

## REGIONAL CAPACITY AND NEED TO MANAGE PERSISTENT TOXIC SUBSTANCES IN CENTRAL AND NORTH EAST ASIA

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### Introduction

Since the adoption of the Stockholm Convention on Persistent Organic Pollutants, worldwide awareness and attention by policy-makers, industries, scientists, NGOs, and the general public on environmental and health concerns have increased, and the importance of management issues for the reduction and elimination of persistent organic pollutants (POPs) have heightened. POPs are toxic, long-lived, can travel long distances, and move from warm areas to colder areas. Due to their affinity to lipids, they are absorbed by the fatty tissues of humans and animals and are bioaccumulated and biomagnified through the food chain causing adverse health effects such as reproductive disorders, developmental deformities and cancer. POPs pose a major concern at the local, national, regional and global level. A two-year global project, supported by UNEP/GEF, whose objectives are complementary to the Stockholm Convention has recently been completed. The "Regionally Based Assessment of Persistent Toxic Substances" project focuses on the 12 Stockholm POPs (a subset of persistent toxic substances, PTS) in addition to other PTS, and (a) identifies sources of PTS, (b) assesses impact of PTS on human health and the environment, (c) assesses transboundary pathways of PTS, (d) assesses root causes of PTS related problems and capacity to manage regionally, and (e) identifies regional and global priority PTS environmental issues. For this project, the globe has been divided into 12 regions, namely Arctic, North America, Europe, Mediterranean, Sub-Saharan Africa, Indian Ocean, Central and North East Asia, South East Asia and South Pacific, Pacific Islands, Central America and the Caribbean, Eastern and Western South America, and Antarctica.

This paper presents major findings from the UNEP/GEF project with respect to the regional capacity and the need to manage PTS in the Central and North East Asia region (Region VII) which consists of China, Japan, Republic of Korea, Democratic People's of Korea, Mongolia, Russian Federation and the five Commonwealth of Independent States (CIS)- Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. The PTS considered for this region are the 12 Stockholm POPs (aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, HCB, mirex, toxaphene, PCBs, dioxins and furans) in addition to PAH, HCH, PCP, PBDE, organotin, and organomercury. The full regional report can be obtained elsewhere<sup>1,2</sup>.

### Methods and Materials

The development of the regional report for the Central and North East Asia region was carried out through the gathering and interpretation of existing information, including literature review (journals, reports, databases), and through establishment of a regional expert network. The expert network contributed to the project by filling questionnaires, developed by UNEP-Chemicals, relating to information on sources, environmental concentrations and impacts of PTS at the national level. The results from the data collection along with presentations from regional experts at two technical workshops were used to develop the report. Information on management of PTS was also collected via a questionnaire designed by members of the regional team and from a wide range of sources during various discussions held within the region. Furthermore, a priority setting workshop with participation of representatives from many countries of the region resulted in priorities being established regarding the threats and damages of these substances to the region. A Global Report, incorporating the information and conclusions derived from the 12 regional reports, has recently been finalised.

### Results and Discussion

As a result of two technical workshops- 1<sup>st</sup> Technical Workshop (Sources and Concentration of PTS in the Environment, 18-20 March 2002, Tokyo) and 2<sup>nd</sup> Technical Workshop (Ecotoxicological Impact and Transboundary Transport of Persistent Toxic Substances, 14-16 May 2002, Hong Kong) and the Regional Priority Setting Meeting (16-18 October 2002, Hong Kong) held with PTS experts, policy-makers, industries, scientists, and NGOs, in addition to other communications for the project, the 18 chemicals have been prioritised for Region VII according to sources, environmental levels, ecotoxicological effects and human effects along with their corresponding data gap level. Chemicals of regional concern or limited concern are listed in Table 1. They are not ranked within each group.

**Table 1** Prioritisation of Persistent Toxic Substances for Central and North East Asia

Priority of PTS	Sources	Data Gaps	Environmental Levels	Data Gaps	Ecotoxicological Effects	Data Gaps	Human Effects	Data Gaps
<b>Regional Concern</b> (with sparse data available)	Dioxins Furans PCBs PAHs DDT HCH	Dioxins Furans PCBs PAHs PCP PBDE HCB Org Hg	Dioxins Furans PCBs DDT PAHs	Dioxins Furans PCBs DDT PAHs Toxaphene HCH	Dioxins Furans PCBs DDT PAHs	Dioxins Furans PCBs DDT PAHs HCH PBDE	Dioxins Furans PCBs DDT PAHs HCH	Dioxins Furans PCBs DDT PAHs HCH PBDE
<b>Limited Concern</b> (with limited data available)	Chlordane PCP PBDE HCB Org Hg Org Tin	Aldrin Chlordane Dieldrin Endrin DDT HCH Mirex Toxaphene Org Tin Heptachlor	Toxaphene HCH PCP Org Hg Org Tin PBDE PBDE Chlordane HCB	PCP Org Hg Org Tin PBDE Heptachlor	HCH PCP Org Hg Org Tin PBDE HCB	Aldrin Toxaphene PCP Org Hg Org Tin HCB Heptachlor	PCP Org Hg Org Tin PBDE HCB	Aldrin Toxaphene PCP Org Hg Org Tin HCB Heptachlor

Dioxins, furans, PCBs, and PAHs are of regional concern in terms of sources, environmental levels, ecotoxicological and human effects. In the region, dioxins and furans are mainly released from

municipal waste incineration, industrial waste incineration and open burning. Sintering plants and industries producing chloro-alkali are also an important source of dioxins and furans. PCBs are found within intentional products (i.e. PCB products manufactured in past industrial activities) or formed as a by-product in combustion processes. The main sources of PAHs in the region are generated from power plants, automobile exhaust, coal industry, and metal production (aluminium, iron and steel industry).

In general, inventories of PTS sources are not well documented in the region, in particular for developing countries and countries with economies in transition, thus accounting for much data gaps. There is a scarcity of reliable data on the sources of PTS in the Asian territory of the Russian Federation (Siberia and Far East). Little information is available on the quantity and location of obsolete pesticides in the Commonwealth of Independent States.

The Central and North East Asia region consists of countries of varying economic development which reflect differences in the management of PTS. Japan, being the most economically developed and technologically advanced country of the region has a longer history of monitoring PTS contamination in the environment. The Ministry of the Environment of Japan has been conducting environmental monitoring of major organochlorines for almost three decades, and of organotins for more than a decade<sup>3</sup>. In developing countries such as the Republic of Korea, its Ministry of Environment has established mid- and long-term research plans concerning Endocrine Disrupting Chemicals including PTS, and in China, environmental monitoring is being carried out by environmental protection departments, however, there is no regular monitoring of PTS since there are no stipulations for its monitoring<sup>4,2</sup>. Nonetheless, efforts are being made to set up major facilities for analysing PTS in several cities throughout China. In countries with economies in transition (CIS and Mongolia), programs on PTS monitoring and inventories are relatively recent or are in the stages of development.

The scattering of data and insufficient data collected across the region cannot adequately describe the spatial and temporal variations as well as toxicological and ecotoxicological effects in this region. Within the region, different methods are used in different countries for the monitoring of the same chemicals. To date, there are no standardised methodologies for sampling and analytical measurement established among most of the countries for PTS. This hampers the comparability of the data collected by different countries and also makes it difficult to compare data with countries outside the region.

Presently, many major difficulties exist in administering the management of chemicals for most countries in this region. These include:

- (1) *Lack of Funds*: Most countries do not have the funds for monitoring works or to manage the elimination/reduction of PTS emissions. For example, large amounts of funds are needed for the destruction of PCBs and the analysis and monitoring of dioxins and furans.
- (2) *Lack of Information*: Most countries do not have the necessary information for the management of PTS, which includes methods to provide scientific comparable monitoring data, information about PTS sources, existing pollution caused by PTS, adverse effects, and PTS substitutes.
- (3) *Lack of Advanced or Best Available Technology*: Safe, effective and efficient technologies needed to eliminate or reduce emissions of PTS are not available in many countries.
- (4) *Insufficient Knowledge and Training of Special Personnel*: The knowledge and techniques of specialists in many countries in the region can no longer meet the requirements of up-to-date administration or research. Competent specialists and experts are in great demand.
- (5) *Low Public Awareness*: The general population, consumers and buyers in most countries lack awareness of the possible harm of PTS. They also lack information about the sources of hazardous chemicals and consequently do not know their long-term effects.

(6) *Difficulties in Co-ordination Within Government*: The co-ordination and co-operation between government departments is of great importance for the management of PTS, however, such co-ordination and co-operation are still bureaucratic hurdles in many countries.

In order to build capacity in the region for the management of PTS, the following could be undertaken:

- (1) Development of a framework for administration, management systems and policy for the implementation of the Stockholm Convention.
- (2) Capacity strengthening on PTS monitoring whereby standardisation of monitoring methodologies and detection limits may be the initial steps.
- (3) Capacity strengthening on technical assistance and promoting the transfer of technology, which is important especially for substitution, reduction, elimination, and safe disposal of PTS.
- (4) Best available technique (BAT) and best environmental practice (BEP) should be adopted by all countries.

A regional organisation is recommended to be established for setting up a monitoring network. The organisation will ensure that monitoring methods among the countries within Region VII are co-ordinated and standardised. Above all, an integrated monitoring/modeling approach based on (a) systematic monitoring, (b) measurement campaigns on national and international levels, and (c) model assessments of contamination within the region, should be established. It is also essential for representatives of different countries to meet on a regular basis to update information and improve regional communication. There should be joint effort among different countries to closely monitor human health effects using effective and less invasive analysis such as PTS levels in human breast milk<sup>5</sup>. This will provide information on the possible adverse impact of contaminants on future generations. Studies on the effects of different PTS on sensitive animal species are also essential. Development of various biomarkers could provide us with effective early warning systems. In addition to collaboration amongst government, industry and NGOs, support from the public is important in contributing to the effective and efficient implementation of proposed actions toward the elimination of PTS. Hence, raising the awareness of the general public is an important issue that needs to be addressed. It is recommended that financial assistance should be actively sought from international funding agencies such as the World Bank and GEF for supporting technology transfer for studies into PTS and related activities.

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