The Global Monitoring Plan and the Effectiveness Evaluation of the United Nations Environment Programme (UNEP)/Stockholm Convention on Persistent Organic Pollutants (POPs)

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Abstract

The United Nations Environment Programme (UNEP)/Stockholm Convention on POPs (SC) entered into force in 2004 and has to date 164 parties. It establishes under Article 16 a process to evaluate its effectiveness. At the fourth Conference of the Parties (COP4) in May 2009, this process has produced 5 regional reports summarizing available information on levels and trends of POPs in air and human media (serum and milk) for all regions of the world. In addition the reports, identify information gaps and provide recommendations for future actions. At the COP4 meeting in Geneva, several decisions were adopted, concerning new substances to be added [including polybrominated diphenyl ethers (PBDEs) and perfluorinated compounds (PFCs)]; synergies with the Basel and Rotterdaam Conventions; further implementation of the Global Monitoring Plan (GMP); and the development of tools and methods to evaluate the effectiveness of the measures undertaken. This paper describes briefly the process of effectiveness evaluation of the Stockholm Convention and identifies the available information resulting from it.

Introduction

When it entered into force, the Stockholm Convention[1] called for international action on 12 POPs grouped into three categories: 1) pesticides: aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex and toxaphene; 2) industrial chemicals: hexachlorobenzene (HCB) and polychlorinated biphenyls (PCBs); and 3) unintentionally produced POPs: dioxins and furans.

Governments are to promote best available techniques (BAT) and best environmental practices (BEP) for replacing existing POPs while preventing the development of new POPs. Provision was also made for a procedure to identify additional POPs and the criteria to be considered in doing so.

Key elements of the treaty include: the requirement that developed countries provide new and additional financial resources; measures to eliminate production and use of intentionally produced POPs; measures to eliminate unintentionally produced POPs, where feasible; measures to manage and dispose of POPs wastes in an environmentally sound manner; and substitution involving the use of safer chemicals and processes to prevent release of unintentionally produced POPs. Precaution is exercised throughout the Stockholm Convention, with specific references in the preamble, the objective and the provisions for identifying new POPs.

The Convention can list chemicals in three annexes: Annex A contains chemicals to be eliminated; Annex B contains chemicals to be restricted; and Annex C calls for the minimization of unintentional releases of listed chemicals.

The SC includes in Article 16 provisions to evaluate the effectiveness of the measures undertaken including the gathering of comparable monitoring data on the presence of the listed chemicals and on their regional and global environmental transport. To put this into effect, the COP established the GMP. Work was initiated after 2004 and the first Effectiveness Evaluation (EE) has been completed in 2009. In this article, the outcome of the first Effectiveness Evaluation Report and the COP4 meeting in Geneva will be summarized. Their implications on national and international monitoring activities will be discussed.

The Conference of the Parties (COP) has met 4 times in May over the last 5 years (Punta del Este, Uruguay in 2005; Geneva, Switzerland in 2006; Dakar, Senegal in 2007; and in Geneva in 2009) conveening delegations of all signatory parties, observer parties and other observers [International Inter-Governmental Organizations

(IGO), Non-governmental Organizations (NGO)]. The COP meetings are prepared with very substantial technical documents distributed in the 6 United Nations languages several months in advance. The COP meetings agree on decisions that steer the course of action in the Convention. Documents prepared for the successive COP meetings represent a publicly available and very valuable repository of information on the subtances, and the ways to diminish their presence in the environment and people.

Several lines of work were identified in 2007 at COP3, including new substances, synergies, finacial mechanisms and EE. The work was carried out in preparation for the next COP by experts from the parties with the assistance of the Secretariat following the guidance given in the previous meetings.

The SC in COP1 established a technical group to study and decide on the information provided by parties about substances that should be listed beyond the initial 12. The Persistent Organic Pollutants Review Committee (POPRC) had several meetings since COP3 and produced detailed reports concluding that a number of new substances fulfilled the criteria established in the Convention and should be listed under Annex A , B or C.

Two points have been clear since the early days of the SC. Firstly, obligations entail costs and these need to be considered in the framework of financial mechanisms and capacity enhancing efforts. Secondly, synergies with existing instruments, such as the Basel, Rotterdam and LRTAP Conventions, should be maximized.

Concerning the Basel and Rotterdam Conventions, a Joint Working Group on Enhancing Cooperation and Coordination among the Basel, Rotterdam and Stockholm Conventions was established at COP3 and has made recomendations that were adopted at COP4.

The synnergies between LRTAP and the SC are central for both processes and can be improved in particular concerning the screening of new substances [SC's POPRC /LRTAP's Task Force on Persistent Organic Pollutants (TFPOPs)] and the modelling and assessment of transport and fate [SC's GMP /LRTAP's Task Force on Hemispheric Transport of Air Pollution (TFHTAP)] (see below, paragraph 36 of the Annex in document COP.4/31 "Report by the co-chairs of the coordination group on the global monitoring plan").

One component in which the SC is a precedent and commendable innovation is in Article 16 on EE. EE is based on three components: a) information provided by the GMP on baseline levels and trends in core media (air, humans) and other regional media; b) the compilation by the Secretariat of information submitted by parties under their obligations (Article 15) concerning stockpiles, uses under specific exemptions, unintentional emissions etc; and c) the results of the compliance mechanisms that is still under development in the SC.

In the remainder of this short paper, we will attempt, not to summarize, an impossible task in a few pages, but rather to help the readers find the available documents concerning the GMP and the EE and understand their relation and relevance.

Materials and Methods

The information in this article is intended to help the readers find and make use of the valuable information compiled in COP4 for the first EE of the SC (document references according to the UNEP SC COP documentation system are given in brackets):[2-6]

1. Effectiveness Evaluation (UNEP/POPS/COP.4/30):
http://chm.pops.int/Portals/0/Repository/COP4/UNEP-POPS-COP.4-30.English.PDF

In this document, the secretariat has compiled the limited information available for EE based on the reports from the parties under Article 15 and the main conclusions from the GMP.

2. GMP for Effectiveness Evaluation (UNEP/POPS/COP.4/31):

http://chm.pops.int/Portals/0/Repository/COP4/UNEP-POPS-COP.4-31.English.PDF

COP3 decided to implement the GMP and as this document describes:

"In response to this request, the Secretariat facilitated the establishment and operation of regional organization groups through inception and drafting workshops held in four of the five regions: Nairobi, Kenya (29–31 October 2007), Lomé, Togo (25–27 February 2008) and Nairobi (14–16 July 2008) for the African region; Beijing, China (17–19 September 2007) and Doha, Qatar (16–18 June 2008) for the Asia and Pacific region; Prague, Czech Republic (15–17 October 2007) and Brno, Czech Republic (17–20 April 2008) for the Central and Eastern Europe region; and Mexico City, Mexico (14–16 January 2008) and Guadalupe, Costa Rica (25–28 August 2008) for the Latin American and Caribbean region. The Western European and other States group had corresponded through teleconferences. A workshop to facilitate and harmonize drafting of the regional monitoring reports was held from 19 to 23 May 2008 in Geneva."

Strategic partnership arrangements have been established to overcome the limitations in the capacity to collect monitoring data on POPs in the core media, for air in particular, with support from existing programmes in other countries or regions and the Secretariat. A human milk survey was implemented throughout the regions in collaboration with the World Health Organization and with the support of the Secretariat. Not all of these data were available during the time of preparation of the Global Monitoring Report.

Regional monitoring reports have been produced by the regional organization groups and are provided in document UNEP/POPS/COP.4/INF/19 (item 4 below).

3. Global Monitoring Report under the Global Monitoring Plan for Effectiveness Evaluation (UNEP/POPS/COP.4/33):
http://chm.pops.int/Portals/0/Repository/COP4/UNEP-POPS-COP.4-33.English.PDF

The Global Monitoring Report is made available as document UNEP/POPS/COP.4/33, while the report of the meeting is set out in document UNEP/POPS/COP.4/INF/20. The report of the co-chairs of the Coordination Group may be found in the Annex of UNEP/POP/COP.4/31 (Item 2 above). These reports contain recommendations regarding the continued implementation of the GMP.

These three documents are also available in Arabic, Chinese, French, Spanish and Russian.

Other documents presented to COP4 in English only are:

4. The five [Africa, Asia Pacific, Central and Eastern Europe (CEE), Latin American and Caribbean Group (GRULAC), Western European and Others Group (WEOG)] Regional Monitoring Reports under the GMP for EE (UNEP/POPS/COP.4/INF/19):
http://chm.pops.int/Portals/0/Repository/COP4/UNEP-POPS-COP.4-INF-19.English.PDF

These documents are also available on CD-ROM from the Secretariat upon request and at the Stockholm Convention website at:
http://chm.pops.int/Programmes/GlobalMonitoringPlan/MonitoringReports/tabid/525/Default.aspx

5. Report of the meeting of the Coordinating Group for the GMP for POPs (UNEP/POPS/COP.4/INF/20):
http://chm.pops.int/Portals/0/Repository/COP4/UNEP-POPS-COP.4-INF-20.English.PDF

6. Status report on the human milk survey conducted jointly by the Secretariat of the Stockholm Convention and the World Health Organization (UNEP/POPS/COP.4/INF/31):
http://chm.pops.int/Portals/0/Repository/COP4/UNEP-POPS-COP.4-INF-31.English.PDF

Results and Discussion

Summary of the COP4 Meeting in Geneva in May 2009

Concerning EE, COP4 agreed that the first evaluation had been completed with severe limitations due to the lack of reporting. The GMP and the Regional Organization Groups (ROG) had provided in time the best available information concerning POPs in air, human milk and serum for all regions.

Major conclusions include: (1) the disparity in coverage for different regions of the world, (2) the large decrease since the late 1980s for "legacy POPs" in most regions, but small changes since then, (3) the need to maintain long term monitoring efforts, and (4) the importance of considering long range transport and its climatic and meterological variability to interpret trend data.

COP4 decided to include the following substances and established mechanisms to provide technical and financial support to parties to eliminate their use and decrease emissions:

α- and β-hexachlorocyclohexane (HCH); lindane (γ-HCH); hexabromobiphenyl (HBB); chlordecone; pentachlorobenzene (PeCB); perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride [perfluorinated compounds (PFCs)]; penta- and octa-PBDE mixtures.

This has implications for the further development and implementation of the GMP and will result also in a revision of the National Implementation Plans and their participation in the GMP.

COP4 decided to continue with the implementation of the GMP including the newly listed substances, and to establish an ad hoc working group that will prepare a report for COP5 on possible procedures for the EE, including indicators, data requirements and arrangements to update the baseline and to prepare for future EEs.

Workplan

The next Global Monitoring Report is due in 6 years (2015). The baselines for the new POPs need to be updated and available data need to be compiled for the new report. This work can start from the gaps and capacity enhancing needs identified in the First Global Monitoring Report (COP4/INF20).

The ad hoc working group will report to COP5 in Buenos Aires in 2011 with a review and suggestions for improvements in reporting under Article 15 (Country reports). It will also propose indicators of process and outcomes for the next EE in 2015.

The process of EE initiated in 2004 under Article 16 of the SC has established the foundation of a long term GMP for POPs and produced a Global Monitoring Report in 2009 compiling the best available information on baseline levels and trends for POPs in air and human bodies (serum and milk).

Implications to Regional Monitoring Programmes and the Analysis of Long-Range Transport of Pollutants

There is a lack of long term stable monitoring of environmental fate on the new POPs and other possible new and emerging chemicals. For future EEs and the review of new substances in the Convention, modelling and monitoring efforts are required in order to assess the long-range transport capability of these compounds, especially to remote environments such as the Arctic. Such assessments would assist in the identification of trends , transport and fate of chemicals for furture toxicological studies.

Atmospheric Monitoring

With the inclusion of the above mentioned new chemicals in the Convention as decided upon at COP4, regional atmospheric monitoring programs not only face challenges of including these new POPs on their target chemical

list, but also the consideration of including alternative chemicals which may have POP-like properties for future new substances review purposes. As PBDEs and PFCs are withdrawn from the market, a large number of alternative chemicals [e.g. new flame retardants (FRs)] will fill this need. Some of these new chemicals have POP-like properties but are more polar and/or have higher tendencies to bind to particles than the legacy POPs. Therefore, it is necessary to adapt current sampling methods to capture these priority compounds. For instance, current passive and active air monitoring programs that uses polyurethane foam plugs (PUFs) as a vapour-phase sampling medium will have to adapt with the inclusion of XAD resins to capture more polar chemicals such as PFCs. Also, high volume air sampling is required to distinguish between particle-bound versus gas-phase pollutants, which is important for understanding the fate of particle-bound PBDEs and other FRs.

Human Media Monitoring

According to COP4./33 para 108. "Human media: The review demonstrated that levels of the Stockholm Convention persistent organic pollutants in human media are heavily influenced by social, cultural and ethnic factors that determine patterns of dietary exposure and by age. Sampling strategies for new activities that focus on being able to examine data from the same age group of people of the same sex and in the same area will therefore offer the best prospects for being able to detect changes in levels of persistent organic pollutants over time periods appropriate for the effectiveness evaluation of the Convention."

Monitoring in Other Environmental Media – e.g. Seawater

It is predicted that the dominant transport pathway for perfluorinated carboxylic acids (PFCAs) and precursors is via seawater (slow ocean transport). Although seawater is not a core medium for monitoring under SC, in order to understand the global transport of these substances, the marine component is important; as a transport pathway and to understand atmospheric measurements.

Minimum Requirement for Monitoring

The coordination group agreed (COP.4/31 para24) that the minimum requirement for monitoring for the purpose of the effectiveness evaluation was ideally 10–15 sampling sites for air quality monitoring and around eight sites for human sampling, per United Nations region. Initially, and for regions where there were no existing programmes, this minimum requirement might be only the few sampling points that had reported baseline data for POPs for the first evaluation. Regions should ensure that at least these efforts are sustainable and capable of producing data for the purpose of investigating temporal trends in subsequent evaluations.

Study on Global Fate and Long-range Transport

The following exerpts from the "Report by the co-chairs of the coordination group on the global monitoring plan" (Annex in COP.4/31) address the need for global fate and long-range transport studies:

Paragraph 30:

The absence of data on long-range transport would hinder efforts at a comprehensive effectiveness evaluation of the Convention. Modelling exercises of long-range transport have already been undertaken in some regions and that information could be used in examining trends. Given that long-range transport spanned all regions, a plan or process to develop a coordinated cross-regional approach to assess long-range transport is needed. Future evaluations of changes in POPs levels over time should include information on regional and global environmental transport and a coordinated cross-regional approach to analysis and assessment of data to meet that objective should be established.

Paragraph 36:

Some of the physical and chemical properties of POPs are temperature-dependent and levels of POPs may be

influenced by year-to-year variability in climate and meteorology. This variability may also affect long-range transport pathways and the transport of POPs to air sampling sites and hence influence the observed trends (see also paragraph 30). Improved understanding of these influences is essential to ensure that data are interpreted correctly. The Conference of the Parties should ensure that this factor is adequately addressed in future evaluations. The coordination group suggested that collaboration with the Task Force on Hemispheric Transport of Air Pollution of the United Nations Economic Commission for Europe Convention on Long-range Transboundary Air Pollution or any other body studying the transport of POPs could be a way to achieve that and assist in the proper assessment of trends.

References

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