Assessment of Existing Capacity and Capacity Building Needs to Analyse Persistent Organic Pollutants (POPs) in Developing Countries

Regional Workshop for Latin America and the Caribbean

Montevideo, Uruguay, September 5-9, 2005
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This publication reflects the main findings from the first of three Regional Workshops held within the UNEP/GEF Project "Assessment of Existing Capacity and Capacity Building Needs to Analyse Persistent Organic Pollutants (POPs) in Developing Countries". The project is financed by the Global Environment Facility and implemented by UNEP through UNEP Chemicals. Co-financing of the project is through the governments of Canada, Germany, and Japan.

During the 1st phase of the project, three regional workshops are held:
- 5-9 September 2005 for Latin American and Caribbean countries in Montevideo, Uruguay
- 4-6 October 2005 for African countries in Pretoria, South Africa, and
- 13-16 December 2005 for Asian and Central and Eastern European countries in Beijing, PR China

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UNEP CHEMICALS

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REPORT

REGIONAL WORKSHOP FOR LATIN AMERICA AND THE CARIBBEAN
Assessment of Existing Capacity and Capacity Building Needs to Analyse Persistent Organic Pollutants (POPs) in Developing Countries
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1 INTRODUCTION

UNEP Chemicals together with the Basel Convention Coordinating Center held a Regional Workshop to Assess Existing Capacity and Capacity Building Needs to Analyse Persistent Organic Pollutants (POPs) in developing countries and in order to comply with the Stockholm Convention. The workshop was held in Montevideo at the headquarters of the Technological Laboratory of Uruguay.

This workshop was held in the framework of the UNEP/GEF project “Assessment of existing capacity and capacity building needs to analyse POPs in developing countries”, and received contributions from the governments of Canada, Germany and Japan. This two-year project focuses on country needs relative to POP laboratory analyses, in order to comply with the Stockholm Convention in a sustainable way.

Links to access further information on capacity assessment:
http://www.chem.unep.ch/pops/laboratory/default.htm and on the global inventory of laboratories currently working with POPs: http://www.chem.unep.ch/gmn/gmnlabs/default.htm

The following are among the results of the above-mentioned project:

1. A global database of laboratories operating according to their capacity to analyse different types of POPs. The information is organized in a way to facilitate access through UNEP website http://www.chem.unep.ch/gmn/gmnlabs/default.htm.

2. Criteria recommended for: - Sampling, identification and quantification of analytical data - Sustainability to operate laboratories analyzing POPs.

The purpose of the workshop was to generate regional input for the above-mentioned project; therefore, its objectives included:

- Identification of existing POP analysis capacities in the region.
- Identification of country needs to analyse POPs.
- Improvement and adaptation of the present database to Convention requirements.
- Agreement on quality criteria in POP analysis.
- Development and consensus around sustainability criteria to analyse POPs in the region.

The workshop lasted five days, was conducted in Spanish and English and provided simultaneous interpretation. The agenda is attached in Appendix 6.

The workshop participants mainly included Focal Points of the Stockholm Convention and the regional laboratories that conduct POP analysis. The Focal Points and laboratories registered in the database (that can be accessed at http://www.chem.unep.ch/gmn/gmnlabs/default.htm) served as a basis for the invitations sent out by UNEP Chemicals.
2 Preparation of the Workshop

During the preparation of the workshop the following information was collected:

1. Capacity to analyse POPs in the GRULAC Region, on the basis of UNEP Questionnaire. (Appendix 1)
2. Needs to analyse POPs in the GRULAC Region, on the basis of a questionnaire produced to that purpose by the Basel Convention Coordinating Center. (Appendix 2)

The information gathered was processed and evaluated before its presentation during the workshop (Appendix 4 and 5). This provided context to the work and also contributed to information from the region as well as on the progress of the GEF project and analytical requirements relative to compliance with the Stockholm Convention. Basically, progress achieved during the UNEP Workshop to Develop a Global POPs Monitoring Programme to Support the Effective Evaluation of the Stockholm Convention, Geneva, Switzerland, March 24-27, 2003.

3 Development of the Workshop

The workshop took place according to the agenda, as follows:

3.1 Opening and Introduction

Monday, September 5, 2005

Mr. Jaime Igorra, Under-Secretary, Ministry of Housing, Land Use Management and the Environment
Ms. Heidi Fiedler, UNEP Chemicals
Ms. Celia Barbato, Member of the Board of Directors, Technological Laboratory of Uruguay
Ms. Silvia Aguinaga, Basel Convention Coordinating Center

3.2 Presentation of Participants

3.3 Objectives, Program, and Organizations of the Workshop

Heidi Fiedler, UNEP Chemicals

3.4 UNEP/GEF Project: Linkages to the Stockholm Convention, Objectives and Implementation

Heidi Fiedler, UNEP Chemicals

All presentations during the workshop were printed and distributed to participants so that they could follow the lectures. Disk copies were also provided to those requesting this type of support.

3.5 Existing Analytical Capacity to Analyse POPs in the Region (GRULAC)

A) Presentations by laboratories:

Argentina. Laboratorio de Química Ambiental y Biogeoquímica, Juan Carlos Colombo.
Brazil. CETSB, San Pablo, Casilda Jiunko Aiba.
Chile. Unidad de Sistemas Acuáticos, Universidad de Concepción, Ricardo Barra.
Colombia. Consuelo Montes de Correa, Universidad de Antioquia.
Mexico. Centro Nacional de Investigación, María Teresa Ortuño Arzate.
Chile. Laboratorio HIDRONOR, Rodrigo Romero.

B) Presentation of results derived from questionnaire on capacity to analyse POPs in the region

3.6  Needs to Analyse POP in the Region (GRULAC)
Tuesday, September 6, 2005

A) Presentation of different Focal Points of the Stockholm Convention
- **Costa Rica.** Centro de Electroquímica y Energia Química, Rigoberto Blanco-Sáenz.
- **Cuba.** Ministry of Science, Technology and the Environment, Silvia Alvarez Rosell.
- **Ecuador.** Servicio Ecuatoriano de Sanidad y Agropecuaria, Olga Pazmiño Morales.
- **Peru.** Coordinator of NIP-POP project, Marisa Quiñones.
- **Brazil.** Ministry of the Environment, Sérgia De Souza Oliveira

B) Presentation of results from survey on needs to analyse POPs in the region (GRULAC)

3.7  Exchange of Experiences

Experience in the installation of laboratories. Donors’ vision. Lutz Rexilius
Private laboratories’ vision: quality criteria and sustainability. Marc van Ryckeghem

Discussion
The role of comparative studies across laboratories. Lutz Rexilius

Discussion

Presentation of GMP database, modified questionnaires and new structure. Heidi Fiedler, UNEP Chemicals

3.8  Working Groups (in parallel)
Wednesday – Thursday, September 7 and 8, 2005

3.9  Introduction to Working Groups (WG):

Presentation on Quality Criteria. Marc van Ryckeghem
WG 1: Quality criteria to analyse POPs
WG 2: Needs to analyse POPs

3.10  A Visit to the Technological Laboratory of Uruguay (LATU)
September 8, 2005

WG 3: Sustainability criteria and commitment by countries (with a focus on regional laboratories)

3.11  Closure
Friday, September 9, 2005

Mr. Mariano Arana, Minister of Housing, Land Use Management and the Environment
Ms. Heidi Fiedler, UNEP Chemicals
Ms. Celia Barbato, Member of the Board of Directors, Technological Laboratory of Uruguay
Ms. Silvia Aguinaga, Basel Convention Coordinating Center
4 RESULTS

Presentation and approval of reports.

Friday, September 9, 2005

1. Quality criteria to analyse POPs.
2. Needs to analyse POPs.
3. Sustainability criteria to analyse POPs.
4. Questionnaire on capacity to analyse POPs. Modification and approval of questionnaire.

4.1 Report from Working Group 1: Quality Criteria in POPs Analysis

Version 09/09/05 agreed during Plenary Session

Chair: Ricardo Barra, Chile; Rapporteur: Juan Carlos Colombo, Argentina

Participants
Malverne Spencer (Antigua and Barbuda), Juan Carlos Colombo (Argentina), Leila Davia (Argentina), Beverly Wood (Barbados), Rosario Mena Fuertes (Bolivia), Casilda Jiunko Aiba (Brazil), Joao Paulo Machado (Brazil), Ricardo Barra (Chile), Maria Consuelo Montes (Colombia), Rigoberto Blanco (Costa Rica), Maria Teresa Hernandez (Cuba), Carola Giovanna Resabala (Ecuador), Ana Luisa Mendizábal (Guatemala), Mirta Ferrari Bentancourth (Honduras), Jason Mc.Kenzie (Jamaica), Maria Teresa Ortuño Arzate (Mexico), Jaime Espinosa Gonzalez (Panama), Maria Elena Jacinto Tayco (Peru), Andrew Lewis (Saint Lucia), Gabriela Medina (Uruguay), Natalia Barboza (Uruguay), Cristina Cacho (Uruguay), Doris Quevedo (Uruguay), Laura Olazábal (Uruguay), Marina Torres (Uruguay), Osvaldo Rampoldi (Uruguay), Paulina Zuñiga (Venezuela), Heidi Fiedler (UNEP), Marc Van Ryckeghem (UNEP).

Quality Criteria for POPs Analytical Laboratories in GRULAC Countries

The discussion focused around the requirements for laboratories to ensure an adequate POP sampling and analysis in GMP industrial and environmental matrices, within the framework of the Stockholm Convention.

4.1.1 Sampling

The analyte, matrix, sampling site and conditions are determined depending on the objective of the sampling.

In terms of the sampling, we identified the regional laboratories with a capacity to develop field work and sampling. In total, 18 countries with a capacity to conduct sampling activities were identified (Antigua and Barbuda, Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Honduras, Jamaica, Mexico, Panama, Peru, Saint Lucia, Uruguay and Venezuela). In this activity it was considered indispensable to ensure the representativeness and integrity of the sample during the whole sampling process. It was also considered indispensable to meet quality requirements in terms of equipment, transportation, standardized sampling method, traceability. These good quality practices are considered useful towards a future accreditation. Indispensable requirements include:

1. Equipment: to have adequate sampling instruments according to the type of matrix and POP (dredger, HiVol, water bottles, etc.).
2. Materials: sampling input that is analyte-compatible, including utensils, containers, etc. (stainless steel-glass, never plastic).
3. **Personal protection**: those in charge of the sampling must wear adequate protection outfits depending on the type of samples they will work with (gloves, rubber boots, goggles, etc.).

4. **Sample blanks**: these allow for the assessment of potential contamination.

5. **Preservation**: samples and sample blanks will be preserved according to matrix and type of POP requirements.

6. **Transportation**: adequate transportation that minimizes the possibility to contaminate the sample, ensuring its integrity and conservation until it reaches de laboratory in charge of the analysis.

7. **Availability of “in situ” monitoring equipment**: to measure relevant environmental parameters according to each environment. The environmental conditions should be registered.

8. **Geo-referencing and photographic registers**: availability of GPS to locate sampling sites with precision and ensure future location of the site.

9. **Standardized protocol**: to conduct sampling (EPA, ASTM, EC). It is important to label the sample.

10. **Training of personnel**: personnel should be sufficiently trained and familiarized with the POP analysis techniques. An Ecosystem expert is needed in the sampling group and some local people could act as guides.

11. **Storing capacity**: the laboratory must have an adequate refrigerated storing capacity to ensure the integrity of the samples.

12. **Sub-contracting the sampling**: should it be necessary to sub-contract the sampling process, the laboratory should establish and provide the sampling protocol. Those in charge of the sampling process must apply security seals, as well as follow the preservation criteria to guarantee the integrity of the sample during transportation.
   - i) **Advantages**: Sub-contracting the sampling can be an advantage to the laboratories that don’t have the required personnel and equipment.
     - It could assure one more immediate answer in an emergency situation.
   - ii) **Disadvantages**: the laboratory must be sure that the sampling was made in the established conditions.
     - If the laboratory is not present in the place, it can reduce the value added to the analysis and its interpretation.

13. **Waste Treatment**: A suitable treatment of the waste generated during the sampling.

4.1.2 **Analysis**

In terms of POP analysis, all laboratories expressed some POP analysis capacity, including pesticides, PCBs and dioxines and furanes. In order to perform this activity it was considered indispensable to ensure the quality of the analysis by including the correct preservation of the samples, control of potential cross-contamination, standardization of the technique, calibration and good maintenance of instruments that would allow for accreditation in the medium-run. Requirements considered indispensable include:

14. **General laboratory environmental conditions**: ensure enough laboratory space to develop activities that might interfere in different areas and to separate the samples according to their origin (for example, industrial versus environmental) and expected POP level (minimize cross-contamination). Temperature and air-conditioning control. Availability of extraction roofs, handling of inflammable products, waste disposal and an adequate distribution of activities, as well as a clean and well organized laboratory.

15. **Personnel**: the laboratory personnel must be adequately trained to conduct the analysis.

16. **Ensure the custody chain of the sample**: verify the integrity and preservation of the samples (maintenance) in terms of temperature, containers, labels, registry, those responsible at each
stage, establishment of acceptance criteria (conditions as well as quantity of material, according to analyte and matrix).

17. Separation of aliquots: in the case of complementary analysis (for example, granulometry) prior to the freezing of the sample.

18. Storage: to ensure an adequate storing method (refrigerator at 4oC for water, freezer at – 20 °C for biota and solids, or -80 °C when it is necessary) depending on the analyte and matrix. Adequate registry of the performance of refrigerators and freezers (registration and control of temperature). Registration of storage time (~ 2 weeks in the case of extraction and 40 days for the analysis). Availability of automatic power-supply equipment in case of power cuts.

19. Preliminary treatment of the sample: statistical criteria to obtain compound samples (pooles) that are representative, homogenization of solids and tissue. Preservation of individual samples for their re-analysis (counter-sample).

20. Selection and validation of analysis method: Use method validation protocol according to the type of analyte and matrix (selectivity, repeatability, ability to reproduce, extraction efficiency, recovery, detection limit, quantification limit, accuracy). Quality of solvents and reagents (blanks). Clean glass material (avoid cross-contamination). Maintenance and calibration of auxiliary equipment (stoves, scales, test tubes). Protocols and procedures must be clearly described and documented.

21. Extraction: ensure an adequate and reproducible recovery of the analyte in each matrix, extraction efficiency > 90% depending on the matrix (standardization of extraction times, type of solvent, performance of auxiliary equipment, etc.) Add internal standards.

22. Concentration of extract: optimization of the technique to avoid excessive loss of the analyte (temperature control, flow of nitrogen and vacuum, avoid complete drying).

23. Elimination of water, lipids and sulfur: dry the sample with sodium sulphate, eliminate lipids (sulfuric, permeation in gels), and sulfur, activated copper.

24. Purification: ensure an efficient removal of co-extractives, type of adsorbents, conditioning and selectivity, type of solvents and column flow. Fraction cut control.

25. Chromatographic analysis: quantification and separation of POPs will be conducted through HRGC with electronic capture detectors, mass selection and according to availability of HRMS. Column selection (of at least under 0.25 mm x 30 m long); length should increase up to 60 m in the resolution of very complex mixtures (to separate isomers and congeners of PCB, PCDD/PCDF). Verification of chromatographic conditions including resolution, superficial activity of dirt and columns, purity of gases. Secondary confirmation column (different polarity). Adequate handling and preservation of standards. Verification of the linear range of the instrument. Calibration curves of at least 5 points. Periodical calibration (for example 1-2 times a week) and verification with daily intermediate level standard (define a rejection criterion of, for example, ±10%). Increase points (> detail) in the lowest concentration range. According to the detector, the instrumental detection limits should be a few (1-3) pg µl-1. The signal to noise ratio must be equal or higher than 3:1. Quantified values to be reported must be higher than the quantification limit (3-10 times the detection limit, for example). Registration and traceability of services and performance of equipment.

26. Injection: ensure cleanliness and superficial inertia of injector (deactivated glass insert, evaluate activity with an acceptance criterion, for example, for DDE/DDT < 20%). Verify the split/splitless relation, flows and state of septum. Replicability must be ensured (for example, criterion < 5%) and injection sequence for each group of samples analyzed (blanks, control samples, duplicates, verification standards).

27. Identification: criteria for positive identification, retention time ± 0.2 min or in a percentage of the TR of each peak. Verify internal standard recovery (acceptance criterion) to correct quantification. Use of a second column with different polarity to confirm identity or, alternatively, to include additions.
28. Integration: select the basic level and the adequate signal to noise relation of integration according to the type of sample, verify the general form of the chromatogram, the form of the peaks and manually verify integration.

29. Quantification: ensure that the level of compounds is within the previously determined linear range of the detector. Verify that the concentration of blanks is significantly lower than the samples (< 10 times) and that we have reached the stipulated report level.

30. Data compilation and reporting: verify in detail the concentration units and the basis (dry weight, wet weight, lipids). Express detected compounds < LOQ, report on the recovery efficiency. Consider the adequate significant figures. The report form must include date, name of the sample and description (sampling, etc.), method used and/or the name of employee and signature of person in charge.

31. Quality control and quality assurance: the method performance must be verified through control tables where optimal operation ranges are defined and the periodical material analysis is certified, blind or divided samples (the supply of material must be ensured). The inter-calibration exercises are an essential component in quality assurance of the results and are deemed indispensable in the implementation of a regional laboratory network (once a year for each matrix and POP of interest to the Region).

4.2 Report from Working Group 2: Needs to Analyse POPs

Version 09/09/05 agreed during Plenary Session

Participants:

In the preparation of this workshop, the basel convention coordinating center conducted a survey at the level of countries in order to identify analytical needs in the implementation of their respective national plans and to evaluate their effectiveness on a national, regional and global level. This survey was addressed to people involved in the elaboration of national implementation plans of the Stockholm Convention.

The results of the 12 questionnaires returned to us were presented during the plenary session of this workshop (Appendix 1).

These results reveal that the most interesting matrices for analysis are: water, soil and sediments, products and food; while the most interesting POPs are: PCB, HCB, DDT and PCDD/PCDF.

Country presentations on their analytical needs revealed that Implementation Plans of the Stockholm Convention represent useful instances to identify, prioritize and encourage analytical capacity building.

This group organized its task around three core areas:

1. Why is POP Analytical Capacity needed?
2. What does Analytical Capacity include?
3. How to strengthen Analytical Capacity in the Region.
For each question, participants had 5 minutes to present their vision in writing. We then had a round of presentations, a summary of the outstanding points and an exchange of ideas.

At the end the group was divided into three sub-groups to prepare a report on the collective results agreed by each group. These ideas were then presented to the group and consolidated in a final plenary.

The following are the results of the working group.

**WHY IS POP ANALYTICAL CAPACITY NEEDED?**

Editors: Sergia Oliveira, Brazil; Pablo Issaly Argentina; Shirlene Simmons, Saint Lucia

Analytical capacity must serve as a tool so that countries may strengthen their capacity to protect human health and the environment from risks associated to POPs.

Analytical capacity in POPs must satisfy the needs relative to the enforcement of the Stockholm Convention.

Analytical capacity must generate information that, among other things, allows for:

- Elaboration of diagnosis: to learn about the current status and then to identify and set priorities in terms of problems in each country and to identify and design actions or steps to solve priority issues.
- Measure the efficacy of the implementation of the Stockholm Convention and feed it into the National Implementation Plan.
- Prevention: set reference values and limits to select and implement Best Environmental Practices and Best Technologies Available.
- Standards: preparation, adjustment, improvement of standards. This activity must strengthen institutional capacity of countries to meet their national legislation and international commitments (including the Stockholm Convention) and establish requirements for future undertakings.
- Control: support countries in the application of standards, especially in terms of monitoring and surveillance. Satisfy needs relative to quality control of products for domestic consumption, import and export products.
- Research: stimulate the development of POP Research in each country.
- Waste management: analytical capacity will allow for an adequate waste management within each country and among countries by capitalizing synergies resulting from conventions, in particular, the Stockholm and Basel Conventions.
- Strengthen knowledge and management of information on hazardous substances, POPs in particular
- Generate information for the efficient communication of risk: production of data and information for an adequate communication to the population about risks relative to POPs

**WHAT DOES ANALYTICAL CAPACITY INCLUDE?**

Analytical capacity is the possibility of a country to produce a diagnosis and technical monitoring to learn about the POP levels in the population and the environment, and take the necessary steps to implement the Convention.

A sufficient number of qualified personnel must be available during all phases of the process.
1. **IN THE SAMPLING**
   - Have adequate equipment, instruments (material-input, methods) and possibility to move people and samples
   - Have sampling protocols for all pollutants in different matrices, in order to ensure the quality of the results
   - Have mechanisms that allow sub-contracting the service

2. **IN THE ANALYSIS**
   - Have infrastructure (adequate design, size, air-conditioning, all services)
   - Have the equipment, standards, certified reference material, input, accessories to conduct priority analyses in matrices that are considered main indicators.
   - Have a quality-assurance system in implementation
   - Be accredited to perform priority POP analyses (national and international)
   - Have bio-security program, waste treatment, avoid crossed contamination
   - Have maintenance program for equipment

3. **IN THE REGISTER**
   - Have qualified personnel
   - Have software Implement a quality control and assurance program (for data analysis and treatment), in order to obtain comparable data.

Results generated must be accompanied with value guidelines and, in the context of the case study, this will facilitate interpretation and use of data by those responsible for the implementation of the Stockholm Convention, as well as others.

**HOW TO STRENGTHEN ANALYTICAL CAPACITY IN THE REGION?**

Editors: Silvia Alvarez, Cuba; José Alvaro Rodriguez, Colombia; Wayne Rajkaumar, Trinidad and Tobago; Anthony Leslie Ryan, Bahamas.

To strengthen the analytical capacity of the region implies not only to increase or improve the infrastructure or equipment but also to fully use the existing capacity, optimizing the use of resources, expertise, harmonizing criteria, improving reliability and being able to compare results.

a) Strengthening POP analytical capacity at the national level:

The role of the Stockholm Convention implementation plans in building national capacity for POP analysis, is highlighted.

Encourage and promote the development of laboratory networking to capitalize on the specific expertise and synergies among existing laboratories.

Laboratory infrastructure:
   - Improvement, increase and maintenance or creation of physical plant and equipment, depending on needs.
   - Assess existing capacity in order to improve and/or upgrade it.

Sensitization
   - Sensitization of decision-makers on the need to strengthen the analytical capacity of the country.
Training
- Promote the training of personnel in less-developed laboratories by the more developed ones, through the formulation of projects, agreements, etc.
- Promote the training in sampling and analysis techniques, interpretation of results, reporting, among others.

Accreditation/ Calibration
- Inter-calibration processes among laboratories in each country.
- Work in the preparation of laboratories towards their accreditation.

Economic resources
- Seek adequate national funds to strengthen analytical capacity, as well as funds from international organizations to strengthen national capacity.

Personnel
- Facilitate continuity of institutional efforts by maintaining qualified staff through encouragement and incentives.

Inter-institutional relations
- Strengthen inter-institutional communication and the institutional coordination to avoid duplication of efforts.

Legislation
- Reinvigorate legislation to ensure operation and sustainability of laboratories.

b) Strengthening POPs analytical capacity at the regional level

Encourage and promote development of laboratory networking to capitalize on specific expertise and synergies among laboratories. It would be useful, in turn to have regional pilot laboratories that contribute to further develop this process.

Capacity building:
- Create mechanisms to exchange information in sampling and analysis techniques, interpretation of results, reporting, etc.
- Promote region-wide personnel training through workshops, seminars, etc.
- Have a program for the exchange of professionals at the regional level to share experiences, methodologies, among other things, as for example internships among laboratories.
- Improve communication and synergies among laboratories in the region.

Laboratory infrastructure
- Strengthen existing laboratories so that they might provide services to countries in the region.
- Evaluate installed capacities to strengthen them: sampling, analysis, preparation of reference material, data interpretation, reporting, etc.

Accreditation / Calibration
- Conduct inter-calibration programs among laboratories in the region.
- Harmonize analysis and sampling methodologies among laboratories.
- Access certified reference material that satisfy the specific requirement of countries in the region.

Economic resources
- Seek funds for regional projects at the level of international organizations.
• Use the potential of bilateral and multilateral cooperation to conduct regional projects.

General Aspects
• Capitalize on the existence of Training and Technology Transfer Centers in the region, in issues such as Multilateral Environmental Agreements (MEAs), relative to the Stockholm Convention.
• Capitalize on existing sub-regional agreements, if applicable, so that countries encourage bilateral or multilateral initiatives to develop joint programs.
• Look for adequate ways for the transportation of samples from one country to another, such as bilateral agreements or MOUs.

4.3 Report from Working Group 3: Sustainability Criteria in POPs Analysis

Version 09/09/05 agreed during Plenary Session

**ONE SINGLE LABORATORY OF REFERENCE** (new or on the basis of an existing one).

In favor:
• Concentrates resources ⇒ efficiency
• Laboratory of excellence comparable to other international ones (network)
• Control is under one single institution
• High international and political visibility

Against:
• Sustainability tied to institutional instability
• Concentrates efforts in one single laboratory ⇒ > risk of saturation (transportation?)
• Does not contribute to build on national capacities
• Increases regional imbalances

**PREMISES:**
1. Countries have different economic, scientific and technological realities that determine the sustainability of the POP Laboratory (human resources, input: solvents, national reagents, local technical services, etc.).
2. The procedures of POP analysis are different (experience, infrastructure, etc.).
3. Each country has ≠ POP analysis needs (e.g.: pesticides VS PCBs).
4. Resources are limited ⇒ allocation should favour efficiency and excellence.

**PROPOSAL:**
Regional laboratory networks with ≠ categories and funding (are those represented the only ones or the best ones in each country? ⇒ questionnaires + inspections by experts (UNEP)):

Categories (objective and verifiable criteria):
1. pesticides
2. + PCB
3. + non-ortho and mono-ortho PCB
4. + PCDD/PCDF
or all ⇒ PCDD/PCDF and other POPs, for example, PBDE? (objective criteria).
And matrices?: industrial vs. environmental
1. **Horizontal network:** 1 laboratory per country (20?) or more (which ones?).

2. **Hierarchical network:** 4-5? Pilot laboratories distributed according to geography and capacity ⇒ connected to the other laboratories in each region.

**Responsibility** of laboratories? (compatibility with current role, e.g., research vs. services).

Relation between responsibility/resources.

**REGIONAL PILOT LABORATORIES**

There is general consensus as to the fact that the implementation of just one single regional laboratory would not be adequate to cover the regional needs mostly due to:

- Sustainability limited by institutional instability
- Concentration of efforts in one single laboratory with risk of saturation (transportation mechanisms)
- Does not contribute to build on national capacities
- Increases regional imbalances

**Requirements:** provide evidence of infrastructure and equipment, experience in research and/or development and POPs services to third parties, demonstrate sustainability over time. Training capacity and knowledge transfer (seminars, courses). Ensure an adequate and balanced geographical coverage. Must work with validated methods and proven analytical capacity for 100-500 annual samples. Be subject to periodical auditing by experts and national and international organizations and possess a quality assurance and quality control system. Governments in countries hosting Pilot Laboratories must commit themselves to ensuring the regional role of such laboratories.

**Responsibilities:** development and harmonization of analytical methods, implementation of inter-calibration programs (to provide reference material and standards), knowledge transfer and training of human resources on a regional level.

**Corresponding Regional Centers - MEAS:** facilitate and coordinate shipment of samples for inter-calibration exercises and analysis in the framework of the Stockholm Convention. Co-participation in the organization of workshops and training courses.

Pilot Laboratories will help disseminate know-how and training of human resources. Building on national capacities will depend on country actions at the level of NIP or other projects, that could come together to strengthen this Project.
5 QUESTIONNAIRES ON CAPACITY, MODIFIED AND APPROVED BY THE GRULAC WORKSHOP

Assessment of Existing Capacity and Capacity Building Needs to Analyse POPs in Developing Countries

Questionnaire for Laboratories that Conduct POP Analyses

1. Affiliation

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<tr>
<td>Contact Person:</td>
<td></td>
</tr>
</tbody>
</table>

2. Type of Laboratory

<table>
<thead>
<tr>
<th>Public/Governmental</th>
<th>Private</th>
<th>Research Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Function of the Laboratory

<table>
<thead>
<tr>
<th>Size (in square meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total:</td>
</tr>
<tr>
<td>Dedicated to POPs Analysis:</td>
</tr>
<tr>
<td>Does the laboratory offer services to national and international customers?</td>
</tr>
<tr>
<td>How long has the laboratory been operational (year):</td>
</tr>
<tr>
<td>Experience with POPs analysis since (starting year):</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pesticides:</th>
<th>PCB:</th>
<th>PCDD/PCDF:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Personal Analyzing POPs

<table>
<thead>
<tr>
<th>Total number:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Professionals:</td>
<td></td>
</tr>
<tr>
<td>Academic degrees:</td>
<td>PhD:</td>
</tr>
<tr>
<td>Técnicos:</td>
<td></td>
</tr>
<tr>
<td>Others (Administration, laboratory technicians, etc.):</td>
<td></td>
</tr>
</tbody>
</table>
3. **Activities, Equipment, and Qualifications**

Table 1: Indicative list of major clients

<table>
<thead>
<tr>
<th>The laboratory offers services to third parties?</th>
<th>Yes / No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal clients (%)</td>
<td></td>
</tr>
<tr>
<td>National</td>
<td></td>
</tr>
<tr>
<td>Foreign Countries</td>
<td></td>
</tr>
<tr>
<td>Intra-laboratory (e.g., within the same company / organization)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Principal clients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public/Governmental</td>
</tr>
</tbody>
</table>

Table 2: Sampling according to matrix (please indicate typical procedure; more than one answer is possible for a given matrix; ++ frequently, + less frequently)

<table>
<thead>
<tr>
<th>Matrix</th>
<th>Other Matrices of Interest</th>
<th>GMP Matrices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling is performed by</td>
<td>Stack emission</td>
<td></td>
</tr>
<tr>
<td>The laboratory</td>
<td>Transformer oil</td>
<td></td>
</tr>
<tr>
<td>Other laboratory</td>
<td>Residues (solid)</td>
<td></td>
</tr>
<tr>
<td>Client</td>
<td>Soil / Sediment</td>
<td></td>
</tr>
<tr>
<td>Nurse / physician</td>
<td>Effluents</td>
<td></td>
</tr>
<tr>
<td>The laboratory provides</td>
<td>Chemicals / Products</td>
<td></td>
</tr>
<tr>
<td>sampling equipment</td>
<td>Vegetation</td>
<td></td>
</tr>
<tr>
<td>The laboratory specifies</td>
<td>Food</td>
<td></td>
</tr>
<tr>
<td>the sampling procedure</td>
<td>Water</td>
<td></td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>Ambient Air</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bivalves</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bird’s Eggs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fish / Marine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mammals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mother’s Milk</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blood</td>
<td></td>
</tr>
</tbody>
</table>
Table 3: Analysis offered by the Laboratory:
Please indicate the method of extraction of POPs according to matrix followed by the instrumental method:

Acronyms and abbreviations:

<table>
<thead>
<tr>
<th>Extraction methods</th>
<th>Instrumentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A = Accelerated extraction</td>
<td>1 = Packed column + ECD</td>
</tr>
<tr>
<td>D = Dilution</td>
<td>2 = Capillary column + ECD</td>
</tr>
<tr>
<td>F = Solid phase</td>
<td>3 = Capillary column + MSD (LRMS)</td>
</tr>
<tr>
<td>L = Liquid/liquid</td>
<td>4 = Capillary column + HRMS</td>
</tr>
<tr>
<td>S = Soxhlet</td>
<td>5 = Capillary column + MS/MS</td>
</tr>
<tr>
<td>U = Ultrasound</td>
<td></td>
</tr>
</tbody>
</table>

For example: Soxhlet – Capillary column + ECD = S2

<table>
<thead>
<tr>
<th>Matrix</th>
<th>Matrices of Interest</th>
<th>GMP Matrices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stack emission</td>
<td>Transformer oil</td>
</tr>
<tr>
<td></td>
<td>Residues (solid)</td>
<td>Effluents</td>
</tr>
<tr>
<td></td>
<td>Soil / Sediment</td>
<td>Chemicals / Products</td>
</tr>
<tr>
<td></td>
<td>Vegetation</td>
<td>Food</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ambient Air</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bivalves</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bird’s Eggs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fish / Marine Mammals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mother’s Milk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blood</td>
</tr>
</tbody>
</table>

**Pesticides + HCB**

- Aldrin
- Chlordane
  - $\alpha$, $\gamma$, oxy-, trans-
  - nonachlor
- Dieldrin
- DDT
  - incl. DDD/DDE
- Endrin
  - Endrin ketone
- Heptachlor
  - Heptachlor epoxide
- Mirex
- Toxaphene
  - Parlar 26, 50, 62
- HCB

**PCB**

- 6/7 indicator PCB
dl-PCB (TEQ)
- dPCDD/PCDF
  - 2,3,7,8-subst. (TEQ)
  - Homologs
Table 4: Methods used for the identification and quantification of POPs and specific matrices (e.g., EPA 1613, EN 1948, ASTM, etc.)

<table>
<thead>
<tr>
<th>POP</th>
<th>Matrices of Interest</th>
<th>GMP Matrices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stack emission</td>
<td>Transformer oil</td>
</tr>
<tr>
<td>Aldrin, endrin, dieldrin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlordane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DDT (incl. DDD/DDE)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heptachlor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mirex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxaphene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/7 indicator PCB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dl-PCB (TEQ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCDD/PCDF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,3,7,8 cong. (TEQ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homologs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Number of samples analyzed per matrix and POP annually (e.g., in 2004) (please, provide year)

<table>
<thead>
<tr>
<th>POPs</th>
<th>POPs Pesticide</th>
<th>PCB</th>
<th>PCDD/PCDF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pesticides</td>
<td>DDT</td>
<td>HCB</td>
</tr>
<tr>
<td>Matrices of Interest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stack emission</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transformer oil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residues (solid)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil / Sediment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effluents</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemicals/products</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GMP Matrices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient air</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bivalves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bird's eggs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish/Marine mammals</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6: Costs to external clients per sample according to matrix and POP (USD/sample, Sampling is not included)

<table>
<thead>
<tr>
<th>POP</th>
<th>Matrices</th>
<th>Stack emission</th>
<th>Transformer oil</th>
<th>Residues, Soils, Sediments, Products, Ambient Air</th>
<th>Effluents, water</th>
<th>Biota, Food, Mother's milk</th>
<th>Blood</th>
</tr>
</thead>
<tbody>
<tr>
<td>All POPs pesticides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DDT (incl. DDD/DDE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/7 indicator PCB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dl-PCB (TEQ)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCDD/PCDF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,3,7,8-subst. cong. (TEQ)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homologs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEQ (PCDD, PCDF, PCB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Quality Assurance Program

4.1 Has the Laboratory a quality control system in place? ☐ Yes/ ☐ No  
(example: written instructions, manuals, registers, etc.)

4.2 Has the Laboratory a quality assurance program in place? ☐ Yes/ ☐ No  
(certification by another institution, e.g., SQS)

4.3 Has the laboratory a person identified responsible for QA/QC? ☐ Yes/ ☐ No

4.4 Comments

........................................................................................................................................

5. Accreditation

Please provide information according to POPs and matrix (e.g., ISO 17025)

<table>
<thead>
<tr>
<th>POP</th>
<th>Matrix</th>
<th>Type of Accreditation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pesticides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/7 indicator PCB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dl-PCB (TEQ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCDD/PCDF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,3,7,8-subst. cong. (TEQ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homologs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 6. Inter-calibration Studies

Table 7: Participation in inter-laboratory comparison studies according to POP and matrix

<table>
<thead>
<tr>
<th>POPs</th>
<th>Year</th>
<th>Matrix</th>
<th>Coordinator (please specify address and Web Site)</th>
<th>Result Satisfactory (Y/N)</th>
<th>Number of the Laboratory (assigned)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pesticide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DDT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxaphene</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/7 indicator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dl-PCB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCDD/PCDF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(TEQ)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 7. Indicative List of Most Important Publications

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Year of Publication / Journal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 8. Additional Comments / Recommendations
Abbreviations and Acronyms

ASE  Accelerated solvent extraction
DDD  Dichlorodiphenyldichloroethane, metabolite of DDT
DDE  Dichlorodiphenyldichloroethylene, metabolite of DDT
DDT  Dichlorodiphenyltrichloroethane
dl  Dioxin-like (PCB that have WHO-TEF assigned)
ECD  Electron capture detection
EI   Electron ionization
EN   Euronorm
EPA  Environmental Protection Agency
FID  Flame ionization detection
GC   Gas chromatograph(y)
GMP  Global Monitoring of POPs
GPC  Gel permeation chromatography
HCB  Hexachlorobenzene
HPLC High performance liquid chromatography
HRGC High-resolution gas chromatography
HRMS High-resolution mass spectrometry
ISO  International Standardization Organization
LOQ  Limit of quantification
LR   Low resolution
MS   Mass spectrometry
MSD  Mass selective detection
NPD  Nitrogen phosphorous detection
PCB  Polychlorinated biphenyls
PCDD Polychlorinated dibenzo-para-dioxins
PCDF Polychlorinated dibenzofurans
POP  Persistent Organic Pollutant
SIM  Single ion monitoring
TCD  Thermal conductivity detection
TEQ  Toxic equivalent
USD  United States Dollar
UV   Ultra-Violet (detection)
### 6 Appendix 1

**Assessment of Existing and Needed Capacity to Analyse POPs in Developing Countries**

**Questionnaire for Laboratories that Analyse POPs**

#### 1. Affiliation

<table>
<thead>
<tr>
<th>Leading institution:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of laboratory:</td>
<td></td>
</tr>
<tr>
<td>Address:</td>
<td></td>
</tr>
<tr>
<td>City / State:</td>
<td></td>
</tr>
<tr>
<td>Country:</td>
<td></td>
</tr>
<tr>
<td>Postal Code:</td>
<td></td>
</tr>
<tr>
<td>Telephone:</td>
<td></td>
</tr>
<tr>
<td>Fax:</td>
<td></td>
</tr>
<tr>
<td>E-mail:</td>
<td></td>
</tr>
<tr>
<td>Website:</td>
<td></td>
</tr>
<tr>
<td>Contact:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of lab</th>
<th>Public/Government</th>
<th>Private</th>
<th>Research center</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Task of lab</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Surface (in square meters)</th>
<th>Total:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Devoted to POPs analysis:</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Is it able to offer national/international internships?</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Date of inception (year)</td>
<td></td>
</tr>
<tr>
<td>Experience in POP analysis (year of inception):</td>
<td></td>
</tr>
<tr>
<td>Pesticides:</td>
<td>PCB:</td>
</tr>
</tbody>
</table>

#### Table 1: Indicative list of main customers

<table>
<thead>
<tr>
<th>Does the lab provide services?</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major customers (%)</td>
<td></td>
</tr>
<tr>
<td>National</td>
<td></td>
</tr>
<tr>
<td>Foreign countries</td>
<td></td>
</tr>
<tr>
<td>Intra-laboratory (e.g. in house)</td>
<td></td>
</tr>
</tbody>
</table>
2 Personnel working in POP analysis

| Total number: | |
| Professionals: | |
| Academic level: | PhD | M.Sc.: |
| Technical experts: | |
| Other (Clerks, cleaning staff, etc.) | |

3 Activities, equipment, qualification

Table 2: Services rendered by the laboratory (please mark with an “X”)

<table>
<thead>
<tr>
<th>Matriz</th>
<th>Relevant matrices</th>
<th>GMP Matrices</th>
</tr>
</thead>
<tbody>
<tr>
<td>POP</td>
<td>Stack emission</td>
<td>Transformer oil</td>
</tr>
<tr>
<td>Pesticides + HCB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aldrin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlordane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>α-, γ-, oxy-, trans-nonaclor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dieldrin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DDT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>incl. DDD/DDE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endrin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endrin ketone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heptachlor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heptachlor epoxide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mirex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxaphene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parlar 26, 50, 62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/7 indicator PCB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dl-PCB (EQT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCDD/PCDF</td>
<td></td>
<td></td>
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<tr>
<td>2,3,7,8-subst. (EQT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homologues</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3: Sampling according to matrix (please indicate responsibility; one specific matrix may get more than one answer; ++ = higher frequency, + = lower frequency)

<table>
<thead>
<tr>
<th>Matriz</th>
<th>Relevant matrices</th>
<th>GMP Matrices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stack emission</td>
<td>Stack emission</td>
<td>Stack emission</td>
</tr>
<tr>
<td>Transformer oil</td>
<td>Transformer oil</td>
<td>Transformer oil</td>
</tr>
<tr>
<td>Residues (solid)</td>
<td>Residues (solid)</td>
<td>Residues (solid)</td>
</tr>
<tr>
<td>Soil /Sediment</td>
<td>Soil /Sediment</td>
<td>Soil /Sediment</td>
</tr>
<tr>
<td>Effluents</td>
<td>Effluents</td>
<td>Effluents</td>
</tr>
<tr>
<td>Chemicals/Products</td>
<td>Chemicals/Products</td>
<td>Chemicals/Products</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Vegetation</td>
<td>Vegetation</td>
</tr>
<tr>
<td>Feed/food</td>
<td>Feed/food</td>
<td>Feed/food</td>
</tr>
<tr>
<td>Water</td>
<td>Water</td>
<td>Water</td>
</tr>
<tr>
<td>Ambient air</td>
<td>Ambient air</td>
<td>Ambient air</td>
</tr>
<tr>
<td>Bivalves</td>
<td>Bivalves</td>
<td>Bivalves</td>
</tr>
<tr>
<td>Bird eggs</td>
<td>Bird eggs</td>
<td>Bird eggs</td>
</tr>
<tr>
<td>Fish /Marine mammals</td>
<td>Fish /Marine mammals</td>
<td>Fish /Marine mammals</td>
</tr>
<tr>
<td>Breast milk</td>
<td>Breast milk</td>
<td>Breast milk</td>
</tr>
<tr>
<td>Blood</td>
<td>Blood</td>
<td>Blood</td>
</tr>
</tbody>
</table>

Sampling conducted by:
- The lab
- Another lab
- Customer
- Nurses/physicians
- Lab provides sampling equipment
- Lab determines sampling procedure
- Others (be specific)
Table 4: Equipment currently used to assess POPs according to matrix  
(e.g. HRGC + ECD, HRGC- (HR)MS, etc.) If specific columns are used, please include it in final comments.

<table>
<thead>
<tr>
<th>Pesticides + HCB</th>
<th>PCB</th>
<th>PCDD/PCDF</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDT/DDD/DDE</td>
<td>Aldrin/ endrin/ dieldrin</td>
<td>Chlordane/ mirex /heptachlor</td>
</tr>
<tr>
<td>Matriz</td>
<td>Stack emissions</td>
<td>Transformer oil</td>
</tr>
</tbody>
</table>
Table 5: Methods used to extract POPs from specific matrices (e.g. Soxhlet, ASE, SPE, etc.)

<table>
<thead>
<tr>
<th>POP</th>
<th>Relevant matrices</th>
<th>GMP matrices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stack emissions</td>
<td>Transformer oil</td>
</tr>
<tr>
<td>Aldrin, endrin, dieldrin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlordane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DDT (incl. DDD/DDE)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heptachlor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mirex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxaphene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCB</td>
<td></td>
<td></td>
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<tr>
<td>PCB</td>
<td></td>
<td></td>
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<tr>
<td>6/7 indicator PCB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dl-PCB (TEQ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCDD/PCDF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,3,7,8-subst. cong. (TEQ)</td>
<td></td>
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<tr>
<td>Homologues</td>
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</tbody>
</table>

Table 6: Methods used to identify and quantify POPs in specific matrices (e.g. EPA 1613, EN 1948, etc.)

<table>
<thead>
<tr>
<th>POPs</th>
<th>Relevant matrices</th>
<th>GMP matrices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stack emission</td>
<td>Transformer oil</td>
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<tr>
<td>Aldrin, endrin, dieldrin</td>
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<tr>
<td>Chlordane</td>
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<tr>
<td>DDT (incl. DDD/DDE)</td>
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<tr>
<td>Heptachlor</td>
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<td></td>
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<tr>
<td>Mirex</td>
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<tr>
<td>Toxaphene</td>
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<tr>
<td>HCB</td>
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<td>PCB</td>
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<tr>
<td>6/7 indicator PCB</td>
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<tr>
<td>dl-PCB (TEQ)</td>
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<tr>
<td>PCDD/PCDF</td>
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<td></td>
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<tr>
<td>2,3,7,8-subst. cong. (TEQ)</td>
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<tr>
<td>Homologues</td>
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</tbody>
</table>
Table 7: Number of samples analysed according to matrix and POPs (annual estimate; e.g. in 2004) (please indicate year)

<table>
<thead>
<tr>
<th>Matrix</th>
<th>Relevant matrices</th>
<th>GMP Matrices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stack emission</td>
<td></td>
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<tr>
<td>Transformer oil</td>
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<tr>
<td>Residues (solid)</td>
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<tr>
<td>Effluents</td>
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<tr>
<td>Chemicals/Products</td>
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<tr>
<td>Vegetation</td>
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<tr>
<td>Feed/food</td>
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<td>Water</td>
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<tr>
<td>Ambient air</td>
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<tr>
<td>Bivalves</td>
<td></td>
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<tr>
<td>Bird eggs</td>
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<td></td>
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<tr>
<td>Fish /Marine mammals</td>
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<tr>
<td>Breast milk</td>
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<tr>
<td>Blood</td>
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</tbody>
</table>

The POPs include:
- Pesticides
  - DDT
- HCB
- PCB
  - indicator PCB
  - dl-PCB
- PCDD/PCDF (TEQ)
Table 8  Fees charged to customers for sample analysis services rendered according to POP and matrix (USD /sample, \textit{excluding sampling})

<table>
<thead>
<tr>
<th>Matrix</th>
<th>Stack emissions</th>
<th>Transformer oil</th>
<th>Residues, soils, sediments, products, ambient air</th>
<th>Effluents, water</th>
<th>Biota, feed/food, milk</th>
<th>Blood</th>
</tr>
</thead>
<tbody>
<tr>
<td>POP</td>
<td></td>
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<td></td>
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<tr>
<td>All POP pesticides</td>
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<td></td>
</tr>
<tr>
<td>DDT (incl. DDD/DDE)</td>
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<tr>
<td>PCB</td>
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<tr>
<td>6/7 indicator PCB</td>
<td></td>
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<td></td>
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<tr>
<td>dl-PCB (TEQ)</td>
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<tr>
<td>PCDD/PCDF</td>
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<tr>
<td>2,3,7,8-subst. cong. (TEQ)</td>
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<tr>
<td>Homólogos</td>
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<td></td>
</tr>
<tr>
<td>TEQ (PCDD, PCDF, PCB)</td>
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</tr>
</tbody>
</table>

4 Quality Assurance Program

3.1 Does laboratory have an established quality control system?  Yes/No
(example: written instructions, manuals, registries, etc.)

3.2 Does laboratory have a quality assurance program?  Yes/No
(certified by an institution like SQS)

3.3 Does the laboratory have a person responsible for QC/QA?

3.4 Comments …………………………………………………………………………………..

5 Accreditation

Please enter information according to type of POP and matrix (e.g. ISO 17025)

<table>
<thead>
<tr>
<th>POP</th>
<th>Matrix</th>
<th>Type of accreditation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pesticides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCB</td>
<td>6/7 indicator PCB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>dl-PCB (TEQ)</td>
<td></td>
</tr>
<tr>
<td>PCDD/PCDF</td>
<td>2,3,7,8-subst. Cong. (TEQ)</td>
<td></td>
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<tr>
<td></td>
<td>Homólogues</td>
<td></td>
</tr>
</tbody>
</table>
6 Inter-calibration

Table 9: Satisfactory participation in inter-laboratory exercises according to type of POP and matrix.

<table>
<thead>
<tr>
<th>POP</th>
<th>Year</th>
<th>Matrix</th>
<th>Coordinating Body (please indicate address and website)</th>
<th>Satisfactory result (Y/N)</th>
<th>Participant number (allocated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pesticide</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>DDT</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Toxaphene</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/7 indicator</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>dl-PCB</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>PCDD/PCDF (TEQ)</td>
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</tbody>
</table>

7 List of most relevant publications

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Year of publication/Journal</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

8 Additional comments / suggestions
## 9 Abbreviations and acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDD</td>
<td>Diclorodifenyl dicloroetano, metabolito del DDT</td>
</tr>
<tr>
<td>DDE</td>
<td>Diclorodifenyl dicloroetileno, metabolito del DDT</td>
</tr>
<tr>
<td>DDT</td>
<td>Diclorodifenil tricloroetano</td>
</tr>
<tr>
<td>DI</td>
<td>Dioxin-like</td>
</tr>
<tr>
<td>ECD</td>
<td>Electron capture detection (Detector de Captura Electrónica)</td>
</tr>
<tr>
<td>EI</td>
<td>Electron ionization (Ionización electrónica)</td>
</tr>
<tr>
<td>EN</td>
<td>Euronorm</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
</tr>
<tr>
<td>FID</td>
<td>Flame ionization detection (Detector de Ionización de llama)</td>
</tr>
<tr>
<td>GC</td>
<td>Gas chromatograph(y)</td>
</tr>
<tr>
<td>GMP</td>
<td>Global Monitoring of COPs</td>
</tr>
<tr>
<td>GPC</td>
<td>Gel permeation chromatography</td>
</tr>
<tr>
<td>HCB</td>
<td>Hexaclorobenceno</td>
</tr>
<tr>
<td>HPLC</td>
<td>High performance liquid chromatography</td>
</tr>
<tr>
<td>HRGC</td>
<td>High-resolution gas chromatography</td>
</tr>
<tr>
<td>HRMS</td>
<td>High-resolution mass spectrometry</td>
</tr>
<tr>
<td>ISO</td>
<td>International Standardization Organization</td>
</tr>
<tr>
<td>LOQ</td>
<td>Limit of quantification (Límite de Cuantificación)</td>
</tr>
<tr>
<td>LR</td>
<td>Low resolution</td>
</tr>
<tr>
<td>MS</td>
<td>Mass spectrometry</td>
</tr>
<tr>
<td>MSD</td>
<td>Mass selective detection</td>
</tr>
<tr>
<td>NPD</td>
<td>Nitrogen phosphorous detection (Detector de Nitrógeno y Fósforo)</td>
</tr>
<tr>
<td>PCB</td>
<td>Policloro bifenilos</td>
</tr>
<tr>
<td>PCDD</td>
<td>Policloro dibeno-para-dioxinas</td>
</tr>
<tr>
<td>PCDF</td>
<td>Policloro dibenzofuranos</td>
</tr>
<tr>
<td>COP</td>
<td>Compuesto Orgánico Persistente)</td>
</tr>
<tr>
<td>SIM</td>
<td>Single ion monitoring</td>
</tr>
<tr>
<td>TCD</td>
<td>Thermal conductivity detection (Detector de Conductividad térmica)</td>
</tr>
<tr>
<td>TEQ</td>
<td>Toxic equivalent</td>
</tr>
<tr>
<td>USD</td>
<td>United States Dollar</td>
</tr>
<tr>
<td>UV</td>
<td>Ultra-Violet (detection)</td>
</tr>
</tbody>
</table>
7 APPENDIX 2

Survey on national analytical needs to implement a National Plan in compliance with the Stockholm Convention

1. Objective of survey
To help countries in Latin America and the Caribbean prepare a diagnosis on the identification of analytical needs to implement National Plans, to inform the COP and to assess their effectiveness at the national, regional and global levels. This will also contribute to identify monitoring and analysis needs.

2. Background
At present there are countries that have conducted their own diagnoses and have a list of the main issues facing POPs management, in the framework of their international commitments; others have already advanced in the formulation of a National Implementation Plan.

In any case, it is necessary to consider the country needs to determine priority activities for the implementation of actions that configure the plan and to measure the efficacy in the implementation of such activities and plan follow-up.

The following are some advances in the harmonization of criteria to tackle the necessary analytical capacity building for the Global Monitoring Program for Persistent Organic Pollutants, resulting from the Workshop to develop a Global Monitoring Program to conduct an evaluation of the effectiveness of the Stockholm Convention, as organized by UNEP, Geneva, March 2003. Five thematic areas were addressed during this workshop and guidelines were proposed, namely:

- **Substances and Analytical Techniques**
  To develop a mechanism to generate certified reference materials (CMRs) from a centralized source, as well as laboratory reference materials (LRMs).
  Suggest compulsory inter-laboratory exercises.
  Suggest the use of matrices: Air, bivalves, wildlife animal species and breast milk.
  The need is highlighted to consider that not all future POPs have to be soluble in fat; for this reason, a broader range of matrices might be needed.

- **SAMPLING. Matrices, Sites and Techniques**
  Attempt to have a responsibility system at the level of institutions that collect samples and laboratories.
  Have protocols for sampling, detection limits, blanks, duplicates, calibrations, standards, quality of co-factors, confirmation tests.
- **Quality Assurance and Control and Treatment of Data.**

  Establish a quality assurance system for the program as a whole. Laboratories must use validated methods or methods that are recognized worldwide.

  Prepare an annual, *compulsory competence test* system for every POP/matrix.

- **Data communication**

  Data handling will be on the basis of an information policy to be defined and a data communication strategy.

- **Assessing development needs and capacity building at a global level.**

  The following were taken into consideration:

  a) Institutional capacity that ensures long-term sustainability of monitoring efforts

  b) Laboratory and technological capacity

  c) Professional and technical qualification of human resources

  d) Assistance across regions will be encouraged

  It is necessary to articulate at three levels: national, regional and global. **Regions** are expected to work as *operational units* to collect, analyse and evaluate information. The regional information thus organized will be used as feedback for the Global Coordinating Group.

  The origin of data will first be sub-regional, national and even local. It is important to remember that we are looking for ongoing, government, laboratory-related, GMP Inventory-related, research, scientific, NGO, etc. activities. The aim is to avoid duplication and capitalize on existing expertise; property rights of data will be respected and sources acknowledged.

  Data handling will be according to an information policy to be defined and a data communication strategy. An institutional capacity building plan must be implemented; this plan must be holistic and permanent, based on *intra- and inter-regional networks.*
3. **Survey to determine analytical needs in POP management:**

Your country is working to diagnose problems related to POPs in your country.

<table>
<thead>
<tr>
<th>POP</th>
<th>Stack emission</th>
<th>Transformer oil</th>
<th>Residues (solid)</th>
<th>Soil / sediment</th>
<th>Effluents</th>
<th>Products</th>
<th>Vegetation</th>
<th>Feed/fod</th>
<th>Water</th>
<th>Ambient air</th>
<th>Bivalves</th>
<th>Bird eggs</th>
<th>Fish/Marine mammals</th>
<th>Breast milk</th>
<th>Blood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aldrin</td>
<td></td>
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<td>Chlordane</td>
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<td>Dieldrin</td>
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<td>Endrin</td>
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<td>Mirex</td>
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<td>Toxaphene</td>
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<tr>
<td>PCDD/PCDF/PCB/HCB</td>
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</tr>
</tbody>
</table>

Mark the squares as applicable:
- With 1 your screening needs and 1 if you already have them: (11), or 0 if they are absent: (10).
- With 2 instrumental needs and 1 if you already have them: (21) or 0 if they are absent: (20).
- To set a priority add an * in the squares relative to the 3 analyses that you currently consider a priority.

Some situations may require screening and instrumental analysis, for example **1121**

- Whatever is not foreseen in the short-term should be marked with an X

**Comments:** at the end

If you already have planned activities for the Implementation Plan of the Stockholm Convention, what are your analytical requirements for a) and b) in the following pages:

Some **Stockholm Convention implementation activities** will not require **analytical capacity**, but at this point we focus on those that do require it.
For example, in terms of PCB some actions imply reducing or not increasing the number of transformers in the country that contain them and this does not require analytical capacity. However, to implement activities such as elimination or removing pollution from transformers, sites, etc., will require analytical determination. The same is true in the case of other POPs, action on pesticides, stockpiles, dioxines and furanes; mention them in table a).

(a) **Major analytical needs to implement your action plans during the first three years.**

<table>
<thead>
<tr>
<th>Nº</th>
<th>Activities of the Plan</th>
<th>Analytical requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
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<td>3</td>
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<td>5</td>
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<tr>
<td>6</td>
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</tr>
</tbody>
</table>

are also required to sample analysis of the different environmental compartments affected and population exposed determine whether POP levels are diminishing; mention this in table b).

(b) **Major Analytical Needs to follow-up and evaluate the efficacy of your National Plan**

<table>
<thead>
<tr>
<th>Nº</th>
<th>Evaluation activities of the Plan</th>
<th>Analytical requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
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<td>4</td>
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<td>5</td>
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<tr>
<td>6</td>
<td></td>
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</tr>
</tbody>
</table>

The Basel Convention Coordinating Centre for Latin America and the Caribbean appreciates the value of your country’s contribution to this survey that will help us know and steer the existing needs at the level of country and region, so that we may make effective steps in the implementation of the Stockholm Convention.

Should you need further clarification or additional information to complete this questionnaire, please contact patac@adinet.com.uy.

Comments
8 APPENDIX 3


Stockholm Convention...

- Art 11:
  1. The Parties, according to their capacity, shall encourage and/or carry out adequate research, development, surveillance and cooperation activities relative to POPs at the National and International levels.

  g) Harmonized methodologies to produce inventories on generation sources and analytical techniques to measure emissions.
Stockholm Convention...

- Art 11:

2. When taking steps to enforce paragraph 1, the Parties will, according to their capacity:

   a) Support programs, networks and international organizations whose objective is to define, conduct, assess and fund research, data compilation and surveillance activities, aware of the need to reduce duplication of efforts to a minimum.

   b) Support National and International efforts to build on national scientific and technical research capacity to foster access and exchange of data and analysis.

Stockholm Convention...

- Art. 11 states that in order to understand the behaviour of POPs thoroughly, it is necessary to research and monitor characteristics such as: POP sources of origin, behaviour, type of transportation, destination, toxicity, both in the environment as well as in human health.

- These activities can be conducted at any level of organization: national, regional or global.
Stockholm Convention...

- Art 16:

1. Convention Efficacy Assessment to obtain comparable surveillance data on POPs, both on regional and global scales.

Stockholm Convention...

- As many countries will not be able to respond to these articles due to lack of resources, laboratories, equipment and know-how, the Convention sets forth an activity to assess the existing capacity and capacity building needs to monitor POPs.
Evaluation of questionnaires...

- An average of 2 questionnaires per country was obtained with the exception of Colombia (11) and Uruguay (9).

- Total number of countries in the region: 33
  Total number of countries responding: 18
  Total number of forms returned: 48 (Laboratories)

- Average response of countries: 55%.
  - Only 1 country from list of labs registered in UNEP database did not respond.
  - Conversely, several countries that are not part of that list, were contacted and provided answers.
  - Some countries that work with POPs did not respond.

Information obtained...

Public vs private laboratories

- Public laboratories: 34

- Private laboratories: 14
Information obtained...

POPs analysed...

% de Analisis Vs COPs

<table>
<thead>
<tr>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plaguicidas</td>
<td>43</td>
</tr>
<tr>
<td>HCB</td>
<td>27</td>
</tr>
<tr>
<td>PCBs</td>
<td>25</td>
</tr>
<tr>
<td>PCDD-PCDF</td>
<td>4</td>
</tr>
</tbody>
</table>

Fuente: 48 Formularios Recibidos

Information Obtained...

Relevant matrices...

Matrices de importancia

<table>
<thead>
<tr>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emision de Chimenea</td>
<td>4</td>
</tr>
<tr>
<td>Aceite de transformer</td>
<td>11</td>
</tr>
<tr>
<td>Residuos (Solidos)</td>
<td>14</td>
</tr>
<tr>
<td>Suelo/Sedimentos</td>
<td>27</td>
</tr>
<tr>
<td>Efluentarios</td>
<td>21</td>
</tr>
<tr>
<td>Quimicos/Produtos</td>
<td>7</td>
</tr>
<tr>
<td>Vegetacion</td>
<td>13</td>
</tr>
<tr>
<td>Alimentos</td>
<td>17</td>
</tr>
<tr>
<td>Agua</td>
<td>35</td>
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</tbody>
</table>

Fuente: 48 Formularios Recibidos
Information obtained...
GMP matrices...

Matrices GMP

<table>
<thead>
<tr>
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<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ave Ambiente</td>
<td>3</td>
</tr>
<tr>
<td>Bileidos</td>
<td>11</td>
</tr>
<tr>
<td>Huevos de Aves</td>
<td>6</td>
</tr>
<tr>
<td>Peces/Mamifera</td>
<td>16</td>
</tr>
<tr>
<td>Leche materna</td>
<td>8</td>
</tr>
<tr>
<td>Sangre</td>
<td>5</td>
</tr>
</tbody>
</table>

Fuente: 48 Formularios Recibidos

Information obtained...
Quality control...

Control de Calidad

<table>
<thead>
<tr>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sistema de calidad Impl.</td>
<td>35</td>
</tr>
<tr>
<td>Labs. Acreditados</td>
<td>5</td>
</tr>
<tr>
<td>Labs en proceso de acred.</td>
<td>12</td>
</tr>
<tr>
<td>Inspectores</td>
<td>13</td>
</tr>
</tbody>
</table>

Fuente: 48 Formularios Recibidos
### Information obtained...

#### Accreditations...

<table>
<thead>
<tr>
<th>POP</th>
<th>Matrix</th>
<th>Number of labs</th>
<th>Type of accreditation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pesticides</td>
<td>Water</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soil/Sediment</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Residues</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>HCB</td>
<td>Water</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soil/Sediment</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Residues</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>PCB</td>
<td>Transformer oil</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soil/Sediment</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Residues</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>PCDD-PCDF</td>
<td>Air</td>
<td>1</td>
<td></td>
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<tr>
<td></td>
<td>Soil</td>
<td>1</td>
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</tr>
<tr>
<td></td>
<td>Feed/Foodstuffs</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

#### Information obtained...

#### Equipment...

![Bar chart showing equipment usage](image)

- GC-ECD: 36
- GC-uECD: 5
- GC-MS: 11
- GC-HRMS: 4

*Fuente: 48 Formularios Recibidos*
Conclusions and Recommendations

- The analysis should be considered as a pilot study on how to assess the GRULAC region and not as a diagnosis of the current situation.

- It could be reckoned that many of the labs have the infrastructure to conduct POP analysis, with the exception of dioxines and furanes.

- A commitment on the part of governments is advisable for a self-evaluation at the country level so it can then be extrapolated to the region and, finally, to a global level.

- So that analyses are reliable, labs should install Quality Control and Assurance Systems (economic resources).

Food for thought...

- What type of infrastructure, equipment and qualified staff can each country and the region expect to have to conduct adequate studies in a reliable and sustainable way???

- Is it possible to create national and regional networks ???
THE END

Muchas Gracias !!

Thank you !!
9 APPENDIX 4

Presentation of survey and assessment of Needs to Analyse POPs in Latin America and the Caribbean.
Basel Convention Coordinating Center. Patricia Acosta.
Analytical Capacity Needs to determine POP levels:

Environment, each one of its compartments
- local
- national
- regional
- global

People

Data for:
- Monitoring Plan
- Sampling: sites, matrices, representative sizes.

Indicators
STATE
STRESS
RESPONSE
TRENDS

Evaluation and feedback
Implementation Plans
Stockholm Convention

It is necessary to learn about the **ANALYTICAL NEEDS** of countries in order to:

+ **DIAGNOSE**, identify POP issues and management measures required
+ **PRIORITIZATION** of actions,
+ **IMPLEMENTATION** of planned activities
+ to **MEASURE EFFICACY** achieved through implementation of such activities, plan follow-up.
**Progress in harmonization of criteria**  
Workshop to develop a Global Monitoring Program, UNEP, Geneva, March 2003:

- **Centralized source** of certified reference materials (CMRs) and laboratory reference materials (LRMs).
- Suggest **compulsory inter-laboratory exercises**.
- **Availability of sampling protocols, detection limits, blanks, duplicates, calibrations, standards, quality of co-factors, confirmation tests.**
- **Annual, compulsory capacity test system, for every POP/matrix.**
- **Data management** will be based on an information policy to be defined and a data communication strategy.

---

**The assessment of needs in terms of development and capacity building at a global level, took into account:**

- **institutional capacity** that ensures long-term sustainability of monitoring efforts,
- **laboratory and technological capacities,**
- **professional and technical know-how of human resources.**
- **foster assistance across regions.**
11 out of 33 countries responded to the questionnaire:
- Antigua and Barbuda
- Argentina
- Barbados
- Costa Rica
- Cuba
- Chile
- Ecuador
- Guatemala
- Mexico
- Peru
- Uruguay

Number of countries expressing need for POPs analysis, from a total of 11 countries.
Number of countries that expressed matrix analysis needs, from a total of 11 countries.

Results of Survey on NEEDS to Analyse POPs:
### Development of a SURVEILLANCE PROGRAM on the basis of a NATIONAL LABORATORIES NETWORK

<table>
<thead>
<tr>
<th>Action Plan</th>
<th>Analytical Capacity Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify national laboratories with analytical capacity and involve them in a NETWORK</td>
<td>To be currently conducting POPs analysis</td>
</tr>
<tr>
<td>Define MATRICES to be MONITORED</td>
<td>------------------------</td>
</tr>
<tr>
<td>Develop SAMPLING and ANALYSIS METHODS</td>
<td>EQUIPMENT, STANDARDS and REFERENCE MATERIALS</td>
</tr>
<tr>
<td>Start SAMPLE collection program</td>
<td>Equipment and methods for collection of Samples</td>
</tr>
<tr>
<td>Conduct inter-laboratory studies</td>
<td>Establish an expedite system to register, process and communicate DATA.</td>
</tr>
</tbody>
</table>

#### Economic sustainability

### Develop ACTION PLANS according to POP GROUP

<table>
<thead>
<tr>
<th>Action Plan</th>
<th>Analytical Capacity Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contaminated Sites Action Plan: National Register with priority on POPs</td>
<td>SAMPLING and ANALYSIS of 12 POPs in SOIL</td>
</tr>
<tr>
<td>Dioxines and Furanes Action Plan SURVEILLANCE: Medical waste, paper pulp, other activities, Strengthen regulations</td>
<td>SAMPLING and ANALYSIS D and F in: - EMISSIONS from incinerators - FEED/FOOD - EFFLUENTS</td>
</tr>
<tr>
<td>PCB Action Plan Inventories: Withdrawal and disposal of PCB equipment:strengthen regulations</td>
<td>SAMPLING and ANALYSIS of PCB in DIELECTRIC OILS</td>
</tr>
<tr>
<td>Research</td>
<td>SAMPLING and ANALYSIS of 12 POPs in air, soil, water, feed/food, breast milk and biota.</td>
</tr>
</tbody>
</table>

Technically and economically it is better to have one POP/matrix Laboratories Network, each lab with its own expertise, to inter-calibrate and inter-compare at national and international levels.
## Need for RELIABLE, EASY-TO-ACCESS DATA

<table>
<thead>
<tr>
<th>Action Plan</th>
<th>Analytical Capacity Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assurance of RELIABLE AND COMPARABLE data</td>
<td>Compilation and selection of SAMPLING AND ANALYSIS TECHNIQUES according to POP/M.</td>
</tr>
<tr>
<td>Definition of CRITERIA for QUALITY assurance and control</td>
<td>Approval and validation procedures</td>
</tr>
<tr>
<td>Evaluation, handling and interpretation of data: INFORMATION SYSTEM that covers all POP CV and all actors involved.</td>
<td>Data registration system with quality control and in a format according to protocol. Foresee mechanisms for disposal.</td>
</tr>
<tr>
<td>Monitoring and analysis to DIAGNOSE MATRICES OF INTEREST</td>
<td>Sampling and analysis resources: Equipment, instruments, reference material</td>
</tr>
<tr>
<td>Setting up CRITERIA for programs in MONITORING</td>
<td>SCREENING techniques as well as INSTRUMENTAL analysis</td>
</tr>
</tbody>
</table>

Build on the necessary institutional capacities.

## POP PESTICIDES

Evaluate areas where these were used broadly, soil, biota, feed/food, products.

## WASTE - EMISSIONS - EFFLUENTS:

- Assess basins and areas of POP reception or influence
- Promote pollution PREVENTION MECHANISMS in:
  1. Ongoing activities: Best Available Technologies and Best Environmental Practices: Promotion, Training, Surveillance and CONTROL.
  2. New undertakings: Best Available Technologies and Best Environmental Practices, EIA.

Standards and action.
Environmental matrices:
✓ Great diversity of situations, **SUB-NATIONAL SCALE**
✓ Requirements for the **protection of the environment and people**
✓ International commitments, **environment and trade**

**Human Matrices**
✓ Population with **LABOUR EXPOSURE** (workers)
✓ Population **LOCALLY EXPOSED**, environmental liabilities, activities (local population)
✓ Population in general

---

Analytical Capacity to manage POPs
✓ **SAMPLING** - **ANALYSIS** - **INTERPRETATION**
✓ Reliability /Harmonization: - inter-laboratory exercises - protocols
✓ **Expertise**: **POP - MATRIX** - **POP/MATRIX**
✓ Coordination among national, regional and global actors.
✓ Training
✓ ¿**EQUIPMENT?** ¿**INPUT?** ¿**Standard?**

**NETWORKS**
Thank you!
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## APPENDIX 6. PROGRAM OF THE WORKSHOP

Regional Workshop on Capacity to Analyse POPs in Developing Countries

**5-9 September 2005**  
LATU, Montevideo, Uruguay

### Draft Program

<table>
<thead>
<tr>
<th>5 Sep 2005</th>
<th>Opening and Introduction</th>
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<tbody>
<tr>
<td>8:30-9:30</td>
<td>Registration of participants</td>
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</table>
| 9:30-11:00 | Welcome – Opening remarks  
Presentation of the participants  
Objectives of the workshop, program and structure |
| 11:00-11:30 | Coffee break |
| 11:30-12:30 | UNEP/GEF Project:  
- Linkages with Stockholm Convention  
- Objectives and implementation |
| 12:30-14:00 | Lunch |
| 14:00-16:00 | Existing POPs Analysis Capacity in GRULAC Region  
- POPs Lab 1-5  
- Summary from questionnaires returned |
| 16:00-16:30 | Coffee break |
| 16:30-18:00 | Country View on POPs Analysis Needs  
- Country 1-4  
- Summary from questionnaires returned |
| 19:00-21:00 | Reception |

<table>
<thead>
<tr>
<th>6 Sep 2005</th>
<th>Experiences and Lessons Learned</th>
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</table>
| 9:00-11:00 | Experiences with establishment of laboratories – View of donors  
Discussion |
| 11:00-11:30 | Coffee break |
| 11:30-12:45 | View from private laboratories: quality criteria, sustainability  
Discussion |
| 12:45-14:00 | Lunch |
| 14:00-16:00 | Role of inter-laboratory comparison studies  
Discussion |
<p>| 16:00-16:30 | Coffee break |
| 16:30-17:30 | Presentation of GMP database, modified questionnaires, and new structure |</p>
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<tr>
<th>7 Sep 2005</th>
<th>Capacity and Needs in GRULAC Region</th>
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<tr>
<td>9:00-10:30</td>
<td>Introduction to working groups:</td>
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<tr>
<td></td>
<td>• WG1: Quality criteria for POPs analysis</td>
</tr>
<tr>
<td></td>
<td>• WG2: Needs for POPs analysis</td>
</tr>
<tr>
<td>10:30-11:00</td>
<td>Coffee break</td>
</tr>
<tr>
<td>11:30-12:45</td>
<td>WG1 and WG2 (in parallel)</td>
</tr>
<tr>
<td>12:45-14:00</td>
<td>Lunch</td>
</tr>
<tr>
<td>14:00-18:00</td>
<td>WG1 and WG2 (cont’d)</td>
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<th>Capacity and Needs in GRULAC Region</th>
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<tbody>
<tr>
<td>9:00-10:30</td>
<td>Report from WG1 and WG2 Discussion</td>
</tr>
<tr>
<td>10:30-11:00</td>
<td>Coffee break</td>
</tr>
<tr>
<td>11:00-12:45</td>
<td>Tour of laboratory at LATU</td>
</tr>
<tr>
<td>12:45-14:00</td>
<td>Lunch</td>
</tr>
<tr>
<td>14:00-16:00</td>
<td>WG3: Sustainability criteria and country commitments (with view of regional labs)</td>
</tr>
<tr>
<td>16:00-16:30</td>
<td>Coffee break</td>
</tr>
<tr>
<td>16:30-17:30</td>
<td>WG3 (cont’d)</td>
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<th>Future Needs for POPs Analysis and Its Implications</th>
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<tr>
<td>9:00-11:00</td>
<td>Report from WG3 Discussion Next steps and its implications</td>
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<tr>
<td>11:00-11:30</td>
<td>Coffee break</td>
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<tr>
<td>11:30-12:45</td>
<td>Presentation and Adoption of the Reports</td>
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<tr>
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<td>POPs Laboratory Database</td>
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<td>Quality Criteria for POPs Analysis</td>
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<td></td>
<td>Needs for POPs Analysis</td>
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<tr>
<td></td>
<td>Criteria for sustainability</td>
</tr>
<tr>
<td>12:45-14:00</td>
<td>Lunch</td>
</tr>
<tr>
<td>14:00-17:00</td>
<td>Conclusions and recommendations – regional view (Aggregated report)</td>
</tr>
<tr>
<td>17:00-17:30</td>
<td>Coffee break</td>
</tr>
</tbody>
</table>