Report of the Meeting of the Coordination Group of the Global Monitoring Plan for Persistent Organic Pollutants under the Stockholm Convention

Introduction

1. At its third meeting in May 2007, the Conference of the Parties of the Stockholm Convention, by decision SC-3/19 on effectiveness evaluation, provisionally adopted the amended global monitoring plan for persistent organic pollutants (UNEP/POPS/COP.3/22/Rev.1, annex II) and the amended implementation plan for the global monitoring plan (UNEP/POPS/COP.3/23/Rev.1). It agreed that the amended preliminary version of the guidance on the global monitoring plan for persistent organic pollutants (UNEP/POPS/COP.3/INF/14/Rev.1) provided an appropriate basis for the Parties to implement the global monitoring plan. Decision SC-3/19 also established a regional organization group for each of the five United Nations Regions to facilitate regional implementation of the global monitoring plan, and a coordination group composed of three members from each of the regional organization groups with mandate and tasks set out in an annex to that decision.

2. The coordination group was to meet once prior to the fourth meeting of the Conference of the Parties and mandated to, inter alia:

Facilitate preparation of the global monitoring report;

Assess regional work with the aim of achieving consistency between regions;

Identify impediments to the implementation of the global monitoring plan;

Promote:

experience sharing within and between regions,

capacity strengthening to address gaps in coverage for the core media where possible and

Evaluate the first phase of the global monitoring plan and develop recommendations for consideration by the Conference of the Parties at its fourth meeting.

3. A workshop to facilitate drafting of the regional monitoring reports was held in Geneva, Switzerland from 19 to 23 May 2008. Attending members of the coordination group of the global monitoring plan met informally during that meeting.

4. The Meeting of the Coordination Group of the Global Monitoring Plan for Persistent Organic Pollutants under the Stockholm Convention was held at the International Environment House in Geneva Switzerland from 10-12 November, 2008.

Opening of the Meeting

5. The meeting was declared open at 9:00 a.m. on Monday 10 November 2008. Opening statements were made by Mr. Donald Cooper, Executive Secretary of the Stockholm Convention and by Ms. Fatoumata Keita-Ouane, Senior Scientific Affairs Officer, Technical Team Leader, Secretariat of the Stockholm Convention.

6. Mr. Cooper welcomed the members of the coordination group and said that as experts they were present to determine how a component of the Convention was functioning. The Stockholm Convention had established a process of continuing forward based on lessons learned and had chosen to measure success as early as possible after coming into force; for that purpose it needed to create a starting point or basis from which to judge that success. Such a basis must be understood both by scientists and decision makers and hence a facilitative process must be used. He added that this should not be a

unique activity as the Convention had to continue to evaluate itself and with that in mind, reasonable time frames had to be established for future evaluations. Those time frames had to take into account both the time needed for scientific studies as well as the periodicity and frequency of meetings of the Conference of Parties. Whatever the recommendations of the global monitoring report it had to cater to all stakeholders. Targeted responses as well as scientifically detailed and logically progressive reports were essential. He concluded by stating that the Parties to the Convention were anticipating the delivery of a report over which they did not have to deliberate at length but rather which demonstrated the success of the activities to date.

7. Ms. Keita-Ouane said the meeting objective was to finalize the work begun in the regions one short year previously. The current regional reports from which the global monitoring report would be developed were the best that could be achieved in such a short time. The Conference of the Parties had not provided direction on how to proceed after the first monitoring report. The coordination group might wish to make some suggestions in that regard, especially in light of the new chemicals being proposed for inclusion in the Convention.

I. Organizational Matters

A. Adoption of the Agenda

8. The meeting adopted the following agenda on the basis of the provisional agenda contained in document UNEP/POPs/GMP-CG/2008/1 :

1. Organization of the coordination group work
    a. Selection of a chair/co-chairs
2. Facilitating preparation of the global monitoring report
    a. Evaluation of the status of the regional monitoring reports
    b. Outline, structure and contents of the global monitoring report, in particular the summary of the global monitoring report
    c. Timelines and responsibilities to finalize the report
3. Evaluation of the first phase of the global monitoring plan
    a. Coordination and oversight for subsequent evaluations
        i. Long-range transport
        ii. Other media
        iii. New persistent organic pollutants
        iv. Comparability issues
        v. Specimen banking
        vi. Interval for effectiveness evaluation
    b. Guidance on the global monitoring report
    c. Further capacity enhancement for Parties on a regional basis, including interregional cooperation (addressing coverage in core media)
    d. Role, membership and activities of the coordination group in support of subsequent evaluations (terms of reference for regional organization group and coordination group)
    e. Regional capacity-building needs and how to address them

B. Selection of a chair/co-chairs

9. The meeting elected Mr. Ramon Guardans (Spain) and Mr. Vincent Madadi (Kenya) to serve as co-chairs.

C. Organization of work

10. The representative of the Secretariat outlined the objectives of the meeting and drew attention to the programme of work (UNEP/POPs/GMP-CG/2008/3) and possible outcomes.

11. She reiterated the purpose of the meeting as contained in the annotated agenda (UNEP/POPs/GMP-CG/2008/2) and said that the expected outputs of the meeting were an outline, structure and content of the global monitoring report, including timelines and responsibilities for its finalization, and a report to the Conference of the Parties for its consideration at its fourth session. In developing those outputs the coordination group had to agree on what was needed and how much time was available to prepare the work and how to carry it into the future. She said that it was critical that all data in the report be evaluated and that it provide an effective baseline from which to undertake future work. She said there should be clear elements for the Conference of the Parties to examine including the obstacles faced and the continuing gaps. For the future it was necessary to develop a clear message on the minimum framework necessary in the regions, including technical and financial assistance for current work to continue and be maintained.

D. Attendance

12. The meeting was attended by the following coordination group members: Mr. Malverne P. Spencer, (Antigua and Barbuda), Ms. Anahit Aleksandryan (Armenia) Ms. Sara Broomhall (Australia), Mr. Tom Harner (Canada), Mr. Lorenzo Caballero (Chile), Mr. Minghui Zheng (China), Mr. Ivan Holoubek (Czech Republic), Mr. Trajce Stafilov (Former Yugoslav Republic of Macedonia), Mr. Yasuyuki Shibata (Japan), Mr. Vincent Odongo Madadi (Kenya), Ms. Halimatou Kone Esp Traore (Mali), Ms. Ana Patricia Martínez Bolivar (Mexico) and Mr. Ramon Guardans (Spain).

13. The meeting was also attended by the following observers: Mr. Barry Reville (Australia), Ms. Hiroko Arataki (Japan) and Mr. Tor Johannessen (Norway – regional organization group member from the Western European and other States).

14. The meeting was also attended by Ms. Heidelore Fiedler, UNEP Division of Technology, Industry and Economics and Mr. Matthias Kern, UNEP Division of Global Environment Fund (GEF) Coordination.

II. Facilitating preparation of the global monitoring report

A. Evaluation of the status of the regional monitoring reports

15. The meeting heard presentations from Mr. Madadi for the African region, Mr. Zheng for the Asia-Pacific region, Mr. Holoubek for the Central and Eastern European region, Ms. Martinez for the Latin America and Caribbean region and Mr. Harner for the Western European and Other states Group (WEOG) on the status of the regional monitoring reports including on data unavailable for the initial deadline of 15 October 2008 but which were either available now or would be in the near future.

16. The members provided information on the current data and also outlined the process followed to prepare the regional reports and the challenges they faced. For the African region, in general there was limited capacity for monitoring of POPs. In particular there was a lack of systematic monitoring, delays in receiving authorization at the national level to permit milk sampling, resource difficulties to undertake journeys for field sampling, difficulties in transferring samples for analysis and limited communication with national focal points. Air data were available from the ongoing Global Atmospheric Passive Sampling Survey (GAPS) programme and from the newly initiated strategic partnership with the RECETOX programme. Except for one country, all milk data will be available from the UNEP-WHO milk survey, which is currently being implemented and the results

should be available in the coming months. Also, for the Latin American and Caribbean region, there was almost no data for breast milk or human blood except for one sampling site for each medium. Air data was mainly from existing international programmes such as the GAPS programme. Similarly as in Africa, human milk data will become available from the UNEP-WHO human milk survey.

17. For several regions, final sets of data were expected in the coming weeks and those data could be included in an appendix to the respective regional reports until 20 March 2009.

Status of the UNEP/WHO milk survey

18. The meeting heard a presentation on the current status of the UNEP/WHO milk survey including suggestions to overcome the lack of data from certain regions. The representative of the Secretariat said that additional countries would be contacted to ascertain their interest in participating in the survey and that samples that had already been collected could be stored in WHO reference laboratories to be analyzed in future if required. This project is currently expected to provide data from13 countries in the African region, two countries in Asia, five countries in Central and Eastern Europe, and six countries from Latin America and the Caribbean.

B. Outline, structure and contents of the global monitoring report, in particular the summary of the global monitoring report

19. The representative of the Secretariat presented the draft global monitoring report (UNEP/POPs/GMP-CG/2008/4) and the elements to be included in the summary of the global monitoring report. She recalled that the draft global monitoring report was comprised of a summary prepared on the basis of the findings of the five regional reports as well as executive summaries of the five regional reports. The main summary section would consist of an introduction, an overview of availability of baseline data in the regions, and a conclusions and recommendations section. She further described the executive summaries of the regional reports noting they contained a regional introduction, a description of contributing programmes and collaborative programmes, the main findings, a description of data gaps and capacity building needs, and conclusions and recommendations including proposals for a (cost) effective monitoring strategy for future evaluations.

20. In the ensuing discussion several members suggested that the summary of the global monitoring report include an explanation of the term ‘baseline’. It should be clarified that the baseline was being set to determine trends of increase or decrease in POPs levels on both the short-term and long-term bases. Some members noted that the regional reports and the data therein constituted a warehouse of information that could serve as a useful resource for policy makers and researchers and should be placed on the Convention website in the Secretariat’s role of acting as a clearing house for POPs information. The members agreed that an interpretation of the global situation could be obtained from the information contained in the regional reports. While baseline data, data gaps, capacity-building needs and future monitoring programmes should be addressed on a regional basis, long-range environmental transport and the conclusions and recommendations should be covered from a global perspective. The coordination group agreed that the data collected were not being analyzed but that an assessment was being made to determine whether the quality was sufficient to gauge changes over time.

21. The meeting agreed to a structure for the global monitoring report which would inter alia include the introduction, a matrix presenting a summary of the information on POPs from the regional reports, conclusions and recommendations including information on long-range transport and the executive summaries of the five regional reports.

C. Timelines and responsibilities to finalize the report

22. The meeting agreed on the following timelines for finalization of the global monitoring report.

Activity	Timeframe
Revised summary of the draft global monitoring report circulated to coordination group members for comments	21 November 2008
Revised executive summaries of regional reports along with comments on summary of the draft global monitoring report submitted to the Secretariat	**30 November 2008**
Draft global monitoring report revised by Secretariat and circulated to coordination group members for approval	17 December 2008
Final comments on draft global monitoring report submitted to Secretariat	**10 January 2009**
Final Draft of the global monitoring report is ready for editing and translation	15 January 2009
Final drafts of the regional monitoring reports uploaded on the Stockholm Convention web page	**15 March 2009**
Final drafts of the regional monitoring reports available as information documents for the Conference of the Parties	20 March 2009

III. Evaluation of the first phase of the global monitoring plan

23. The coordination group members agreed that the amended global monitoring plan for persistent organic pollutants (UNEP/POPS/COP.3/22/Rev.1, annex II) and the amended implementation plan for the global monitoring plan (UNEP/POPS/COP.3/23/Rev.1) adopted by decision SC-3/19 on effectiveness evaluation, provided a good framework for implementation of the first phase of the global monitoring plan and will also provide an appropriate framework for future evaluations.

24. The meeting identified several impediments to implementation of the global monitoring plan. These included a lack of on-going programmes and systematic monitoring in some regions, logistical and technical problems such as a need to facilitate sampling at distant sites and improved means to transfer samples for analysis. There were also delays in implementation of projects due to communication difficulties, for example: contact information that was not up-to-date after focal points changed or moved; challenges of ensuring inter-departmental collaboration resulting in delays before responses and commitment for proposals were obtained; cultural and ethical barriers to the collection of human samples in some contexts; and occasionally no response or rejection of the invitation to participate in initiatives. It was also noted that there had been limited response to requests for country endorsement of GEF regional projects.

A. Coordination and oversight for subsequent evaluations

25. The meeting had before it a document entitled draft implementation of the global monitoring plan (UNEP/POPs/GMP-CG/2008/6) that outlined the main tasks to be completed for subsequent evaluations of the monitoring plan.

1. Long-range transport

26. In discussing coordination and oversight for subsequent evaluations, members emphasized that knowledge on long-range transport was key to assessing temporal trends. An understanding of the long-range transport of POPs would help evaluate the effectiveness of the Convention. The physico-chemical properties of each chemical defined how it was transported over long distances – whether they were “flyers” though air, or “swimmers” through water. Overall persistence defined how long a compound would remain in the environment. Compounds with long transport characteristic and long persistence would be expected to last a long time in remote areas and make it difficult to determine the effectiveness of the Convention. More advanced methods of back-trajectory analysis and modelling of long-range environmental transport could help to determine the fate of compounds. Some of the POPs that might be included in the Convention could be more

water soluble and as such marine transport by ocean currents might be important to examine in the future.

27. Given that long-range transport spanned all regions, a plan or process to develop a coordinated cross-regional approach to meet the environmental transport objective was recommended. This could be done independently or in conjunction with the coordination group. Modeling exercises of long-range transport had already been undertaken in some regions and by existing monitoring programmes such as GAPS, that information could be useful in examining trends.

28. An understanding of the impact of year to year climate variability on monitoring results was also important in assessing trends. The regional monitoring report for the group of Western European and other States concluded that the effects of climate on the transport and partitioning of POPs has the potential to significantly complicate interpretation of measurements of POPs in environmental media for future evaluations. It was therefore suggested that consideration be given to encouraging studies on meteorological influences on levels of POPs in environmental media. This may be best undertaken in cooperation with the existing monitoring programmes. To that end, it was suggested that ways of working with the Task Force on Hemispheric Transport of Air Pollution (HTAP) of the UNECE Convention on Long Range Transboundary Air Pollution (LRTAP) or any other body studying transport of POPs should be examined.

2. Other media

29. The meeting discussed the option for undertaking future evaluations using the same core media or adding new media. It was noted that the core media of air monitoring, and human exposure through breast milk or human blood should continue to be used as currently that was the most appropriate and cost-effective option. Valuable data from other media might be available in many existing programmes that could also be used to establish temporal trends. Such data, for example levels in polar bears, could even provide solid trend data as their environments and diet rarely changed, and could be useful in indicating trends in levels of POPs. The data might be included in regional reports as long as they met the requirements for acceptance as defined in the guidance for the global monitoring plan and in Annex I to the implementation plan. It was noted that for some of the candidate POPs which may partition differently in the environment, other media may prove to be more appropriate for the purpose of the evaluation.

30. The meeting agreed that the core media were the appropriate ones to be used for global monitoring and evaluations. It recognized that additional regional-specific media may be available in some regions or sub-regions, and that these could provide useful supplemental data for the evaluation. The meeting further agreed it might be necessary to review the core media when new POPs are included in the Convention.

3. New persistent organic pollutants

31. The meeting addressed the question of when to begin assessment of chemicals proposed for inclusion in the Convention. Some members considered that there might be some advantages, especially in terms of cost-effectiveness, if POPs proposed for inclusion were analyzed at the same time as those chemicals already in the Convention. It was considered that this would also be a time-saving process that would enable a baseline to be established at an early stage in order to determine trends as soon as possible. Others considered that as long as the chemicals were not listed in the Convention no additional work should be undertaken. It was agreed, however, that if there were chemicals of concern in a region or sub-region, regardless of whether they were proposed for listing in the Convention or not, data sets could be collected using the criteria described in paragraph 29 above.

32. During the discussion it was noted when the Conference of the Parties decides to add new substances to the Annexes of the Convention, it would be necessary to include these new POPs into the effectiveness evaluations. It was stressed that the inclusion of additional POPs might create needs to modify or amend the current guidelines for global

monitoring and the implementation plan. Some of the candidate POPs being assessed by the POPs Review Committee could be routinely sampled and analyzed with the current POPs, while others could require different or additional sampling or analytical protocols.

33. It was confirmed that existing monitoring programmes that have monitored the core media would be able to provide useful data, however some new requirements might need to be added to the guidelines, for example: the deployment of additional sampler(s) for ambient air sampling for the determination of new POPs to account for optimal sampling methods or periods for these substances; development of new methods of collection of non-fatty human tissues; development of recommended analytical methods and training for laboratories, given that some of the new POPs might require sophisticated analysis which is not readily available at all laboratories; and the development of sampling and analytical methods for other possible media (determination of POPs in water, sediments, soils, biota, methods suitable for the evaluation of long range transport via air or waters, marine transport, etc.). It was also suggested that there be the development of suitable long-term storage methods for new substances and media. Meeting such requirements would undoubtedly increase the cost of the monitoring programmes.

34. It was suggested that when new POPs are included in the Convention, monitoring of those POPs would have to be initiated as soon as possible so that effective baselines could be established.

35. It was further suggested that, when the Conference agrees to list new substances in Annex A, B or C of the Convention, the coordination group, and subsequently the regional organization groups, should, as soon as practicable, consider if there is a need to amend the guidance document on the global monitoring plan. If changes are required it would need to determine: how to amend the guidance document on the global monitoring plan; how to incorporate monitoring for the new listed substances into regional monitoring activities (noting that in some cases they may already be included); what the capacity implications were; and how to address the capacity for monitoring of the new substances.

4. Comparability issues

36. Turning to comparability issues, members agreed that to interpret POPs concentrations in air, it was expected that programmes were consistent in their methods over time and thus the data collected within a programme should be comparable. It was confirmed that arrangements to gather data should be implemented using existing programmes and mechanisms to the extent possible. Existing programmes had procedures to ensure data comparability within the programme, taking into account constraints related to the use of different analytical laboratories. However, it was noted that it would be very difficult to achieve comparability between various programmes due to many sources of variability including the use of different laboratories, different sampling methods or analytical protocols. While in some instances it might be desirable to compare data across different programmes, for example for modelling exercises or semi-quantitative spatial comparisons of POPs across regions or programme boundaries, ensuring comparability across regions should not be a priority.

37. Comparability among programmes could be assessed and improved through inter-comparison exercises however such exercises were complex and the group re-affirmed that this level of comparability was not required for trends analysis within a given programme. Comparability could be achieved when a programme operating in several regions maintained identical monitoring protocols and a centralized analytical facility. However it was not a requirement that data be comparable between different programmes, given the numerous sources of uncertainty that would come into play. The focus should hence be placed on internal consistency of the methods and comparability of the data within a particular programme over time.

5. Specimen banking

38. The meeting acknowledged the value of specimen banking but emphasized the importance of maintaining rigorous records including details on monitoring methods,

sample preparation and history. In general specimen banking can support capacity building initiatives as samples could be stored and then analyzed once a region's laboratory capacities had been enhanced.

39. It was recalled that a primary role of specimen banks was to maintain environmental monitoring samples for future analysis. Such storage could serve to reveal temporal and spatial trends of newly identified pollutants promptly and thereby assist in the development of appropriate regulation or control measures and could also reveal temporal and spatial trends of pollutants using more advanced techniques (such as higher sensitivity or increased harmonization) such that previously unobtainable information could be acquired. Specimen banking might hence provide improved analysis of previous data, support development of more advanced environmental monitoring or analytical methods, quality assurance/quality control procedures and so forth. It was noted that major specimen banks had techniques to homogenize samples and archive part of them without contamination which in itself was a technique useful to make reference materials for quality assurance/quality control procedures.

40. Specimen banking could usefully serve as a supporting tool for developing countries to collect baseline samples for future effectiveness evaluation, by enabling Parties to begin or continue sampling immediately while pending analysis until appropriate capacity building or enhancement had been achieved.

41. Such a supporting tool could also be used on an anticipatory basis in the event that new POPs are added to the Convention. This would allow the creation of baseline levels for candidate compounds at an early stage. Samples of such POPs kept in a specimen bank have been used for retrospective analysis and would allow doing so whenever a chemical was included in the Convention. Retrospective analyses of archived samples would allow for faster investigation of temporal or spatial trends of new POPs.

6. Interval for effectiveness evaluation

42. The meeting discussed what would be the most appropriate interval for successive evaluations. It was considered that, to obtain optimal results while remaining cost effective an interval of between four to five years between evaluations would be a minimum. Considering the periodicity of meetings of the Conference of the Parties at which reports would have to be made on successive evaluations it was suggested that the optimum time between each evaluation would be six years. It was further suggested that while six years presented a suitable interval between evaluations, in the interim period work should be on-going; in particular there should be continuous air monitoring and data assessment and a minimum of one milk survey. Interim activities could also include developing additional programmes for core media, identifying possible partnerships and further work on long-range transport, including how to assist regions with regional long-range transport issues and long-range transport by water.

B. Guidance on the global monitoring plan

43. The meeting agreed that the guidance document had served well for the first evaluation. Several members suggested, however, that some modification might be necessary to improve the guidance in view of evolution of the Convention. It was suggested that rather than undergo a complete review of the guidance document at this time, appendices or annexes could be prepared on new topics. Such appendices could be prepared by small task teams with one team leader from the coordination group and invited experts in the field**.**

44. The meeting agreed that the guidance should be updated with appendices/annexes on long-range transport, specimen banking, the impact of including new POPs in the Convention and the selection of new core media if appropriate.

C. Further capacity enhancement for Parties on a regional basis, including interregional cooperation (addressing coverage in core media)

45. Given the close link between agenda item III C and agenda item III E on regional capacity-building needs and how to address them the discussion under both items have been collated under agenda item III E below.

D. Role, membership and activities of the coordination group in support of subsequent evaluations (terms of reference for regional organization groups and for coordination group)

46. The members addressed the terms of reference of the coordination group by also examining the terms of reference of the regional organization groups. It was suggested that the regional organization members should be appointed for a minimum of one six-year term to concur with the proposed evaluation cycle. Each term would commence after the effectiveness evaluation performed by the Conference of the Parties and terminate with reporting on each subsequent evaluation at the relevant Conference. In the event a member could no longer fulfil his/her mandate, the region would select a new member in consultation with the regional bureau members. Members' terms may be extended as decided by the regions in accordance with the procedure outlined in the Conference decision SC-3/19.

47. The meeting urged that, in order to ensure continuity and benefit from institutional memory and experience gained during the first evaluation phase, all efforts be made to extend the mandate of the current members of the regional organization groups. The amended terms of reference of the regional organization groups and the coordination group as proposed by the meeting are set out in Annex 1 to the current report.

E. Regional capacity-building needs and how to address them

48. The representative of the Secretariat introduced document UNEP/POPs/GMP-CG/2008/5 REV on identifying and addressing regional capacity building needs for global monitoring plan implementation. She said the draft implementation plan for the global monitoring plan for the first effectiveness evaluation (UNEP/POPs/COP.3/23/Rev.1) included a draft generic step-by-step capacity enhancement plan that had two major components: an assessment of needs comprising approaches and possible components of a step-by-step plan, and a capacity enhancement plan with a knowledge and logistical component. The document outlined the needs identified so far and the proposed approach to continue the work. The draft generic step-by-step plan is annexed to the document on identifying and addressing regional capacity building needs for global monitoring plan implementation.

49. She said the needs identified across the five regions during the regional organization group inception workshops held in 2007-2008 were consistent and constituted human capacity strengthening, improving quality assurance/quality control and acquisition of analytical and laboratory equipment. Human capacity strengthening was necessary in data management, including analysis, interpretation and communication; sampling techniques, sample preparation and analytical procedures; validation of analytical methods; and in-laboratory training. Improving quality assurance/quality control included implementation of standard operation procedures; participation in inter-laboratory tests; provision of reference materials and analytical standards and provision of laboratory consumable. Finally acquisition of analytical and laboratory equipment include improving of detection limits; improving of instrumentation to sample and analyze all Stockholm Convention persistent organic pollutants in core media; and replacement of obsolete equipment.

50. The capacity enhancement steps implemented so far for the knowledge component included preparation of guidance documents, references on monitoring, training, organization of inter-calibration exercises between analytical laboratories and project planning and development. Describing the capacity building activities of the Secretariat, she acknowledged the support and assistance for training at the Science and Technology Branch of Environment Canada and at summer schools at the Research Centre for Environmental Chemistry and Ecotoxicology (RECETOX) at Masaryk University, Czech Republic. She also acknowledged the WHO Global Environment Monitoring System/Food Contamination

Monitoring and Assessment Programme (GEMS/FOOD) which in cooperation with UNEP had launched the persistent organic pollutants survey in human milk and the laboratory training under the UNEP/GEF project described in paragraph 56 below. The logistical component had included assistance with sampling and sample analysis, participation in inter-laboratory tests for quality assurance/quality control, equipment, sample storage in specimen banks, data management and data integration, interpretation review and reporting. Regional monitoring partnerships had been in place with the Arctic Monitoring and Assessment Programme (AMAP), the GAPS programme, RECETOX, WHO and two SAICM Quick Start projects in support of effectiveness evaluation had been initiated. Similar components were proposed to support future effectiveness evaluations.

Need for capacity strengthening in support of future evaluations

51. Under agenda item III. E, members from the regional organization groups presented a minimalist (cost) effective regional monitoring plan, building and expanding on the established baseline, and which supported evaluation of changes in POPs levels over time in the core media. The proposed minimalist monitoring plan outlined a possible way in which monitoring programmes could be developed in each of the regions, including regional maps showing the current monitoring points and indicating where there was need for capacity building and support and for filling the gaps in geographic coverage. The members emphasized that these plans were only draft proposals and had not been endorsed by the regions. The proposed regional minimalist monitoring programmes are attached to the current report as Annex 2.

GEF projects for effectiveness evaluation

52. Mr. Kern described the development of the GEF projects for effectiveness evaluation. At the inception workshops, there had been agreement on the drafting of medium sized projects that could move forward at a rapid pace. There had been a timeline of a few months to approve the projects, however preparation of and obtaining endorsements at the national level had been more time-consuming than expected. Currently the project preparation was under way with some final stages to be completed.

53. There had been six endorsements for the Pacific region: Fiji, Kiribati, Niue, Samoa, the Solomon Islands and Tuvalu. Palau will participate with co-funding exclusively because it has not yet ratified the Stockholm Convention and is therefore not eligible for GEF funding. The project was awaiting approval by the GEF Secretariat. Regretfully an insufficient number of endorsement letters had been received for the Asian region; as the project had been planned for seven countries, given that only two countries expressed interest, the project could not proceed.

54. For the African region, two sub-regional projects had been initiated. For Western Africa endorsements had been received from the Democratic Republic of Congo, Ghana, Mali, Nigeria, Senegal and Togo, and for Eastern and Southern Africa endorsements had been received from Egypt, Ethiopia, Kenya, Mauritius, Uganda and Zambia. Both projects were submitted to the GEF Secretariat, the concept approved and the projects were currently being prepared. Approval from the GEF Secretariat on the projects was expected shortly.

55. For the Latin American and Caribbean region endorsements had been received from Antigua and Barbuda, Barbados, Brazil, Chile, Ecuador, Mexico, Peru and Uruguay. Again, the concept had been approved and the projects were currently being prepared. Approval from the GEF Secretariat on the project was expected shortly.

56. For the Central and Eastern European region most countries that expressed interest in a project were, as members of the European Union, ineligible for GEF funding. Ways of sponsoring projects were currently being examined.

57. He said that, in principle, it is expected that all projects could shortly be approved by GEF and implementation could start by early 2009. As a potential follow-up, a proposal for a global project could be initiated soon after the fourth meeting of the Conference of the Parties. He said the outcome of the current meeting and eventual recommendations to the

Conference could be the basis for drafting a global follow-up project. In conclusion he said that it was encouraging to see from the outcome of the global project assessment of existing capacities (see section below), there was already some capacity available in countries and, with targeted training and upgrading, laboratories could be brought up to standard to serve the global monitoring and evaluation. In response to a request for clarification he said that regional programmes were medium-sized and their duration usually up to 18 months; a global project could be adapted to a time frame to be determined by the coordination group, within GEF guidelines – for example the project could be divided into phases, with the first phase being for four years, the preferred length of a GEF project of this kind.

UNEP/GEF project on assessment of existing capacity and capacity building needs to analyze persistent organic pollutants in developing countries

58. Ms. Fiedler made a presentation on the UNEP/GEF project on "Assessment of existing capacity and capacity building needs to analyze POPs in developing countries" (for information, see http://www.chem.unep.ch/Pops/laboratory/default.htm). Information from 202 laboratories showed that no laboratory analyzed all twelve POPs; most commonly DDT was analyzed (157 labs) followed by heptachlor (147), PCB (145), and HCB (145); PCDD/PCDF (56), toxaphene (72), dioxin-like PCB (74), and mirex (77) were least frequently analyzed. One quarter of the laboratories had experience with the core media (53 out of 202 for mothers' milk/human blood and 59 laboratories for ambient air). An in-depth assessment of nine laboratories from seven countries in four UN regions showed that the basic infrastructure at all laboratories was adequate with respect to housing, space and analytical equipment, with highly motivated staff and strong institutional support. Although, some faced problems in maintaining more sophisticated equipment (mass spectrometers) running and the laboratories often worked in isolation with no training for technicians/non-academic staff, once training took place results achieved were better.

59. The project concluded that future POPs analysis, in the framework of the global monitoring plan, could build upon existing laboratories, which are present in all regions. It was noted that none of the regions considered one central laboratory as an agreeable approach. In developing country laboratories the infrastructure was typically nearly sufficient to fulfill the needs for POPs analysis under the Stockholm Convention. The required capacity could be achieved with minor additional investment and some training. The main needs included provision of some essential spares and consumables, analytical standards, training of laboratory personnel and participation in future inter-laboratory comparison studies. This capacity strengthening could be undertaken in connection with training and targeted advice until the laboratories are able to contribute high quality data to the global monitoring plan.

60. The project concluded finally, that laboratories that received assistance through the UNEP/GEF project were expected to be involved in the future global monitoring network to provide data and scientific experience to the regional POPs networks and to the regional reports that were due for the effectiveness evaluation. The pilot laboratories might be able to contribute with their enhanced experience in sediment, soil and food analysis; the challenge remains in extending their capacity to analyse POPs in air and human samples.

61. In the discussion on regional capacity building needs, the minimum requirement for reporting data for the purpose of effectiveness evaluation was outlined. It was concluded that the minimum need for air quality monitoring was 10-15 sampling sites and ideally, around 8 sites for human sampling per region. Initially, and for regions where there were no existing programmes, this minimum requirement might include only the few sampling points reporting baseline data for POPs for the first evaluation. Regions should ensure that this was sustainable and capable of producing data for the purpose of investigating temporal trends in subsequent evaluations. Some members stressed that continuation of monitoring had to go hand-in-hand with capacity enhancement. It was noted that if new countries came on board for the next evaluation phase additional training would be necessary to ensure sampling methods were kept consistent. It was suggested that regional labs be identified where capacity enhancement could be undertaken to enable progress in analysis of POPs.

62. Further capacity strengthening should continue to follow the step-wise approach and build on that foundation. The step-wise approach might include improved resolution of sampling in space and time with careful consideration being given to the guidance for the global monitoring plan including the added value of additional sampling points. For instance, regional air sampling networks might ultimately strive for 10-15 sites per region and consider other factors (geography, climate, potential sources) as described in the guidance document. The meeting emphasized the need to focus on existing programmes and to develop long-term evaluations which were realistic and based on not too many sampling sites. In regions where data was contributed from existing programmes, the longevity of these programmes was a priority.

63. In outlining difficulties faced, some members highlighted the problems with communication at the national and regional levels. The Secretariat was requested to urge countries to ensure that information on national focal points, especially contact details, was kept up-to-date.

IV. Conclusions and Recommendations

64. The coordination group members agreed that the amended global monitoring plan for persistent organic pollutants and the amended implementation plan for the global monitoring plan adopted by decision SC-3/19 on effectiveness evaluation provided a good framework for implementation of the first phase of the global monitoring plan and would continue to provide an appropriate framework for future evaluations.

65. The meeting concluded that the regional organization group members should be appointed for a minimum of one six-year term and that each term would commence after the effectiveness evaluation performed by the Conference of the Parties and terminate with reporting on each subsequent evaluation at the relevant meeting of the Conference. A member, who could not fulfil his /her mandate, would be replaced by a new member selected by the same region in consultation with the regional bureau members as outlined in decision SC-3/19. The meeting urged that, in order to ensure continuity and benefit from institutional memory and experience gained during the first evaluation phase, all efforts be made to extend the mandate of the current members of the regional organization groups.

66. For most of the regions baseline data for air monitoring were available and to a large extent also for human samples. Although the existing monitoring results from the regions could not be considered representative for all sub-regions, they did provide a good starting point for the establishment of continuous and coordinated sets of data on the background levels of POPs in the different regions. The meeting therefore considered that, taking into account provision of data from international initiatives from some regions, there was sufficient data to establish a baseline for levels of POPs to evaluate the effectiveness of the Convention.

67. A relatively small number of existing international programmes provided information for a baseline and would inform the Conference of current trends in regions. To ensure trends could be investigated, their long term viability, which is dependent on the continued contribution from national programmes, is essential. Such programmes should continue to be supported. It was agreed that an interpretation of the global situation could be extrapolated from the information contained in the regional reports. It was further agreed that the data collected were not analyzed but that an assessment was made to determine whether the quality was sufficient to gauge changes over time.

68. Several regions have built strategic partnerships with other regions to overcome their limitations in capacity to generate monitoring data on POPs in the core media. That support was obtained through collaboration with RECETOX and/or GAPS for air data in Africa, Central and Eastern Europe, Latin America and the Caribbean, and the Pacific. The POPs Monitoring Project in East Asian Countries, initiated by Japan, helped generate air data in eight countries. Human milk data was generated in collaboration with WHO. UNEP, GEF and the Secretariat facilitated and supported some of these activities. To maintain monitoring activities, future programmes should include continued collaboration with

strategic partners and the establishment of a network of regional laboratories using harmonized protocols for the monitoring of POPs.

69. New activities that had already been initiated should become sustainable, in particular through partnerships, capacity strengthening and gradual increase of national commitment. At the national level cooperation and partnerships with the health sector were particularly vital as was raising awareness of the issue to focal points, decision-makers, the general public and relevant national institutions. It was also suggested that over the long-term countries should be encouraged to take national ownership of the monitoring programmes initiated by strategic partnerships.

70. Monitoring activities should be initiated in sub-regions where data gaps have been identified. The initiated air monitoring arrangements using passive air samplers could be expanded to improve the regional coverage in a cost effective approach to resolve regional gaps in air data. Opportunities for cross-regional cooperation, such as in the Mediterranean which cuts across four United Nations regions, should be explored.

71. The overall goal is to build up all regions to adequately sample all core media and test all POPs in order to produce an evaluation. In developing country laboratories the infrastructure was typically nearly sufficient to fulfill the needs for POPs analysis under the Stockholm Convention given there was already some capacity available in countries and, with targeted training and upgrading, laboratories could be brought up to standard to serve the global monitoring and evaluation. The main needs included provision of some essential spares and consumables, training of laboratory personnel and participation in future inter-laboratory comparison studies.

72. Future efforts should be focused on ensuring internal comparability within programmes. In general there would be very limited direct comparability between regions; with some significant exceptions, such as the WHO coordinated human milk survey which used a single laboratory. It was suggested that the milk survey in cooperation with WHO should be conducted at least once during each evaluation cycle.

73. Ambient air and human milk or blood are suitable media for evaluating changes in POPs levels over time on a global scale. However, several ongoing programmes are monitoring levels of POPs on long term basis in region-specific media which can provide valuable additional information. For future evaluations, all regions should continue monitoring and reporting POPs levels in the current core media. When available, additional data on levels in other media can be used in the evaluation to help assess trends.

74. Future evaluations of temporal trends should include information on regional and global environmental transport as the absence of data on long-range transport would hinder efforts at a comprehensive effectiveness evaluation of the Convention. The Conference might be requested to consider ways to develop a plan or process for a coordinated cross-regional approach to the analysis and assessment of data to meet this objective. The Conference might also consider how to encourage studies on the assessment of climate/meteorological influences on year-to-year levels of POPs in various environmental media.

75. The regional reports and the data therein constituted a warehouse of information that could serve as a useful resource for policy makers and researchers and should be placed on the Convention website in the Secretariat's role of acting as a clearing house for POPs information.

76. The meeting concluded that six years was the optimal time period for repeating the evaluations. This would enable a substantial body of information to accumulate from contributing programmes and would also enhance statistical interpretation. A lesser period would not be cost effective in terms of the effort involved while a longer period would leave the Conference uninformed of important information on environmental levels.

77. The meeting agreed that the guidance document had served well for the first evaluation but that it should be updated in view of the evolution of the Convention. It was agreed that appendices or annexes on long-range transport, specimen banking, the impact of

including new POPs in the Convention and the selection of new core media if appropriate could be developed to support the next evaluation.

78. Financial assistance should be actively sought from international funding agencies such as the GEF and the World Bank and from other donors for continued studies on persistent organic pollutants, effectiveness evaluation and related activities.

V. Closure of the Meeting

79. Following the customary exchange of courtesies, the meeting was closed at 6.10 p.m. on Wednesday 12 November 2008.

Annex 1

Draft terms of reference and mandate of the regional organization groups and the global coordination group

Regional organization groups

1. For the purpose of coordinating global coverage for the global monitoring reports, Parties will report flexibly through the five United Nations regions. For monitoring programmes that cover more than one United Nations region the results will be reported through one of the United Nations regions and the other involved United Nations regions will be informed. In each region, regional organization groups will support regional implementation of the global monitoring plan.

2. The tasks of each regional organization group will include, among other things:

(a) Coordination and oversight of the regional monitoring plan, taking into account the work already achieved;

(b) Identifying where existing suitable monitoring data are and are not available;

(c) Maintaining and updating as necessary the regional strategy for implementation of the global monitoring plan;

(d) Maintaining and promoting regional, sub-regional and interregional monitoring networks and extending them as necessary to improve geographic coverage;

(e) Coordinating with Parties involved in sampling and analytical arrangements;

(f) Ensuring compliance with protocols for quality assurance and quality control, noting the examples described in the guidance on the global monitoring plan for persistent organic pollutants for sample collection and analytical methodologies; for data archiving and accessibility; and trend analysis methodologies to ensure quality and allow comparability of data;

(g) Maintaining the interaction with other regional organization groups and the Secretariat as appropriate;

(h) Identifying further capacity-building needs in its region;

(i) Assisting, for the purpose of addressing gaps, in the preparation of project proposals, including strategic partnerships;

(j) Preparing a summary of experiences in implementing the duties assigned in subparagraphs (h) and (i) above for transmittal to the coordinating group via the Secretariat;

(k) Preparing regional reports including, where appropriate, information from Antarctica;

(l) Encouraging transparency of communication and information dissemination within and between regions, noting the need for stakeholder involvement.

Global coordination group

3. The global coordination group will comprise three members from each region, nominated by the respective regional organization group, and will meet at least twice during the evaluation period, to perform the following tasks:

(a) Coordination and oversight of the global monitoring plan, taking into account the work already achieved;

(b) Assessing regional work with the aim of achieving consistency between regions;

(c) Identifying impediments to the implementation of the global monitoring plan and

actions to address them;

(d) Updating of the guidance on the global monitoring plan for persistent organic pollutants as decided by the Conference of the Parties;

(e) Promoting:

(i) Experience sharing within and between regions;

(ii) Capacity-strengthening to address gaps in coverage for the core media where possible;

(i) And other topics as required;

(f) Reporting on the results of the global monitoring plan, including:

(i) A compilation of the results from the regional monitoring reports;

(ii) Evaluation and assessment of changes in POPs levels over time;

(iii) Assessing long-range transport and the effect of variable climate/meteorology on observed trends for POPs.

(g) Evaluating the global monitoring plan and developing recommendations for consideration by the Conference of the Parties at the end of each evaluation phase, and reporting on the following matters:

(i) The role, membership and activities of the regional organization groups and the coordinating group in support of subsequent effectiveness evaluations;

(ii) The media;

(iii) The need for further updating of the guidance on the global monitoring plan for persistent organic pollutants in view of evolution of the Convention;

(iv) The need for further capacity enhancement of Parties on a regional basis;

(v) Any other issues relevant for the implementation of further evaluations.

Annex 2

Draft proposals for a minimalist (cost)-effective regional monitoring plans building and expanding on the established baseline, supporting evaluation of changes in POPs levels over time at least in the core media, including identification of needs for capacity building and support. (Developed during the meeting)

Proposal for Regional Monitoring Plan - <AFRICA>

a) Existing POPs air Monitoring programmes

Air Monitoring

The current air monitoring programmes in Africa Region include GAPS coordinated by Environment Canada and MONET Africa coordinated by RECETOX in Czech Republic. GAPS has five monitoring sites in four different African countries (South Africa (2), Ghana, Zambia and Egypt). MONET Africa has 25 sampling sites located in 15 countries (Kenya (5), Mali (5), South Africa (3), Ethiopia, Sudan, Egypt, Mauritius, Zambia, Democratic Republic of Congo (DRC), Central Republic of Congo, Nigeria, Ghana, Togo, Senegal, and Tunisia.

In the proposed project, new sampling sites will be established in 10 more sites in the region to increase regional representation and therefore provide adequate baseline data for future POPs monitoring and evaluation activities. It is proposed that new sites will be located in countries will to participate in the ongoing monitoring programmes. The proposed countries include: Uganda, Djibouti, Zimbabwe, Botswana, Niger, Algeria, Guinea, Malawi, Burkina Faso and Gambia. The final selection will depend of the confirmation of the countries willingness to participate in the monitoring programme.

METHODOLOGY FOR MONTORING

The main sampling technique used in GAPS and MONET Africa air Monitoring programmes is **passive air sampling**. Sample analyses are conducted at central backup laboratories outside the region, in each of the programmes. For the purpose of regional capacity building, parallel sampling and analysis will be encouraged among the participating laboratories and compared with the results from the central laboratories. Monitoring activities will be implemented on four weeks period in the case of MONET Africa monitoring programme; and 3 months (for PUF) for GAPS air monitoring programme. It is recommended that the programme runs for at lease 6 years to enable collection of adequate data that will provide time trends and long-range transport of POPs for the second effectiveness evaluation.

Programme summaries

MONET AFRICA

The MONET Africa passive sapling device consists of two stainless steel bowls attached to the common axes to form a protective chamber for the polyurethane foam filter. The filter is attached to the same rod and it is sheltered against the wet and dry atmospheric deposition, wind and UV light (Figure *1*). Exposure times between four and twelve weeks enable

determination of many compounds from the POP group. Average sampling rate was estimated to be 3.5 m^3/day which roughly corresponds to 100 m^3 of the air sampled during four weeks of deployment.

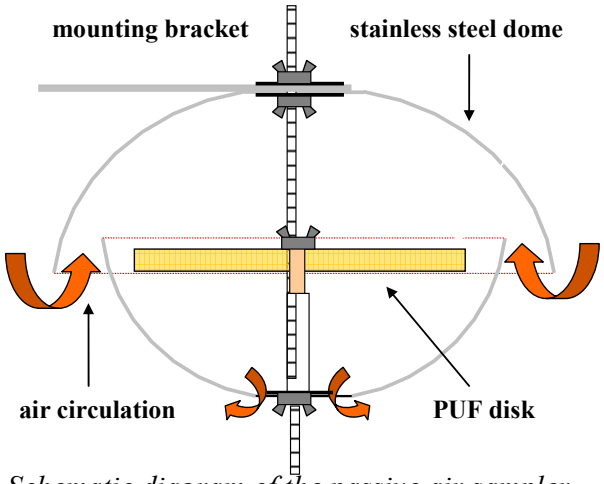


Figure 1: *Schematic diagram of the passive air sampler*

Previous RECETOX studies (*1-3*) confirmed that PAS are sensitive enough to mirror even small-scale differences, which makes them capable of monitoring of spatial, seasonal and temporal variations. Passive samplers can be used for point sources evaluation in the scale of several square kilo meters or even less - from the local plants to diffusive emissions from transportations or household incinerators - as well as for evaluation of diffusive emissions from secondary sources. While not being sensitive to short time accidental releases passive air samplers are suitable for measurements of long-term average concentrations at various levels.

Passive air samplers consisting of the polyurethane foam disks (15 cm diameter, 1.5 cm thick, density 0.030 g cm^{-3}, type N 3038; Gumotex Breclav, Czech Republic) housed in the protective chambers are employed. Sampling chambers were prewashed and solvent-rinsed with acetone prior to installation. All filters were prewashed, cleaned (8 hours extraction in acetone and 8 hours in dichloromethane), wrapped in two layers of aluminum foil, placed into zip-lock polyethylene bags and kept in the freezer prior to deployment. Exposed filters were wrapped in two layers of aluminum foil, labeled, placed into zip-lock polyethylene bags and transported in cooler at 5 °C to the laboratory where they were kept in the freezer at –18 °C until the analysis. Field blanks were obtained by installing and removing the PUF disks at all sampling sites.

In GAPS programme two types of PAS are used (Figure 2). The PUF-disk sampler (left) is deployed for three-month periods to capture seasonal differences and the XAD (right) sampler is exposed for a full year.

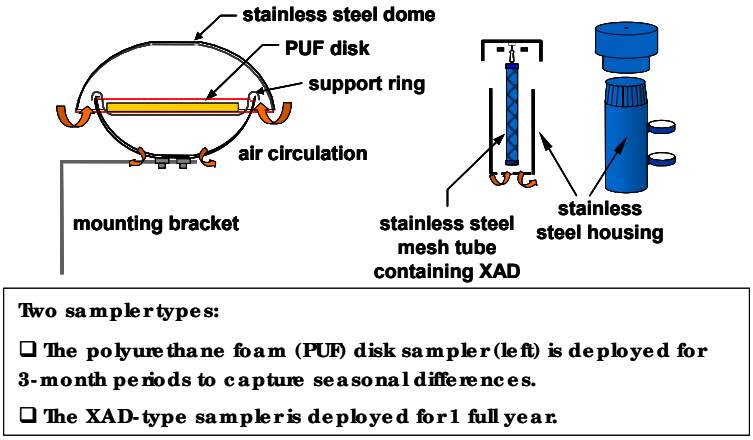


Figure 4.2. *Schematic diagrams of passive air samplers*

The PUF-disk sampler is described in Shoeib and Harner (2002) and Pozo et al. (2006) and the XAD sampler is described in Wania et al. (2003).Both types of PAS are installed outdoors far away from potential sources of contamination to the site (e.g., exhaust vents, electronics, sources of combustion or human activity).They are mounted approximately two meters above the ground in an open area with unobstructed airflow.

- Sampling conditions
  - **PUF-disk PAS**

PUF-disk PAS are deployed at four African sites in the region. The PUF-disk sampling is implemented on a four period annual basis: January–March (Period 1); April–June (Period 2); July–September (Period 3); and October–December (Period 4).

  - **XAD-based PAS**

XAD-based PAS were deployed at three African sites in 2005 and four sites in 2006. By sampling air for one year, XAD resin-based PAS provides annually averaged concentrations of organic pollutants. The sampling lengths and the sequestered amounts of selected OCPs in ng/PAS are assessed. Analyses are performed for the pesticides that are classified under the Stockholm Convention: CC, TC, TN, DDT, DDE, dieldrin, HEPT,and HEPX, and also for the pesticides that are not classified under Stockholm Convention, including α- and γ– HCH, Endo I and II, EndoSO_4, chlorothalonil (CT), dacthal (DT), and trifluralin (TF).

Summary of programmes analytical procedures

MONET Africa programme

In MONET Africa programme samples are sent to a central coordinating laboratory at RECETOX in Czech Republic where analysis take place. The samples are extracted with dichloromethane in a Büchi System B-811 automatic extractor. One laboratory blank and one reference material were analyzed with each set of ten samples. Surrogate recovery standards (*d8*-naphthalene, *d10*-phenanthrene, *d12*-perylene for PAHs analysis, PCB 30 and PCB 185 for PCBs analysis) are spiked on each filter prior to extraction. Terfenyl and PCB 121 were used as internal standards for polyaromatic hydrocarbon (PAH) and polychlorinated biphenyl

(PCB)/organochlorine pesticide (OCP) analyses, respectively. Volume is reduced after extraction under a gentle nitrogen stream at ambient temperature, and fractionation achieved on a silica gel column; a sulphuric acid modified silica gel column was used for PCB/OCP samples. Samples are analyzed using GC-ECD (HP 5890) supplied with a Quadrex fused silica column 5% Ph for PCBs: PCB 28, PCB 52, PCB 101, PCB 118, PCB 153, PCB 138, PCB 180, and OCPs: α-hexachlorocyclohexane (HCH), β-HCH, γ-HCH, δ-HCH, 1,1-dichloro-2,2-bis (p-chlorophenyl)ethylene (*p,p´*-DDE), 1,1-dichloro-2,2-bis (p-chlorophenyl) ethan (*p,p´*-DDD), 1,1,1-trichloro-2,2-bis (p-chlorophenyl) ethan (*p,p´*-DDT), *o,p´*-DDE, *o,p´*-DDD, *o,p´*-DDE, hexachlorobenzene (HCB), and pentachlorobenzene (PeCB). 16 US EPA polycyclic aromatic hydrocarbons are determined in all samples using GC-MS instrument (HP 6890 - HP 5972) supplied with a J&W Scientific fused silica column DB-5MS.

Quality Assurance and Quality Control

Recoveries are determined for all samples by spiking with the surrogate standards prior to extraction. Amounts added are similar to detected quantities of analytes in the samples. The method recoveries are usually higher than 76 % and 71 % for all samples for PCBs and PAHs, respectively. Recovery factors are not applied to any of the data. Recovery of native analytes measured for the reference material vary from 88 to 103 % for PCBs, from 75 to 98 % for OCPs, from 72 to 102 % for PAHs. Laboratory blanks are under the detection limits for selected compounds. Field blanks consist of pre-extracted PUF disks and are taken on each sampling site. They are extracted and analyzed in the same way as the samples, and the levels in field blanks never exceed 3% of quantities detected in samples for PCBs, 1% for OCPs, 3% for PAHs, indicating minimal contamination during the transport, storage and analysis.

GAPS Programme

Details for the extraction and analysis of the PUF-disk samples and field blanks are given in Pozo et al. (2006).The following QA/QC procedures were employed for the PUF-disk sampler:

a) Field blanks – A PUF disk field blank are collected once a year from each site to assess possible contamination caused by shipping, handling and storage.

b) Method blanks – A solvent blank are extracted with every set of eight samples to assess possible contamination during laboratory analysis (i.e., from sample preparation to instrumental analysis).Also, during preparation of PUF disks for deployment, one sample from each batch was extracted and checked for purity.

- Instrument blanks – A solvent blank ware analyzed with every set of twelve field samples to assess for any instrument contamination.
- Surrogate spikes – Prior to extraction, PUF-disk samples are spiked with a method recovery standard consisting of ^{13}C-PCB-105, d_6-*α*-HCH, and d_8-*p, p'*-DDT to confirm analytical integrity.
- Matrix spikes – Analytical (method) recoveries are determined by spiking clean PUF disks with known quantities of the target chemicals and treating them as samples to assess matrix effects on extraction efficiencies.
- Field collocated samples – Duplicate samples are collected at several sites in the GAPS Network to assess overall precision of both sampling and laboratory methods.

- Mirex is added as an internal standard to correct for volume differences in sample extracts.

All samples and field blanks are quantified for target compounds including organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs), and polybrominated diphenyl ethers (PBDEs).OCPs, PCBs, and PBDEs are analyzed on a Hewlett-Packard 6890 gas chromatograph-5973 mass spectrometer (GC-MS) using electron impact (EI) for PCBs and negative chemical ionization (NCI) for OCPs and PBDEs in the selected ion monitoring mode.

XAD PAS

Cleaning of XAD-2 resin, and packing of XAD PAS samples are carried out as described previously by Wania et al. (2003). Cleaning, preparation and extraction of PAS were done in a clean lab.

The XAD-2 resin is Soxhlet extracted with dichloromethane for 20 hours. Prior to extraction, the resin was spiked with standards consisting d_6-□-HCH, $^{13}C_{10}$-HEPX, $^{13}C_{10}$-TN, $^{13}C_{12}$-dieldrin, d_8-*p,p'*-DDT and $^{13}C_{12}$-PCB-32, $^{13}C_{12}$-PCB-77, $^{13}C_{12}$-PCB-118 and $^{13}C_{12}$-PCB-126 to test for the loss of the compounds during the extraction and clean-up procedures. The extracts were volume reduced using a rotary evaporator and concentrated to around 1 ml using a gentle stream of nitrogen. The extracts from first year samples are cleaned using alumina columns, but not those from the second year. After reducing samples to 3 ml using a rotary evaporator, the extracts from second year samples are passed through sodium sulfate (baked at 450 °C overnight) columns to remove any water present in sample. The extracts from the first year air samples were cleaned on a column with 1 g of 6% deactivated alumina (baked at 450 °C overnight) and 0.5 cm of sodium sulfate. The samples are eluted with 20 ml of DCM: PE (5:95; v/v). The extracts are concentrated to 1 ml using a stream of nitrogen and then the extracts were solvent-exchanged to isooctane. The final volume of the extracts is 1 ml, and 100 ng of mirex is added to the sample as an internal standard for correcting volume differences in the sample.

The sample and blank (field and laboratory) extracts are analyzed for Stockholm Convention POPs as well as pesticides not classified under Stockholm Convention POPs using an Agilent 6890 gas chromatograph (GC) coupled to a 5973 mass selective detector (MSD) with a negative chemical ionization source for organchlorine pesticides (OCPs) in selected ion mode. Other analyzed non-Stockholm Convention pesticides which may be of future interest are: α-HCH, γ-HCH, α-endosulfan, β-endosulfan, endosulfan sulfate, dacthal, chlorothalonil, pendimethalin and trifluralin.

Quality assurance and control measures were used to monitor all analytical procedures. Field blanks are collected to determine the levels of contaminants introduced by handling, shipping and storage and one laboratory blank is analyzed for every set of sample extractions to determine the levels of contaminants introduced during extraction and clean-up. The laboratory blanks and field blanks are processed in the same way as the samples. Air samples are not spiked with surrogates for the pesticides that are not classified under the Stockholm Convention POPs, such as chlorothalonil, dacthal, metribuzin, pendimethalin, and trifluralin. To test for the loss of these compounds during the extraction and clean-up procedure, six samples of 20 g of XAD-2 are spiked with the pesticides, then extracted and cleaned in the same way as the samples.

Data comparability

All PUF-disk samples are prepared and analyzed in the same laboratory [Hazardous Air Pollutants (HAPs), Environment Canada in Toronto] to ensure that the data can be compared

spatially and temporally. The HAPs laboratory participates in international intercalibration studies for POPs and performs well in these exercises.

Data storage

Sample extracts are capped tightly in GC vials and stored in a freezer at a temperature of about -20°C. Air concentration results and relevant sample information (e.g. sample ID, site ID, location name, sample duration, meteorological conditions etc.) are recorded in Excel spreadsheets.

b) Existing human milk monitoring programmes

Human milk Monitoring

The current POPs monitoring activities in Human milk are implemented by WHO. At the moment 13 countries are participating in the WHO survey on human milk under the 4th round coordinated by UNEP Secretariat of the Stockholm Convention. These include DRC Congo, Congo Republic, Ivory Cost, Djibouti, Ghana, Guinea Conakry, Mali, Kenya, Mauritius, Niger, Nigeria, Senegal and Uganda. It is anticipated that at least 50 countries will collected from each of the participating country and these will be pooled together to provide a single pooled sample (per country). It is worth noting that human milk data are seldom in the Africa region and solely depend on well established programmes like WHO for production of comparable data.

In the proposed programme it is anticipated that at least 11 more countries will be established to provide a more regionally representative human milk data. The proposed countries include: Botswana, Burkina Faso, the Gambia, Zimbabwe, Algeria, Malawi, Burundi, Morocco, Togo, Benin, Gabon. The final selection will depend of the confirmation of the countries willingness to participate in the monitoring programme. In principal, it is recommended that the two human milk sampling will be implemented after every five years. In principal, it is recommended that the two human milk sampling will be implemented after every four years.

Background on who

Since the mid-seventies, WHO in collaboration with UNEP has implemented the food component of the Global Environment Monitoring System (GMES/Food), which collects, collates and evaluates data on the levels and trends of contaminants in food and human milk. These contaminants include the organochlorine pesticide POPs, which were the initial focus of attention. Beginning in the mid-eighties, WHO coordinated several surveys of the levels of dioxin-like polychlorinated biphenyls (PCBs), polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs). These surveys were carried out in collaboration with other international organisations and national institutions, and concentrated particularly on the health risk of infants, due to exposure through contaminated human-milk, and aiming to prevent and control exposure to these chemicals through food.

More recently, the WHO protocol for these surveys has been revised to include the objective of providing accessible, reliable and comparable data on levels of POPs in human milk for purposes of the Stockholm Convention. The latest protocol (used for the ongoing 4th survey) is different from the early protocol because it: a.) emphasizes the protection, promotion and support of breastfeeding; b.) specifies a minimum of 50 donors for one pooled sample, and; c.) includes the analysis of all 12 POPs currently covered by the Convention. The latest

version of WHO Guidelines (1 October 2007) is currently available at: http://www.who.int/foodsafety/chem/POPprotocol.pdf

Sampling

In order to promote reliability and comparability, participating countries are encouraged to adhere as closely to WHO protocol as much as possible. However, it is also recognized that the situations in countries vary considerably so that some flexibility is required. However, guidance is provided to assist countries in developing their national protocols, including:

Number of donors: A minimum of 50 individual donors should each provide 50 ml of human milk for preparing the pooled sample. Note that one additional participants per million population over 50 million is recommended for large countries and in some cases, more than one pooled sample may need to be prepared. On the other hand, a lower number samples may be necessary for small countries.

Strategies for selecting donors: Interviewing of potential donors can take place pre- or post-natal or well-baby clinics. The stratification of donors should represent the presumed national exposure profile of each country. This would include consideration of diet, occupational exposure, rural and urban residence and proximity to potential POPs releasing activities such as industries and waste sites.

Biosafety: In general, the handling with any milk sample should comply with biosafety rules to protect workers who will handle samples. The National Coordinators should decide whether HIV-positive donors can participate in the survey.

Consequently, the sampling protocol will vary among countries and therefore, comparison of results between countries should be approached with caution. However, once the national protocol is established, it should be applied in subsequent rounds so that changes/trends can be followed. In these cases, observation of temporal trends should be scientifically valid provided information on the distribution of levels in individual samples is available.

Sample analytical procedures

- Procedure for PCDDs, PCDFs and PCBs

After freeze-drying of the whole sample, fat and contaminants of interest are extracted in a hot extraction device (”Twisselmann extractor”) with cyclohexane/toluene (50/50) for 8 hrs. After evaporation of the solvent, an aliquot of fat is spiked with 13C-labeled internal standards (17 PCDD/Fs, 5 non-ortho PCBs [37, 77, 81, 126, 169], 6 mono-ortho PCBs [28, 60, 105, 118, 156,189] and 7 di-ortho PCBs [52, 101, 153, 138, 180, 194 and 209]). Gel permeation chromatography on Bio Beads S-X3 removes fat. A silica column impregnated with sulfuric acid removes remaining oxidizable substances. A florisil column separates PCDD/F from PCBs. The PCDD/F-fraction is purified on a Carbopack C-column. After addition of 1,2,3,4-13C12-TCDD, determination is performed by HRGC/HRMS (Fisons Autospec; resolution 10,000; DB5-MS). The PCBs are separated on a Carbopack B-column into three fractions of first di-ortho PCBs (elution with hexane), then mono-ortho PCBs (elution with hexane/toluene; 92.5/7.5) and finally non-ortho PCBs (reversed elution with toluene). After addition of 13C12-PCB 80, the different PCB groups are determined by HRGC/HRMS (Fisons Autospec; resolution 10,000; DB5-MS) in three separate runs. Marker PCBs are PCB 28, 52, 101, 138, 153 and 180.

Data comparability

To ensure reliability of exposure data and to improve comparability of analytical results from different laboratories, WHO has coordinated a number of inter-laboratory quality assessment studies. A study on levels of PCBs, PCDDs and PCDFs in human milk was conducted between February 1996 and April 1997, with the objective of identifying laboratories, whose results could be accepted by WHO for exposure assessment studies (Malisch et al., 2000; WHO, 2000). Only the State Institute for Chemical and Veterinary Analysis of Food Freiburg met all the pre-set criteria for analyses of PCDDs, PCDFs, dioxin-like PCBs, marker PCBs and fat in human milk and was thus selected as the WHO Reference Laboratory for the third and fourth round of the WHO human milk studies.

As noted above, the protocol for collection of samples may vary from country to country and therefore, data comparability between countries is not advised without a review of the national protocols. However, temporal trends should be possible based on the use of a consistent protocol for collection and handling of samples and on stringent criteria to assure that analytical quality assurance and control over long periods of time.

It should also be noted that the calculation of levels of PCDDs, PCDFs and dioxin-like PCBs may be slightly different for earlier surveys, which use international toxic equivalence factors (I-TEQs) in comparison to the more recent surveys, which use WHO toxic equivalence factors (WHO-TEQs). However, the levels reported for the earlier surveys should only be considered indicative of exposures because of the limited sampling plan and therefore, the differences between I-TEQs and WHO-TEQs are not considered to be minor.

Data storage

Data are stored at the GEMS/Food database located at WHO in Geneva, Switzerland and is password-accessible through the WHO Summary Information and Global Health Trends (http://SIGHT) portal.

c) Sampling and analytical capacity

Sampling in Sub-region / countries with capacity to maintain existing monitoring programme (for ambient air? for mothers' milk/human blood?)

Africa lacks an established longterm POPs monitoring programme. For the first effectiveness evaluation, 15 countries that were involved in the first 6 months pilot project on ambient air sampling. In this regard, these countries have established sampling competence to maintain a monitoring programme. In the case of human milk survey, only Egypt and Sudan have participated previously in the 3rd and 4th WHO milk survey respectively. To fill the data gaps during the first effectiveness evaluation, 13 additional countries showed interest to participate in the UNEP/WHO survey on human milk monitoring in 2008.

In general there is little capacity at national and institutional levels to enable countries participate in the sampling process with facilitation of samplers and field costs.
However, the existing capacity is very weak in most of the countries due to inadequate human capacity and lack of necessary analytical equipment required to provide POPs data at low detection limits. Currently the existing capacity can analyse some pesticide

POPs and PCBs. However the capacity to analyse Dioxins and Furans is completely lacking. In conjunction with this, the region could not provide POPs data on toxaphene residues in ambient air during the first effectiveness evaluation due to the lack of appropriate analytical capacity to handle this analyte.

The Sub-region / countries which need additional capacity (or resources) to maintain existing monitoring programme

All the countries that participated in the six months pilot air monitoring activity will need additional capacity to continue air monitoring campaign. These include: Kenya (5), Mali (5) Ethiopia, South Africa (3), Sudan, Egypt, Mauritius, Zambia, Democratic Republic of Congo (DRC), Central Republic of Congo, Nigeria, Ghana, Togo, Senegal and Tunisia.

Specific needs for existing countries to maintain the existing monitoring programmes

The following are the identified needs for the existing national and regional laboratories to maintain the existing monitoring programmes: Human capacity building through training in sampling and analysis of core matrices (ambient air and breast milk), in repair and maintenance of laboratory equipment, in analytical chemistry and instrumentation regionally with collaboration of backup expert laboratory; 2) Support in purchasing of consumables and ensuring acceptable standards for relevant analytes e.g. PCBs, POPs pesticides, recovery standards; 3**)** Need for air and milk sampling equipment, filters and training to begin air monitoring in most countries; 4) Inter-laboratory calibration studies in relevant matrices (ambient air and breast milk) to verify and improve laboratory performance and implementation of QA/QC; 5) Analytical instrumentation capacity enhancement to handle complex analytes such as PCBs and dioxins and complex POPs pesticides e.g. toxaphene, chlordane and mirex; 6) Strengthening the capacity in data handling, interpretation, storage and dissemination; 7) Strengthening of laboratory networking (e.g. using the CIEN capacity); and 8) establishment of capacity for sampling and appropriate equipment for analysis of dioxins and furans.

Sub-region / countries which need new capacity to establish an on-going monitoring programme

It is clear that there is still lack of adequate monitoring data in most of the suregions in Africa. In this regard, additional monitoring points should be considered in the future evaluations based on regional representation. In this regard, the proposed countries for additional POPs monitoring in ambient air and breast milk in the region will require capacity enhancement in order to participate fully in the monitoring programme.

Existing laboratories within the region having capacity to undertake POPs analysis on an on-going basis (consider both air and human samples; consider both basic POPs and dioxin-like POPs)

Limited institutions in the region have basic capacity to analyse POPs pesticides and PCBs. The capacity to analyse dioxins is completely missing. In general, the existing capacity of the laboratories is adequate to conduct POPs analysis on the ongoing basis without human and analytical capacity enhancement. During the inception workshops, some institutions with capacity to analyse POPs were shortlisted as shown below.

However, it is note worth that these institutions do not have adequate capacity to analyse all the current POPs analytes.

- Existing laboratories that need strengthened capacity to undertake POPs analysis on an on-going basis (consider both air and human samples)

- Department of Chemistry, University of Nairobi Kenya (OCPs, PCBs)
- Department of Public Health Pharmacology and Toxicology, University of Nairobi, Kenya (milk)
- Persistent Organic Pollutants and Toxicants (POPT) research group at the North-West University South Africa
- National Institute for Sanitation Laboratory-Togo
- Lab of the Togolese Agronomic research institute (EU and UNIDO support for accreditation)
- Cairo Central Centre (CCC) Egyptian Environmental Affairs Agency (EEAA)
- Central laboratory for residues of pesticides in food, Ministry of Agriculture, Egypt
- CERES-Locustox laboratory in Dakar, Senegal
- TPRI –Tanzania
- CPE Chemistry Dar-Es Salaam Tanzania
- Government Analytical Laboratory, Uganda
- Faculty of Agriculture and Sciences, Sudan
- National Chemical laboratory, Ministry of Health, Sudan
- University of Gezira, Sudan
- Mauritius Sugar Industry Research Institute (MSIRI)
- National Environmental Laboratory (NEL), Mauritius
- The Water Research Institute of the Council for Scientific and Industrial Research (CSIR-WRI), Ghana
- The Ghana Standards Board (GSB)
- Central Veterinary Laboratory: Environmental Toxicoly Laboratory , Mali
- University of Sierra Leone, Fourah Bay College (dormant)

Specific needs here

The main needs additional laboratories include: 1) Human capacity building through training in sampling and analysis of core matrices (ambient air and breast milk), in repair and maintenance of laboratory equipment, in analytical chemistry and instrumentation regionally with collaboration of backup expert laboratory; 2) Support in purchasing of consumables and ensuring acceptable standards for relevant analytes e.g. PCBs, POPs pesticides, recovery standards; 3) Need for air filters and milk sampling equipment 4) Inter-laboratory calibration studies in relevant matrices (ambient air and breast milk) to verify and improve laboratory performance and implementation of QA/QC; 5) Analytical instrumentation capacity enhancement to handle complex analytes such as PCBs and dioxins and complex POPs pesticides e.g. toxaphene, chlordane and mirex; 6) Strengthening the capacity in data handling, interpretation, storage and dissemination; 7) Strengthening of laboratory networking (e.g. using the CIEN capacity); and 8) establishment of capacity for sampling and analysis of dioxins and furans.

- Additional laboratories that will need capacity to undertake POPs analysis to ensure an on-going programme for both air and human samples:

specific needs

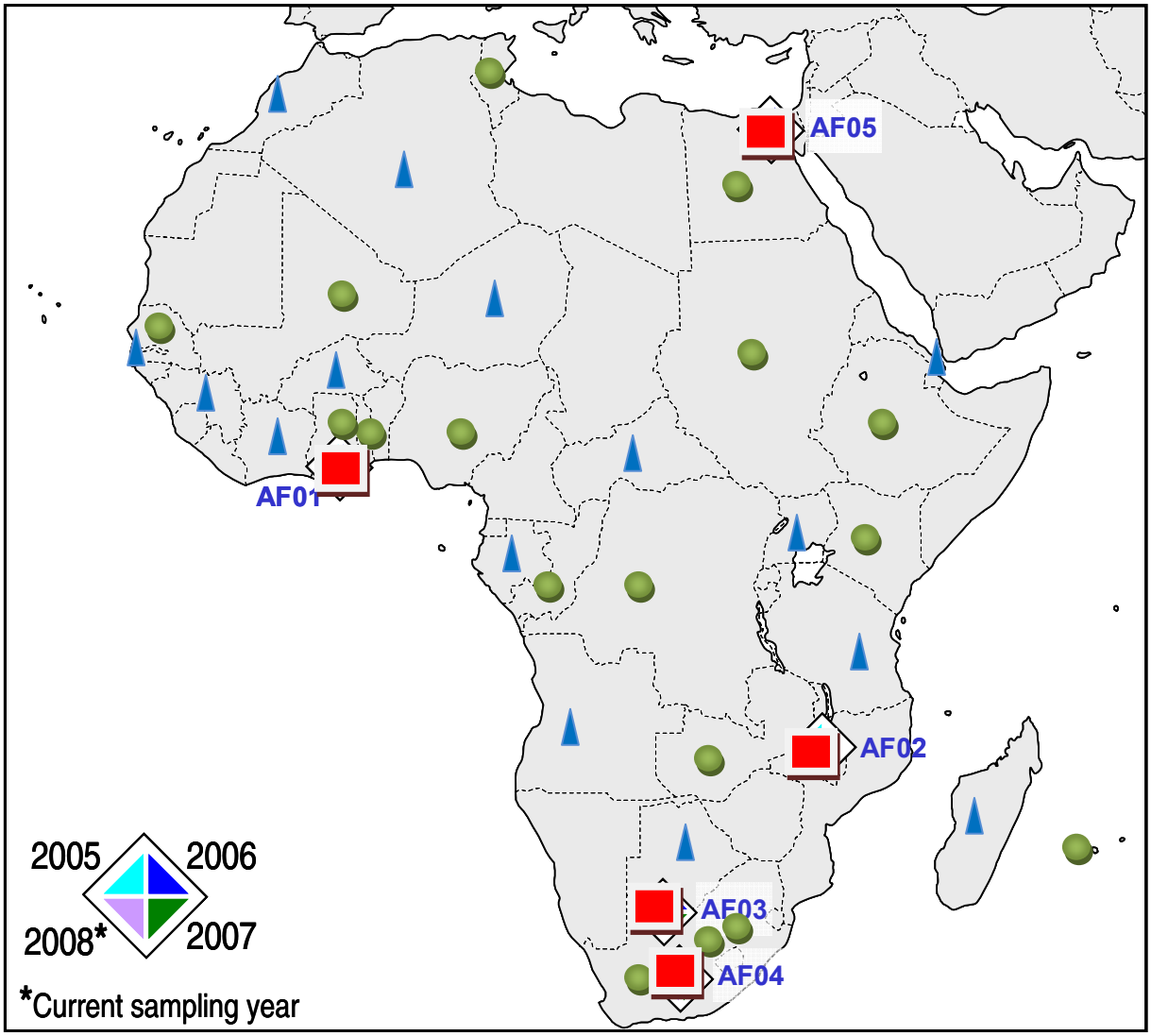
The main needs additional laboratories include: 1) Human capacity building through training in sampling and analysis of core matrices (ambient air and breast milk), in repair and maintenance of laboratory equipment, in analytical chemistry and instrumentation

regionally with collaboration of backup expert laboratory; 2) Support in purchasing of consumables and ensuring acceptable standards for relevant analytes e.g. PCBs, POPs pesticides, recovery standards; 3) Need for air and milk sampling equipment, filters and training to begin air monitoring in most countries; 4) Inter-laboratory calibration studies in relevant matrices (ambient air and breast milk) to verify and improve laboratory performance and implementation of QA/QC; 5) Analytical instrumentation capacity enhancement to handle complex analytes such as PCBs and dioxins and complex POPs pesticides e.g. toxaphene, chlordane and mirex; 6) Strengthening the capacity in data handling, interpretation, storage and dissemination; 7) Strengthening of laboratory networking (e.g. using the CIEN capacity); and 8) establishment of capacity for sampling and analysis of dioxins and furans.

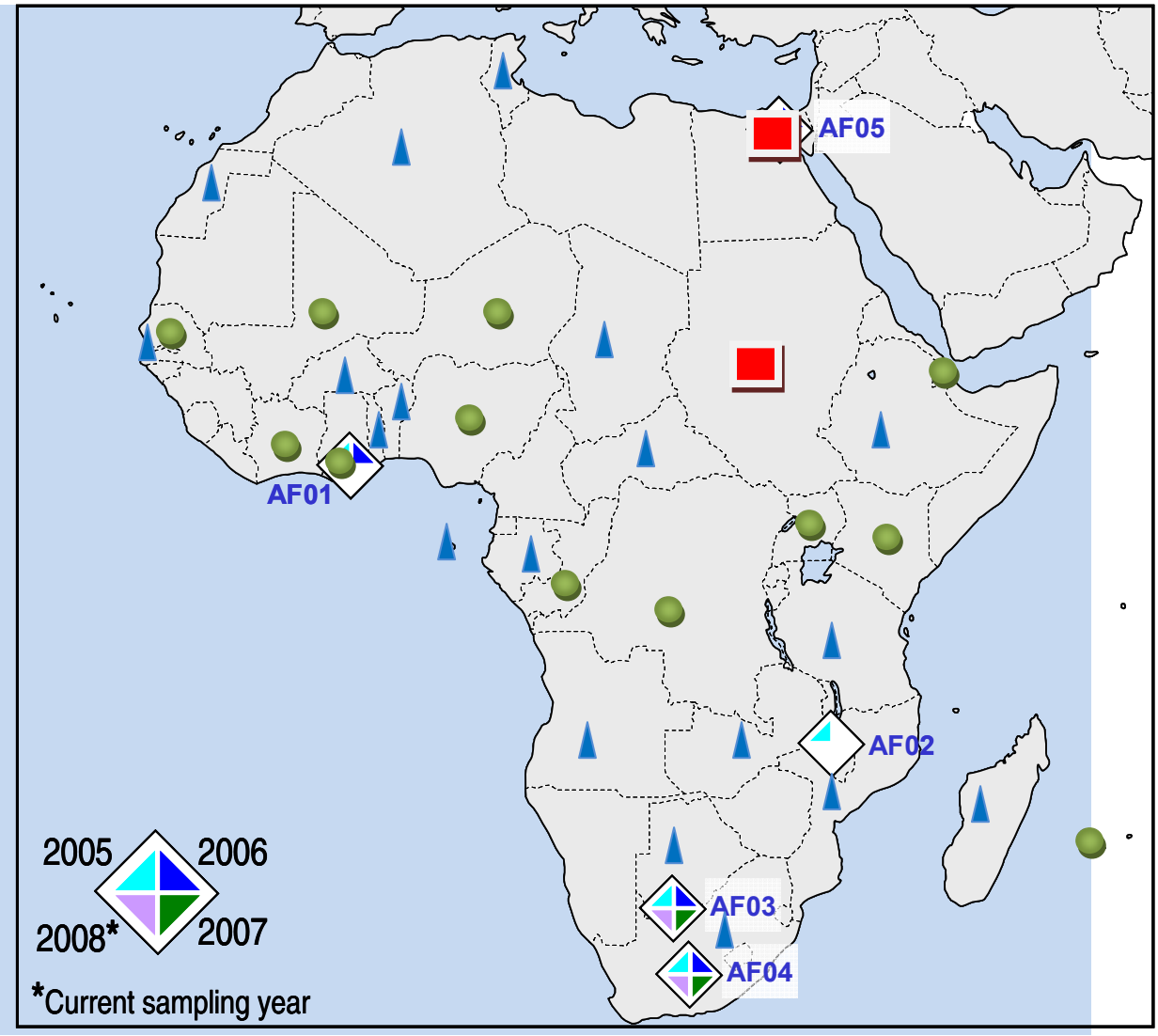
D) Proposed Regional POPs Monitoring points

The two maps below show air human data sampling points from on-going existing monitoring programmes that need to be maintained (red square), sampling points from project activities during supplementary GMP data collection activities that need to be made part of an on-going programme (green dot), and new sampling points that need to be added and made part of an on-going programme (in blue triangle).

Proposed Regional air Monitoring sites


AF05
AF01
AF02
AF03
AF04
2005
2006
2008*
2007
*Current sampling year

Proposed Regional human milk Monitoring points



E) Data storage / interpretation and QA/QC

There are no established existing data centers in the region. This is partly due to lack of regionally well established monitoring programme. Currently data storage is decentralised and at individual country basis in Libraries, national reports. GMP regional data is collected from the countries and monitoring programmes and stored by the ROG coordinator as printed documents, CDs, whereas the e-format is stored at ESTIS server. This should be coupled with building the necessary expertise in data storage and management for the generated GMP data as well as storage of the samples.

Need to institutionalize data management and interpretation (central *vs.* decentralized approach within a region and globally)

Storage of the regional POPs data in a centralised place will be much encouraged. Currently the estis databases are highly encouraged but there is need for the acquisition of the necessary infrastructure such as computers to facilitate processing of the data.

E) Creation of a QA/QC scheme for acceptance of data and interlaboratory comparison studies (note: for WHO mothers' milk study, labs have to "qualify" before allowed to analyze samples)

The existing programmes such as GAPS, RECETOX and WHO have well established QA/QC protocol in place. However, these need to be domesticated among the participating countries as part of capacity building. In this regard, there is need for human and technical capacity building to enable the regional institutions to fully apply the programme methodologies and protocols. This will include participation in parallel sample analyses, inter-laboratory calibration programmes, human capacity development through laboratory trainings, and acquisition of certified reference materials and standards.

Proposal for Regional Monitoring Plan

GRULAC Region

Air Monitoring

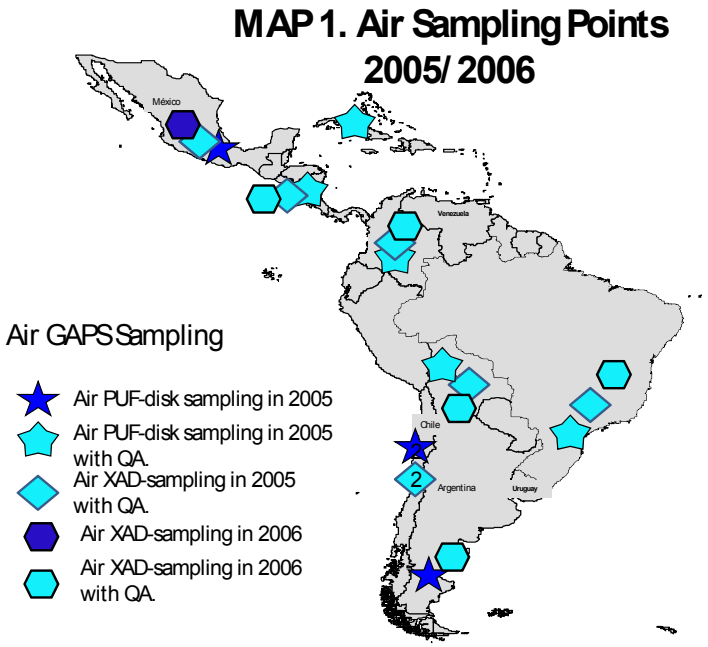
The data available for baseline concentrations in air media comes from the GAPS program (2005-2006); that ran for more than one year and involved 8 of the 33 countries from the GRULAC region namely: Mexico, Cuba, Costa Rica, Colombia, Bolivia, Brazil, Argentina and Chile.

Monitoring systems employed by GAPS involved the use of PUF and XAD samplers, with different deployment times and temporal resolution. PUFs were more often used in the region; however, XAD were deployed together with PUF in some sites allowing for comparison between the two sampling systems. The analyses were conducted by Environment Canada. The PUF samplers were analyzed for PCBs and some chlorinated pesticides, and XAD for chlorinated pesticides only.

Nine sites were deployed in the 8 countries for the PUF sampling and seven for XAD sampling in 2005, and six for XAD sampling in 2006, see MAP 1. However, only four sites accomplish the criteria of 75% of data completeness and there was no evidence to evaluate the precision and accuracy of the data.

It is envisaged to increase the existing GAPS network, to include more monitoring sites in order to have a proper coverage of the region, assuring the quality of the data.

MAP 1. Countries with Air POPs Monitoring Data Available in the GRULAC region. GAPS sites.



Current monitoring programmes/sites that should be kept:

- Total number of sites in 2005: ***Nine sites in eight (8) countries for PUF Sampling and seven (7) sites for XAD sampling.***
- Sub-region / countries where they exist in 2005:
    - ***Andean Region:***
      Bolivia (1), Colombia (1)
    - ***Caribbean Region:***
      Cuba (1 only PUF Sampling)
    - ***Meso American Region:***
      Costa Rica (1), México (1)
    - ***Southern Cone:***
      Chile (2), Brazil (1), Argentina (1)

- Total number of sites in 2008: ***Six sites in five countries, plus 3 additional sites were deployed in 2 countries by the GMP. TOTAL = 9:***
- Sub-region / countries where they exist in 2008:
    - ***Andean Region:***
      Colombia (1), Ecuador (1)
    - ***Caribbean Region:***
      Cuba (1), Barbados (1)
    - ***Meso American Region:***
      Costa Rica (1)
    - ***Southern Cone:***
      Chile (1), Brazil (3)

New monitoring points that need to be added to improve the current geographic coverage

- Total number of sites: ***Six (6)***
- Sub-region / countries where they should be added
  Argentina (1), Bolivia (1). Chile (1), Perú/Ecuador (1), México (2)

Please, if appropriate, indicate sampling technique used (passive/active);

Passive Sampling using both PUF and XAD samplers in each site and Active sampling will be deployed in 7 of the sites.

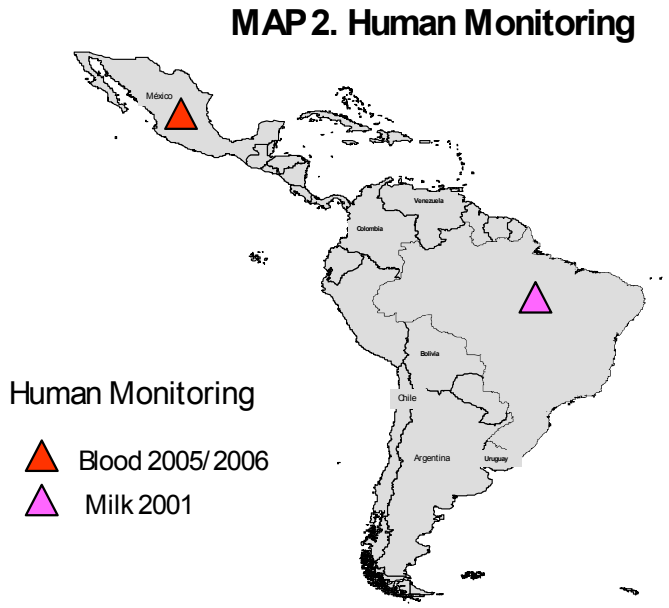
Laboratory

1. ***At the beginning the samplers will be analyzed by the Environment Canada laboratory.***
2. ***Capacity Building for the analysis of samples in the region will be promoted.***
3. ***A Network of Regional Laboratories with QA/QC (availability of SOP, participation in interlaboratory tests, among others) will be established.***

Human Monitoring

Only one program and one study contributing data to this report: the Third Round of the WHO-Human milk survey, a global monitoring program for POPs in human milk, in which samples from Brazil were analyzed for dioxins, furans, PCB and selected pesticides; and a human maternal blood study administrated by the World Bank (2005-2006), provides data for Mexico. No other POPs monitoring programs were identified within the GRULAC region. See MAP 2.

MAP 2. HUMAN POPs MONITORING DATA AVAILABLE IN THE GRULAC REGION.



Current monitoring programmes/points that should be kept (please differentiate between mothers' milk and human blood)

- Total number of points (e.g. pooled samples)
  1 Point Brazil mothers' milk
  1 Point México maternal blood

- Sub-region / countries where they now exist (indicate if more than one monitoring point exists in a country)
  - ***Meso American Region***
    Mexico (1), Blood study
  - ***Southern Cone***
    Brazil (1), Milk

New monitoring points that need to be added to improve the current geographic coverage

- Total number of points to be added
  - ***7 Milk monitoring point***

- ***7 Blood monitoring points***

- Sub-region / countries that need to be added (indicate if more than one monitoring point is needed in a country)
  - ***Andean Region***
    Ecuador (1 Milk)
    Perú (1Blood)
  - ***Caribbean Region***
    Antigua and Barbuda (1 Milk)
    Jamaica (1Blood) (PROPOSED)
  - ***Meso American Region***
    Costa Rica (1Blood and 1 Milk),
    Mexico (1 Milk)
  - ***Southern Cone***
    Argentina (1Blood and 1 Milk)
    Brazil (1Blood),
    Chile (1Blood and 1 Milk)
    Paraguay (1Blood)
    Uruguay (1 Milk)

Suggested frequency of monitoring

Every five years

Sampling and analytical capacity

Sampling

- Sub-region / countries with capacity to maintain existing monitoring programme (for ambient air? for mothers' milk/human blood?)
  - ***None***

- Sub-region / countries which need additional capacity (or resources) to maintain existing monitoring programme
  - Indicate specific needs here (human, technical, financial)
  - ***Brazil and México. Mainly Financial and technical needs***

- Sub-region / countries which need new capacity to establish an on-going monitoring programme
  - Indicate specific needs here (human, technical, financial)
  - ***All Countries (human, technical, financial)***

Analysis

- Existing laboratories within the region having capacity to undertake POPs analysis on an on-going basis (consider both air and human samples; consider both basic POPs and dioxin-like POPs)

- ***Argentina, Brazil, Chile, Costa Rica, México, Panamá and Uruguay have capacity to undertake POPs analysis on an ongoing basis. In some cases the capacity has to be enhanced. No capacity for D & F, analysis***.

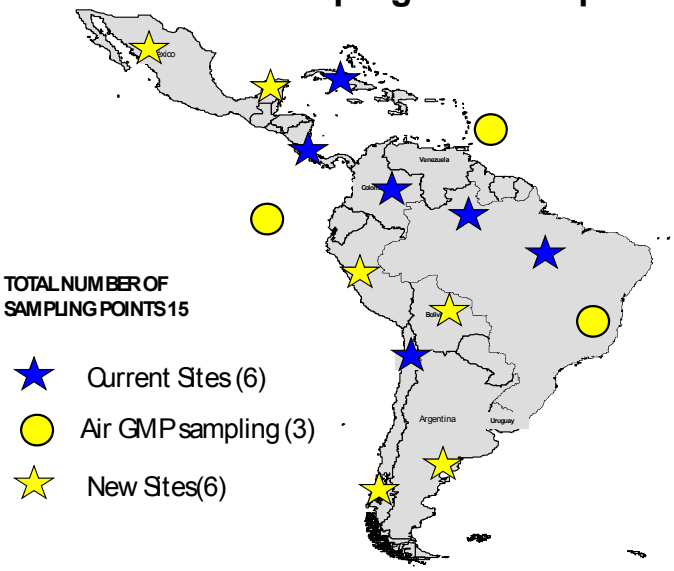
- Existing laboratories that need strengthened capacity to undertake POPs analysis on an on-going basis (consider both air and human samples; consider both basic POPs and dioxin-like POPs)
  - ***Argentina, Brasil, Chile, México, Panamá and Uruguay.***
  - Indicate specific needs here
    - ***Additional analytical equipment (GC-MS, GC- HRMS), to sample and analyse for all SC POPs in GMP matrices.***
    - ***Improving of detection limits***
    - ***Replacement of obsolete equipment***
    - ***Reference materials and analytical standards***
    - ***Laboratory consumables***
    - ***Training in sampling, analysis, study design and implementation of standard operation procedures to ensure QA/QC.***
    - ***Data validation***
    - ***Inter-laboratory comparison/calibration exercises between analytical laboratories.***

- Additional laboratories that will need capacity to undertake POPs analysis to ensure an on-going programme (consider both air and human samples)
  At least one laboratory of excellence in each sub-region, for example: the Caribbean region (possibly the Caribbean Environment Health Institute Laboratory (CEHI), St. Lucia); upgrading of laboratory capacity at the Department of Analytical Services, Antigua and Barbuda for the analysis of at least the pesticides POPs in the first instance. In Brazil we have the Fiocruz foundation, CETESB and many institutions as well as in Mexico CENICA and other laboratories, with large experience and analytical capabilities, and in Argentina some University laboratories (Biogeochemistry Laboratory University of La Plata) as well as in Chile (EULA Center University of Concepción, National Health Institute, Technical University Federico Santa Maria), all of them could be easily upgradedand trained in the sampling and analysis of some of the core matrices
  - Indicate specific needs here
    - ***Upgrading of laboratory infrastructure***
    - ***Analytical equipment, validation of analytical methods***
    - ***Funds for spare parts, laboratory consumables, reference materials and analytical standards***
    - ***Training in sampling techniques, sample preparation and analytical procedures and in improving system.***
    - ***Training in repair and maintenance of laboratory equipment, and in the operation of specialized instrumentation e.g. GCMS.***
    - ***Inter-laboratory comparison/calibration exercises between analytical laboratories to allow for improved QA/QC***
    - ***Strengthening laboratory networking***
    - ***Building capacity to analyse all POPs***

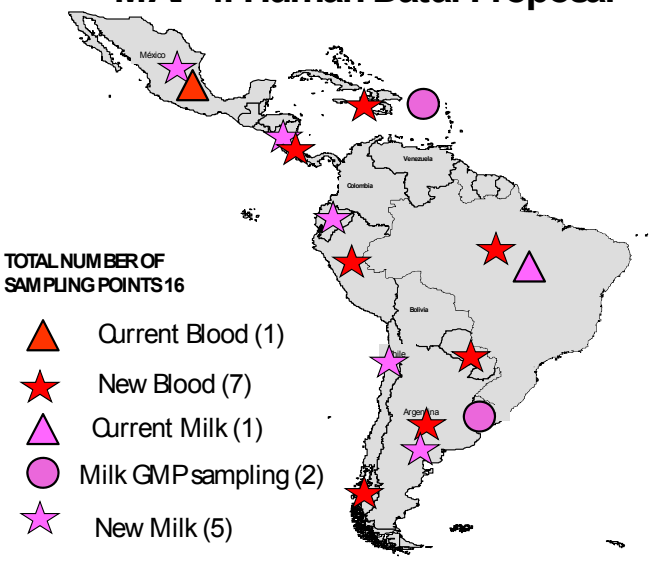
Create two maps for the region, one for air sampling points and the other for human data, showing:

- Sampling points from on-going existing monitoring programmes that need to be maintained (suggested symbol, red square)
- Sampling points from project activities (e.g. those initiated through the GMP) that need to be made part of an on-going programme (suggested symbol, green dot)
- New sampling points that need to be added and made part of an on-going programme (suggested symbol, blue triangle)

MAP 3. Air Sampling Points. Proposal



MAP 4. Human Data. Proposal



Data storage / interpretation and QA/QC

- Existing centers and expertise
    - ***No data storage center at regional level, each research center store and manage its data. The Region needs:***
        - ***Data management protocols with criteria for data quality assurance, e.g. completeness, precision, accuracy, incorporation of duplicates, etc. In order to allow the comparability and compatibility of the data.***
        - ***National commitment to assure the quality of the data***
        - ***Capacity building, establishing compromise with people who was trained***
        - ***Training and capacity building for the interpretation and report of the monitoring data and for modeling, e.g. Long Range Transport.***
- Need to institutionalize data management and interpretation (central *vs.* decentralized approach within a region and globally)
    - ***Yes at Regional and sub-regional level***
- Creation of a QA/QC scheme for acceptance of data and interlaboratory comparison studies (note: for WHO mothers' milk study, labs have to "qualify" before allowed to analyze samples)
    - ***Yes at Regional level. The Region needs:***
    - ***Personnel with high technical level to handle the samplers, to perform the analysis, to strengthen the chromatography technical training, GC/MS, among others,***
    - ***To participate in comparative exercises,***
    - ***To strengthen or implement continuous improvement programs, with precision improvements and the optimization of methods.***
    - To create sample storage in specimen banks
    - ***To create a QA/QC program based on:***
        - ***Standard Operating Procedures to prepare samplers, analysis,***
        - ***Reference or standard materials (LRMs and CRMs)***
        - ***Inter-laboratory comparisons***
        - ***Inter-calibration rounds***
        - ***Training rounds***

MAP 5. Countries with Nominated Laboratories in the GRULAC Region

- **Priority capacity enhancement activities to achieve cost effective implementation of the proposal:**

1. Human capacity strengthening
    a. Data management (analysis, interpretation and communication).
    b. Sampling techniques, sample preparation and analytical procedures Training in a high-level laboratory (PCDD/F)
    c. Validation of analytical methods
2. Improving QA/QC
    a. Protocols
    b. Participation in inter-laboratory tests
    c. Availability of reference materials
3. Laboratory consumables
4. Acquisition of analytical equipment
    a. Improving of detection limits
    b. Improving of instrumentation to sample and analyse additional POPs in GMP matrices (human milk and ambient air)
    c. Replacement of obsolete equipment

Table with an Overview and Summary of the Proposal:

Countries	Monitoring Proposal			Sampling needs			Analytical capacity no D/F*		
	Air	Blood	Milk	Air	Blood	Milk	Air	Blood	Milk
Antigua y Barbuda			1			√			
Argentina	1	1	1	Samplers/Equipment	√	√	√	√	√
Barbados	1			Samplers/Equipment					
Brazil	3	1	1	Samplers /Equipment	√	√	√ Nom. Lab	√ Nom. Lab	√ Nom. Lab
Bolivia	1			Samplers/Equipment					
Chile	2	1	1	Samplers/Equipment	√	√	√	√	√
Colombia	1			Samplers/Equipment					
Costa Rica	1	1	1	Samplers/Equipment	√	√	√		
Cuba	1			Samplers/Equipment					
Ecuador	1		1		Training	Training			
Jamaica		1			Training				
Perú	1	1		Sampplers/training	Training				
México	2	1	1	Samplers	√	Training	√ Nom. Lab	√ Nom. Lab	
Panamá							√ Nom. Lab		
Paraguay		1			√				
Uruguay			1			√	√ Nom. Lab		
TOTAL	15	8	8						

*Analytical capacity no D/F: Needs Quality assurance, inter-laboratory comparisons, technical assistance, FOR ALL LABS. Need financial assistance FOR SOME OF THEM.

Proposal for Regional Monitoring Plan - WEOG

Air Monitoring

Current major ongoing monitoring programmes in the region that measure levels of most POPs in air include AMAP, EMEP, GAPS, IADN and MONARPOP. There are also ongoing national programmes, such as XVPCA, NDAMN and TOMPs, which measure levels of most POPs in air. These provide useful data that can be used to inform the effectiveness evaluation. In addition, many countries have conducted snapshot one off sampling projects that provided useful information. In this latter case, the capacity to repeat or continue such projects would be valuable.

Sub-regions where coverage is considerably weaker include Australia, New Zealand and the Mediterranean, and Antarctica. In the Mediterranean, enhancing institutional coordination and co-operation on POPs monitoring is required. In Australia and New Zealand, establishment of the necessary infrastructure for coordinated and regular monitoring, including setting up air monitoring sites and training personnel is required.

Both passive and/or active sampling techniques are used in the ongoing programmes. High volume active sampling is particularly useful for identifying transport episodes and indicating source regions.

Human Monitoring

Current ongoing monitoring programmes in the region that sample POPs in human milk and blood include the WHO and AMAP. There are also ongoing national programmes, such as in the USA, Sweden and Germany, which measure levels of chemicals in human media. These provide useful data that can be used to inform the effectiveness evaluation. In addition, some countries have conducted snapshot one off sampling projects that provided useful information. In this latter case, the capacity to repeat or continue such projects would be valuable, particularly in areas such as Australia, New Zealand and the Mediterranean.

Overall, valuable additional insight would be gained from the establishment of national or regional programmes that aim to obtain samples that are representative of populations, for example taking into account dietary, social, economic, age, sex and ethnic differences and which can provide a more robust dataset.

Existing programmes already have established monitoring periods but for new programmes it is recommended that sampling is conducted at least once every 5 years.

Sampling and analytical capacity

Sampling

- Many countries in the region participate in existing monitoring programmes. Australia is developing an appropriate programme.

Analysis

- Existing laboratories within the region have capacity to undertake POPs analysis on an on-going basis

- Refer regional report

Data storage / interpretation and QA/QC

- Many countries in the region participate in existing monitoring programmes that have established data storage facilities and appropriate QA/QC procedures. Australia is developing an appropriate programme.