic national approach where its GEF supported PCB project sits within the framework of the national Sustainable Solid Waste Management Program.

To help the Tunisian Government implement a national action plan for the management of PCBs, the GEF project helped create:

- An inventory of PCB stockpiles and of in-place equipment owned by the national electricity company and by the private sector, and
- A management plan for the phased decommissioning and elimination of PCBs.



Disposal options for PCB stocks will be assessed and selected to eliminate all stocks of PCBs and all PCB-containing equipment currently owned by the national electricity company. Financing will also be made available to train those who handle PCBs, in both the public and private sectors. These activities will directly eliminate large sources of PCBs to the environment, and build the capacity to safeguard and better handle the other sources of PCBs that remain.

#### LATVIA

As one of the former Soviet Republics, Latvia inherited a network of transformers and capacitors using PCBs. A series of investigations were undertaken to map this equipment, and a project began in 2006 to replace equipment containing PCBs.

With the PCB situation largely mapped during the development of the National Implementation Plan, a follow-up project began in 2006 to replace equipment containing PCBs. Through a partnership with the industries holding PCB equipment, proper management and safe disposal abroad has avoided and mitigated the potential release of PCBs into Latvian soil, waters, and air. Identifying and registering PCB sources has also helped to avoid dioxin emissions from improper disposal.

The project's initial target to safely dispose of 280 tons of PCB-containing equipment has been more than doubled — today at least 590 tons of PCB equipment (80 % of the identified



PCB equipment in Latvia) from 112 companies will have been safely disposed of within the project.

One success factor was the more than 100 individual meetings with enterprises, high-profile mass media coverage, and three special seminars that dealt with PCB issues among key stakeholders, including PCB holding companies and the State Environmental Service. This public information and training work has significantly facilitated the introduction of safe PCB management and disposal operations.

#### CHINA

Although China no longer produces PCBs, thousands of tons of these chemicals still exist around the country. During the 1980s, and following growing health and environmental concerns, the government removed most PCB-containing capacitors from service and stored them in temporary storage facilities, mostly in underground concrete storage chambers and caves intended for a period of 3–20 years.

Recent investigations, however, indicate that most PCB-containing equipment remains in these temporary storage facilities, many of which are leaking PCBs into the environment.

To help China address these challenges, the GEF approved a project in 2005 to demonstrate cost-effective PCB management in the Zhejiang province. The project is providing training and an institutional framework at both the national and provincial levels (Zhejiang province is serving as a demonstration), raising public awareness, and reviewing and revising national and provincial policies and regulations for better PCB management.



## FARMERS IN THE RIFT VALLEY

A 2006 study of the Rift Valley, *Pesticide Use, Accumulations and Impacts*, showed that Ethiopia had more than 1,500 tons of obsolete pesticides and 1,000 tons of contaminated equipment (containers, sprayers, etc) stored at 400 sites. The storage conditions were poor, with leaking drums, bursting sacks, and the stores themselves in a neglected state, posing a great threat to human health and the environment.

Although the Ethiopian Ministry of Agriculture and Rural Development has removed 1,500 tons of pesticides from eight sites over the past decade, farmers in the Rift Valley continue to increase their use of pesticides, despite rising prices, while neglecting safer, traditional pest control methods. Seventy-five percent of interviewed farmers in the study area believed they could not sustain the current level of agricultural production without the use of pesticides.

Seventy-four percent of respondents said that pesticides do not affect their health. Records from four health centers, however, revealed serious health effects in farming communities, including death, as a result of improper pesticide storage and use.

More than 90% of farmers interviewed prepared their pesticides close to water sources that are used by local people for drinking, cooking and other household purposes. In all, 61% washed their pesticides sprayers and other equipment on the farm field. Seventy-two percent of respondents reported re-using pesticide containers for storing food, other products and general domestic purposes.

The project has introduced mobile thermal desorption technology for the first time in China for *in situ* decontamination of soil with relatively low PCB concentrations. In Zhejiang, the project is helping to identify all PCB storage facilities and providing substantive training on PCB management, recovery, packaging, transportation, and final disposal in an environmentally sound manner. Most PCB sites have been identified and the process of clean-up has started.

#### DESTRUCTION TECHNOLOGIES

Projects also promote non-incineration for destroying PCBs and other POPs and related hard-to-destroy chemicals such as CFCs. These technologies rely on chemical reaction or physico-chemical processes to destroy POPs. As such they are less prone to the potential for generation of dioxins and furans that might arise from combustion of POPs chemicals. These technologies, however, have not yet been introduced in developing countries due to a lack of information and technical knowledge, limited vendors, and a need for supporting regulations and policy.

Two GEF projects demonstrate how such obstacles can be overcome and explore effective alternatives for destroying

PCBs in the developing world. In the Philippines, a GEF project to destroy PCBs without incineration will be used to treat approximately 1,500 tons of equipment and wastes containing PCBs, and will ultimately address all of the 7,000 tons of PCBs in the country.

Another project in China will enable environmentally sound management and disposal of obsolete POPs pesticides and associated wastes. The project will treat a minimum of 10,000 tons of identified POPs pesticide wastes and 1,000 tons of dioxin-rich fly ash. The project will also introduce regulatory reforms and strengthen the national capacity to identify, assess, manage, and treat other such wastes in an environmentally sustainable manner.

In addition to those discussed here, many other countries around the world are engaging with the GEF to develop and implement PCB management, phase-out, and disposal programs, including Argentina, Brazil, Honduras, Mexico, Uruguay, Armenia, Azerbaijan, Belarus, Kazakhstan, Macedonia, Mongolia, Romania, Ghana, Tunisia, India, and Vietnam.



## ASP IN MOLODO

In July 2008, Mali's Ministry of Agriculture, Ministry of Environment and Sanitation, Central Veterinary Laboratories (LCV), and a number of national programs undertook the urgent task of safeguarding, cleaning and remediating a highly contaminated site in the town of Molodo. The site contained large amounts of highly toxic obsolete pesticides and empty containers, which for many years had contaminated soil, water and vegetation.

Using local staff and simple cost-effective techniques, 2400 liters of obsolete pesticides were safely stored, including the insecticides dieldrin, parathion, fenthion and cyanophos. An additional 260 contaminated containers were removed, and the soil at the site remediated using landfarming technology, a bioremediation treatment successfully tested for the first time in Mali that utilizes soil microorganisms and agricultural methods in an aerobic process to reduce soil contamination.

In line with the project's environmental management plan and health and safety requirements, staff that worked at the site were medically tested for accidental exposure, and found healthy. Samples from the site were collected to determine baseline and post-treatment values, and the area was subsequently fenced to prevent human and animal access.

## Fighting Malaria

Malaria continues to be endemic in the developing world, causing more than one million deaths every year, mostly among children living in Sub-Saharan countries. Without a truly effective vaccine against malaria, public health agencies remain focused on controlling the mosquitoes that carry the malaria parasite.

That control has often resulted in the use of the insecticide DDT, a paradoxical and controversial POP. While effective in controlling mosquitoes and saving millions of lives, DDT has been shown to be toxic to humans and wildlife. Mosquito resistance to DDT is also increasing, particularly in West Africa.

The good news is that the fight against malaria does not have to depend on using DDT. Since 2004, a GEF project has been carried out with the technical support of the Pan American Health Organization (WHO) in Mexico, Belize, Costa Rica, Guatemala, Honduras, Nicaragua, El Salvador, and Panama. In Mexico and the Central American countries, more than 100 million people live in areas favorable to the transmission of malaria, and 35 percent of these people are at high risk of contracting the disease.

This highly successful GEF-funded effort to reduce the incidence of malaria without the use of DDT demonstrated significant progress, with an average of between 26 percent and 80 percent reduction in each country, and about 30 percent reduction for the whole region. This success is forming the framework for new DDT reduction projects underway in Africa, the Middle East, Southeast Asia, and elsewhere in the world.



Critical to the success of these projects is the use of public health measures aimed at controlling mosquito breeding sites, rapid diagnosis and treatment of those affected with malaria, and active community participation. Similar public health measures in the Mexico and Central America project include participatory community treatment of larval breeding sites, improved housing conditions, periodical clearing of vegetation around the houses, and elimination of stagnant water deposits.

## Cleaning Up MEDICAL WASTE

As health systems are strengthened and healthcare coverage expands in developing countries, an increasing amount of waste is generated, which can substantially increase the release of persistent organic pollutants and other toxic substances to the environment. This is often an unintended consequence of choices in materials and processes that improve health outcomes.

At the same time, the use of medical waste incinerators appears to be rapidly expanding in developing countries when such incinerators are being phased out in many industrialized countries for health and environmental reasons. Although these incinerators are often constructed in response to immediate and pressing concerns about the spread of diseases caused by exposure to healthcare wastes, incineration and open burning of healthcare waste are major sources of dioxins released in many countries.

Working in a number of countries across all regions, GEF projects show how health care waste management can avoid the need for waste incineration. For example, the Demonstrating and promoting best techniques and practices for reducing health-care waste to avoid environmental releases of dioxins and mercury project in Argentina, India, Latvia, Lebanon, Senegal, Tanzania, and Vietnam aims to demonstrate and promote replication of best environmental practices and techniques for health-care waste management at model facilities—including reuse, recycling, waste separation, and the use of products that generate smaller volumes of less toxic wastes. Projects sharing similar objectives are underway or under preparation, in China and Tunisia.

The project also contributes to the control of mercury. Many health care facilities in the above countries have also begun



to phase in devices that avoid the use of mercury. If replicated nationally and sustained, best practices and techniques initiated during the project's implementation are expected to reduce the release of mercury to the environment each year by nearly 3,000 kg.

In Tanzania in Bagamoyo, about an hour's drive outside the capital, the project is demonstrating that a pressurized steam sterilizer designed to disinfect medical instruments can successfully treat infectious waste with a capital cost and capacity comparable to that of a commonly used incinerator—without the release of major pollutants such as dioxin. The levels of disinfection achieved have met or exceeded the minimum international standards for medical waste.

The project at Bagamoyo District Hospital has been so successful that the Tanzanian Ministry of Health is now considering installing these cleaner steam technologies instead of highly polluting incinerators at all 229 district hospitals throughout the country. This could result in the elimination of as much as 23 to 180 g (toxic equivalent) of dioxin emissions per year in Tanzania alone.



## Cleaning Up TERMITES

Termites are essential to soil health, but problems arise when they come in contact with agricultural, forest, or urban areas. The annual economic cost of structural damage to buildings from termites in urban areas is about \$15–20 billion worldwide.

When this is combined with the cost of damage to agricultural and forestry resources, the overall cost to society is over \$30 billion per year.

Managing termites without using harmful POPs chemicals is one of the most difficult challenges under the Stockholm Convention. Recognizing the importance of effective termite control without using POPs, the GEF promotes alternative methods — complemented by building public awareness, providing training, and developing institutional capacity.

### CHINA SUCCESS

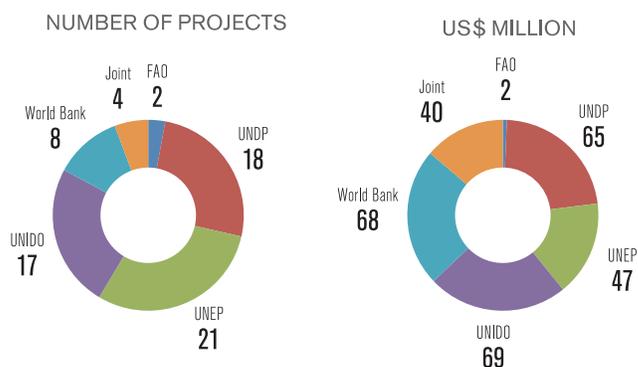
More than 450 species of termites are found in China's populated areas, infesting wooden structures and tree plantations, and threatening critical infrastructure, including housing, non-residential buildings, communications facilities, and dams used for watershed management. Termite damage led to the collapse of the Dongkaomia Dam, which washed away villages and claimed the lives of over 180 people.

Since the mid-1980s, the government has supported coordinated termite control strategies to protect buildings, dams, and other essential infrastructure. There are more than 800 termite control stations in China and 10,000 operators involved in termite control, using chlordane and mirex, two well-known POPs.

## GEF AGENCIES FOR POPS PROJECTS

- United Nations Development Programme (UNDP)
- United Nations Environment Programme (UNEP)
- World Bank (WB)
- Food and Agriculture Organization of the United Nations (FAO)
- United Nations Industrial Development Organization (UNIDO)
- African Development Bank (AfDB)
- Asian Development Bank (ADB)
- European Bank for Reconstruction and Development (EBRD)
- Inter-American Development Bank (IDB)
- International Fund for Agriculture Development (IFAD).

## SHARE OF GEF POPS FINANCING BY AGENCIES





Because of the health and environmental impacts from chlordane and mirex, the government of China has teamed with the GEF to introduce viable alternatives to these two dangerous chemicals. In June 2006, the GEF approved a project to introduce alternatives to chlordane and mirex for termite control in three demonstration provinces (Anhui, Hunan, and Jiangsu).

The project will also review construction codes and policies that promote use of alternative termite control methods, provide an institutional framework and training to government officials and termite control professionals on Integrated Pest Management, raise public awareness, and demonstrate the application and monitoring of bait systems without the use of the most hazardous chemicals.

On a pilot basis, China has used bait systems in selected municipalities in the three demonstration provinces in 2007-2008, and is beginning large-scale application. The project is also helping to prepare new national soil quality standards based on a risk assessment approach.

China has committed to completely shut down its production of chlordane and mirex. To achieve that goal, the largest chlordane and mirex plant in China was closed on December 31, 2007 under the China termite control project supported by the GEF. The plant had a production capacity of 500 tons of chlordane and 250 tons of mirex; and had been producing between 150 to 190 tons in the past years. Mechanisms are in place to guarantee that the closure is permanent and is not compensated by increased production elsewhere in the country.

## Cleaning Up

### METHYL BROMIDE AND OZONE DEPLETING SUBSTANCES

The GEF is the main technical and financial support for the countries with economies in transition (CEITs) of Central and Eastern Europe and the former Soviet Union to implement the Montreal Protocol. With US\$183 million in grant resources and an additional US\$ 187 million from other partners, the GEF has helped 18 countries meet their obligations under the protocol. These countries have achieved over 99% reduction in their consumption of ozone-depleting substances (ODS), phasing out some 296,000 tons, including some 20,000 tons directly targeted by GEF projects.

Methyl bromide is a toxic chemical used to control a broad spectrum of pests in soil, agricultural and forest commodities, and structures. In the early 1990s, scientists identified methyl bromide as one of the substances that depletes the ozone layer. Because it is an excellent fumigant, however, it is difficult to substitute for some applications and the reason why it continues to be used, although many countries have made progress finding substitutes and replacing common usages of methyl bromide.

Because it so dangerous, methyl bromide is being phased out as part of the Montreal Protocol — one of the last remaining challenges to protect the ozone layer. Fortunately, phasing out methyl bromide offers multiple benefits for agriculture, the environment, and human health, since carefully chosen alternative techniques can be cost-effective, protect the ozone layer, and improve worker safety. The GEF has helped a number of CEITs successfully reach the Montreal Protocol goal of total methyl bromide phase out.

Looking forward, the GEF is now assisting eligible CEITs in their efforts to meet the targets agreed upon by the international community for accelerated phase out of HCFCs, taking into account linkages and synergies with climate change mitigation.





# Outlook

GEF's work in the POPs area since 2007 has been characterized by an emphasis on investments to help developing countries and countries with economies in transition implement the Stockholm Convention. A large number of the projects approved in the recent period, for example, address PCBs and PCB containing wastes, as well as pesticides containing waste.

Through these first years of GEF support to the Stockholm Convention, both delivery capacity of GEF Agencies and absorptive capacity at the country level have been strengthened. At the same time, GEF processes have been simplified to facilitate effectiveness and access. The Stockholm Convention is also maturing and adding new chemicals with POPs characteristics under its control.

All these factors point to the strong prospects over the coming years for GEF POPs activities in support of the Stockholm Convention's implementation in developing countries to continue to deliver strong global benefits to protect ecosystems and human health.

## PHOTOGRAPHY

GEF/WB: cover, 2, 4, 11, 18, 20

GEF/UNEP: inside front cover, 19

GEF/PAHO: 5, 8, 15, inside back cover

GEF/FAO: 7, 10, 13 (right)

GEF/UNITAR: 9, 12

GEF/UNDP: 13 (left), 16

GEF: 14, 17

## ABOUT THE GEF

The Global Environment Facility (GEF) unites 178 member governments — in partnership with international institutions, nongovernmental organizations, and the private sector — to address global environmental issues. An independent financial organization, the GEF provides grants to developing countries and countries with economies in transition for projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants. These projects benefit the global environment, linking local, national, and global environmental challenges, and promoting sustainable livelihoods.

Established in 1991, the GEF is today the largest funder of projects to improve the global environment. The GEF has allocated \$8.3 billion, supplemented by more than \$33 billion in cofinancing, for more than 2,225 projects in more than 165 developing countries and countries with economies in transition. Through its Small Grants Programme (SGP), the GEF has also made more than 10,000 small grants directly to nongovernmental and community organizations.

The GEF partnership includes 10 agencies: the UN Development Programme; the UN Environment Programme; the World Bank; the UN Food and Agriculture Organization; the UN Industrial Development Organization; the African Development Bank; the Asian Development Bank; the European Bank for Reconstruction and Development; the Inter-American Development Bank; and the International Fund for Agricultural Development. The Scientific and Technical Advisory Panel provides technical and scientific advice on the GEF's policies and projects.

[www.theGEF.org](http://www.theGEF.org)



**GLOBAL ENVIRONMENT FACILITY**  
INVESTING IN OUR PLANET