

## EXECUTIVE SUMMARY

This study is part of the obligations contracted by Chile when signing and ratifying the Stockholm Convention on Persistent Organic Pollutants, sponsored by the United Nations Environment Programme (UNEP) whose aim is to protect the human health and the environment. The present report contains a compilation and analysis of the available data on concentrations of twelve persistent organic pollutants (POPs), measured in humans, the environment and biota in Chile for a period of 25 years. Local information on the effects of POPs on human health is commented. It was elaborated between September 2003 and August 2004 under the supervision of the Environmental Health Department, Ministry of Health.

This evaluation is part of the GEF/UNEP pilot project aimed at designing a national plan to implement the management of twelve POPs in Chile. The plan is one of four initiatives to meet the Convention's requirements.

The objectives of this bibliographic research were to outline a public health profile concerning POPs in Chile and evaluate the potential health risks associated with population exposure to such pollutants.

A separate analysis was carried out on three subgroups of pollutants included in the larger group of twelve POPs. The subgroups share different characteristics in terms of polluting sources and the way they have been approached and managed by national institutions; they are chlorinated pesticides (CPs), polychlorinated biphenyls (PCBs) and dioxins and furans.

Enough information was collected to be able to outline a national risk profile based on the distribution and trends of POPs concentration levels. Environmental data was larger than data on humans. Information sources were scattered and diverse due to the nature of the selected matrices. Around one hundred documents on the subject from Chile were identified, almost eighty of them include measurable data. A number of 57 papers were evaluated in terms of the analytical methods used. No studies were found dealing with adverse effects of these pollutants on human health.

CPs received special attention and were measured in different matrices since the late 1970s until the early 1990s, particularly from Region V to Region X. High levels of environmental and human pollution caused by CPs were observed in the 1970s and part of the 1980s, frequently higher than safety limits set in those days. This situation gave way to lower levels due to the progressive banning of CPs and enforcement of regulations, all of which decreased the human exposure to a great extent, reaching levels often below national and international standards. However, due to their persistent nature chlorinated pesticides can still be detected in food and biota though in low concentrations.

Interest for PCBs in Chile grew in the 1990s; however, diagnoses in different environmental areas are still in their early stages, and frankly delayed in the area of human exposure. Nevertheless environmental studies and ongoing inventories on PCBs sources have been of great help in identifying the regions with higher risk where primary exposure is greater. The trophic cumulative process of PCBs in aquatic organisms has been clearly identified in some geographical areas of the country. Environmental studies have demonstrated that concentrations of PCBs in Chile fall below the common levels found in industrialized countries. PCBs require further studies to assess in depth the risk levels for the population.

This study detected a great dispersion and ubiquitousness of CPs and PCBs in the national territory as they were often found in remote regions, far from human activity.

Information on dioxins and furans in the environment and in humans is practically null in Chile. The recent inventory on releases of these two POPs made it possible to identify the regions with most of the emissions and consequently make inferences on where the most exposed human populations are located. Dioxins and furans in public health still remain as an undertreated issue.

A preliminary epidemiological exploratory study based on ecological correlations allowed to detect higher gallbladder cancer mortality in regions where concentrations of CPs in the past were

high and where most of dioxins and furans are currently released into the environment. A similar finding was identified as regards to liver and kidney cancer mortality in northern regions where the highest rates of PCBs use have been found. These findings require further analytical epidemiological studies.

Toxicological, epidemiological, and clinical studies done world-wide for some decades have progressively and persistently demonstrated cause-effect relationships between long term exposure to POPs and several health problems hard to be measured in public health, as immunotoxicity, endocrinal and reproductive alterations and cancer. This accumulated scientific data, the bibliographical findings from this study and the information gaps identified make advisable to recommend a revision and adjustment of research policies concerning POPs in Chile. Simply stated, surveillance and monitoring for CPs need to be improved, and research plans for PCBs and dioxins/furans are required in various areas; proposals on these lines of action should include:

- e) Updating diagnoses on levels of POPs in the environment and human populations.
- f) Creating integrated, multi sector and multi institutional monitoring and surveillance programmes.
- g) Encouraging collaborative projects to carry out studies on human exposure to POPs and on associated diseases. These projects should include environmental epidemiology studies for PCBs and dioxins/furans in particular, with an emphasis on mother and fetus exposure and studies on cancer associated to these POPs.
- h) Consolidating qualitatively and quantitatively the development of analytical laboratories for POPs.